Stabilize, Inc.
1414 Redwood Drive
Chatham, IL 62629
217.525.6653
Fax 888.440.6658
Email: Rmmcde@aol.com

July 14, 2009

Mr. Allan Keller, PE
Manager Permit Section
Bureau of Water Pollution Control
Illinois Environmental Protection Agency
1021 N. Grand Avenue East
Springfield, IL 62794

Re. City Water, Light, and Power - 35 IAC 620 Ash Pond Assessment

Dear Mr. Keller:

In accordance with your letter dated May 15, 2009, received May 20, 2009 by our client, City Water Light and Power, we have prepared an overview of an assessment of the ash ponds' hydrogeology, regional setting and other pertinent characteristics related to the ash ponds' compliance with the 35 Illinois Administrative Code (IAC) 620 groundwater standards.

This submittal was prepared based upon conversation with your staff member, Darrin LeCrone. He was very helpful describing what the Agency was striving to ascertain for ash ponds in Illinois and their potential impact on the groundwater adjacent to these ponds across the state.

If you have any questions about the submittal, please do not hesitate to contact me at (217) 525-6653. Thank you for your cooperation in advance.

Sincerely,

R Michael McDermont

R. Michael McDermont, PE, CMRS
President

RMM/cf

enclosure

Ash Pond Assessment

In accordance with the Illinois Environmental Protection Agency's (IEPA) request for additional information demonstrating compliance with 35 Illinois Administrative Code (IAC) 620, City Water, Light and Power (CWLP) is providing this outline of proposed assessment activities for their ash ponds. CWLP operates a series of ash and lime sludge clarification or settling ponds east of the power plant complex in Springfield, Illinois. The utility is owned and operated by the City of Springfield. The ponds are operated under a National Pollutant Discharge Elimination System (NPDES) Permit Number IL0024767. The ash ponds are located north of East Lake Shore Drive, just east of Interstate 55. The site is bordered on the south by Lake Springfield, on the west and north by Sugar Creek and on the east by an operating landfill. The setting is depicted on Figure 1.

Beyond the areas depicted on Figure 1, to the west is Interstate 55 and at a greater distance is Dirksen Parkway that parallels the interstate. Commercial property is abundant on both sides of this street and these businesses rely on potable water delivered by CWLP. There are no known wells in this area. The lake is south of the ponds along with the impoundment dam. A flood plain and clay soil borrow area for the landfill is located in the area north of the ash ponds. There is City property located directly east of the ponds that includes a flood plain along with the landfill area. Residences are located further east in several subdivisions. There residences are typically served by potable water from CWLP, as the subdivisions were built in the 1970's, 1980's and 1990's.

The impoundment ponds include the Dallman Ash Pond placed in service in approximately 1976. This pond is approximately 36 acres. The Lakeside Ash Pond was placed into service prior to 1958. The Lakeside Ash Pond has been divided into three separate ponds with the East Lime Pond being 7.3 acres in size, the west lime Pond 4.2 acres and the remaining Lakeside Ash Pond consisting of 32.3 acres. Both ash ponds receive bottom and fly ash from the coal fired boilers, by wet sluicing the ash with raw lake water.

The lime ponds receive the sludge, typically composed of lime, flocculants and lake water solids from the water treatment plant clarifiers. These ponds are typically operated one at a time. The clarified supernatant from these ponds flows into the Lakeside Ash Pond. The settled water from both the Dallman Ash Pond and Lakeside Ash Pond flow into opposite sides of the center Clarification Pond before being discharged through permitted NPDES Outfalls 004 or 006. The clarification pond consists of 10 acres. The maximum water flow through the pond system is approximately 7.5 MGD.

The adjacent landfill disposes of Flue Gas Desulphurization Sludge from the electric generating facility's sulfur dioxide scrubbers and the landfill is segregated into two regulated units. Unit 1 is a closed landfill regulated by the 35 Illinois Administrative Code (IAC) 807 regulations and comprises approximately 10.5 acres. Unit 2 is north of Unit 1 and consists of 22.3 acres with only 3.5 acres currently being developed to date. This landfill is regulated by the 35 IAC 811 regulations.

Accordingly much is known about the east side of the ash ponds based upon the regulatory required hydrogeological studies that have been done for the landfill. The landfill has approximately 25 monitoring wells and piezometers spread over the approximate 40 acre total area.

The southern area of the ash ponds and dam is bounded by Lake Springfield. The lake was made by constructing an earthen dam across Sugar Creek. Therefore the lake and the dam are upgradient in terms of groundwater flow direction and groundwater quality. Much of the ash ponds and landfill were constructed in the Sugar Creek flood plain. Therefore the dam was constructed of glacial till largely consisting of silty clay to clayey silt ensuring that the reconstructed earthen dam, and pond embankments, exhibit low permeability characteristics. Recompacted silty clay samples from the native soils have exhibited permeability's in the 1×10^{-7} to 1×10^{-9} cm/sec range with relative ease and reproducibility based upon construction of the landfill's liner and final cover systems. The in-place creek sediment's soil permeability's predominantly range from 1×10^{-6} to 1×10^{-8} cm/sec.

CWLP is proposing to complete an assessment submittal that will include all of the known regional data regarding the regional hydrogeologic characteristics of the ash pond area. This will also include the available results of site specific investigation programs for the general area including but not limited to:

A) Structural characteristics and distribution of underlying strata including bedrock;

B) Chemical and physical properties including, but not limited to, lithology, mineralogy, and hydraulic characteristics of underlying strata including those below the uppermost aquifer;

C) Soil characteristics, including soil types, distribution, geochemical and geophysical characteristics;

D) The hydraulic conductivities of the target screen zone and all strata above it;

E) The vertical extent of the uppermost aquifer;

F) The direction and rate of groundwater flow;

G) The known location of adjacent drinking water wells within 2500 ft;

H) Site specific boring logs;

I) Groundwater results of existing monitoring wells and piezometers;

J) Effluent water quality characteristics of the individual ponds;

K) Any available data from the engineering drawings for the individual ash ponds;

L) Any available construction details from the ash pond drawings;

M) Any available construction details from the dam drawings; and

N) Groundwater flow direction and gradient.

Three representative wells located on the permitted landfill, down gradient of the ash ponds, were reviewed as part of preparing this assessment. Well AW - 3 is north of the Dallman Ash Pond, Well G120 is located approximately 20 feet east of the Dallman Ash Pond and well G110 is located down gradient of the Lakeside Ash Pond. The recent groundwater quality data was reviewed and compared to the 35 IAC 620 Groundwater Class 1 standards as required by IEPA as part of the landfill permit. Only one continuous exceedence was noted (G-120) and that was for manganese. It is likely not attributed to the ash ponds as some of the other wells at the landfill, close to the ash ponds, do not exceed the standard.

Based upon the quantity and quality of the information already available through the landfill groundwater monitoring program, CWLP proposes to do a limited hydrogeologic investigation of the ash pond area. The major focus of the investigation will be on the west side of the ash ponds. Four piezometers, constructed of PVC pipe and appropriately sized and slotted screen, will be installed along the west side the ash ponds including the northwest side of the Dallman Ash Pond. The piezometers will be spaced evenly north to south, as access is allowed, over the approximate 2,750 feet west side of the ash ponds. Laterally, the piezometers will be placed approximately halfway between the Sugar Creek and the ash pond toe of slope. The approximate locations of the piezometers are shown on Figure 2.

The piezometers will be drilled at least ten feet below the known invert of the ash ponds by continuously sampling the boring. All of the soil shall be logged and recorded on boring logs. The screen interval on the east is a basal sand unit that exists above the shale. Our target screen zone on the west will also be this same zone if encountered. This will allow the groundwater to be further characterized by one continuous geological strata.

Representative soil samples shall be collected from the borings and submitted to a laboratory to determine the grain size, classification, Atterberg limits and permeability of the soil. Special detail shall be given to the soil strata directly beneath the ash pond inverts. The uppermost aquifer beneath the ash pond invert will be screened with an appropriate length screen and the annular space sealed with hydrated bentonite.

Since the piezometers will be located in a flood plain, ten foot risers with sealed caps will be added to prevent infiltration of surface water into the piezometers from flooding along Sugar Creek.

After development, the piezometers will be surveyed for exact location and elevation of the ground and the stickup used for the elevation reference during sampling. This surveying will enable geological cross sections of the geological strata, combined with the ash pond design features, e.g. pond invert, to be portrayed in cross section form. At a minimum, two east to west cross sections and a north to south one shall be made and submitted to the Agency for review. The north to south section will include available details about the lake's earthen dam.

A set of groundwater samples will be collected from these four new piezometers and the three previously mentioned groundwater wells. Water elevation data will be used to generate water elevation contour maps to show groundwater direction and gradient for the sampling event. Sample handling, preservatives, field filtering, chain of custody forms, etc. will all be done according to conventional approved practices. The entire applicable 35 IAC 620 list will be analyzed for the seven wells and piezometers.

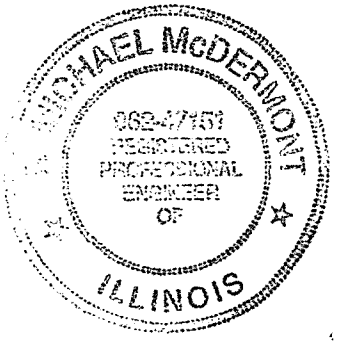
The investigation, field work, sampling and submittal of the data contained discussed herein will be initiated upon acceptance of this assessment plan's by the Agency. The overall time period to perform this work will be less than the 180 days provided in the Agency's letter dated May 15, 2009.

Upon approval of the Agency accepting the results of the assessment submission, the new piezometers will be abandoned by a licensed water well driller. The PVC pipe will be filled with bentonite slurry and the piezometers' pipe removed below grade in accordance with IEPA and Sangamon County Health Department standards.

The ash ponds are located in a non-residential area with few residences. If there is any impact from inadvertent leakage of the ponds to the groundwater, it will be relatively minimal. Any leakage will likely flow into Sugar Creek. Sugar Creek is the same water source that receives the effluent from the ponds after treatment of the solids and pH adjustment. The clayey soils that the ash ponds are located in and constructed with should retard any migrating pollutants that might otherwise be present.

We hereby certify that the information contained herein is true to the best of our understanding based upon our experience with the City Water, Light and Power ash ponds and landfill.

R. Michael McDermont, PE, CMRS
President
Stabilize, Inc.



(Seal)

Expires: 11/30/2009

Illinois Department of
Natural Resources

One Natural Resources Way Springfield, Illinois 62702-1271
http://dnr.state.il.us

Pat Quinn, Governor
Marc Miller, Director

October 26, 2011

Ms. Sue Corcoran
City Water Light and Power
201 East Lake Shore Drive
Springfield, Illinois 62712

RE: Lakeside and Dallman Ash Ponds

Dear Ms. Corcoran:

This letter will present the findings of the Dam Safety Program regarding the hazard classification of the referenced impounding structures and the recommendations of the U.S. EPA's inspection report. The findings are based upon the October 6, 2011 site inspection and documents in our possession related to the structures.

This office has been previously involved in the permitting of modifications of the Lakeside Ash Pond. That structure was constructed against the downstream toe of Spaulding Dam. While Lakeside Ash Pond was not permitted at construction, it is considered an appurtenant structure to Spaulding and modifications have been reviewed and permitted by this office. Based on the information available from the record, as an independent structure Lakeside Ash Pond is classified as a Small Size, Class III dam.

Our office has jurisdiction over all dams in the State of Illinois. The Dallman Ash Pond is a jurisdictional structure; however, our preliminary assessment indicated that it was a Class III dam with a low priority for additional analysis. Both the U.S. EPA inspection report and our inspection of the structure indicate that it is stable and reasonably maintained. Based upon our inspection and assessment of the downstream area, Dallman Ash Pond's provisional classification of Intermediate Size, Class III dam is confirmed. For Class III structures the dam safety regulations require permitting of structures when the dam owner proposes major modifications or at the point when downstream land use changes require a change in the hazard classification.

I have reviewed the requested actions from the U.S. EPA inspection report . Our regulatory requirements and recommendations are listed below.

PRIORITY 1 RECOMMENDATIONS

1. Our assessment of downstream land use indicates that these dams do not require Emergency Action Plans. Since a plan exists for Spaulding Dam, and provision of information to the emergency response community is always beneficial, we recommend that the EAP for Spaulding be made a comprehensive plan for the CWLP complex by the addition of information on the Lakeside and Dallman Ash Ponds.
2. Lakeside and Dallman Ash Ponds have minimal inflows from adjacent areas. Based upon this knowledge, the further assessment of hydrology and hydraulic conditions is unnecessary. The operation plan for each structure should account for the Probable Maximum Precipitation event of 28 inches falling on the impoundment.
3. This Office does not regulate groundwater quality. Recommendations of the Illinois Environmental Protection Agency should be followed.
4. Embankment stability was addressed in the permitting of the modifications to the Lakeside Ash Pond in 1987. This office found that the modified embankment meets the stability requirements for regulated dams. The documented performance of the Dallman Ash Pond since its construction provides evidence that it meets stability requirements. There is no reason to expect unusual foundations conditions which would bring the stability into question based on the knowledge developed for analysis of the Lakeside Ash Pond and Spaulding Dam. This office does not believe that additional analysis will provide significant knowledge regarding the stability of the embankment.
5. The inspection found the condition of the vegetation on the embankments to be acceptable. Further discussion of the maintenance activities indicates that CWLP understands the need for and process of maintenance of the vegetative cover, including control of woody vegetation. We believe the embankments are properly monitored by CWLP staff.

PRIORITY 2 RECOMMENDATIONS

1. My discussions with your staff during the inspection indicates that the need to repair erosion is fully understood and that there are standard procedures in place to complete this work by methods that are intended to preserve the integrity of the structures. These procedures should be made part of the Operation and Maintenance Plan document if not currently included.
2. Documentation of maintenance activities is recommended for all engineered structures. The process of documentation should be made part of the Operation and Maintenance Plan.
3. We concur with the recommendation to the extent that standard maintenance and inspection procedures should be contained in a written document and be available to appropriate staff. The recommendation that the Operation and Maintenance Manual include the EAP is contrary to our regulatory requirements.

With regard to both sets of recommendations, we see nothing provided as a basis for the proposed 'complete by' dates. For those items where an activity is recommended by this office, it should be initiated as soon as possible, but completion by a specific date will not significantly improve the safety of the structure.

We appreciated the opportunity to inspect the Ash Ponds and the assistance of the CWLP staff during the discussions of the issues and the inspection. If you have any questions regarding this letter or the Illinois Dam Safety Program, please contact me.

Sincerely,

Paul Mauer, Jr., P.E.
Senior Dam Safety Engineer

PM:crw

Sue
Christine

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

PAT QUINN, GOVERNOR JOHN J. KIM, INTERIM DIRECTOR

December 29, 2011

Ms. Sue Corcoran
Environmental Health & Safety
City Water, Light, and Power
East Lake Shore Drive
Springfield, Illinois 62712

Re: City, Water, Light, and Power - Power Plant Ash Impoundment - Groundwater Monitoring Program Response - NPDES Permit No. IL0024767

Dear Ms. Corcoran:

This letter is a follow-up to the November 18, 2011 letter from City, Water, Light, and Power (CWLP) concerning the Groundwater Monitoring Program (Program) for the power plant ash impoundment site.

The Illinois EPA has reviewed the information provided and determined that the Program is approvable with the following revision. The monitoring wells must be sampled for Class I groundwater chemical parameters listed in 35 IAC 620.410(a) and (d). Once adequate data has been collected to provide a statistically valid representation of groundwater quality, CWLP may request that analytes, which have been consistently below detectable levels, be dropped from the monitoring program.

Thank you for your attention to these matters. If you have any questions concerning this letter, please contact Carl Kamp of the Hydrogeology and Compliance Unit at 217-785-4787.

Sincerely,

Alan Keller

Alan Keller P.E.
Manager, Permit Section
Division of Water Pollution Control

cc:

Rick Cobb
Bill Buscher
Carl Kamp
Shu-Mei Tsai
BOW Records
Sangamon County GW General File

4302 N. Main St., Rockford, IL 61103 (815)987-7760
595 S. State, Elgin, IL 60123 (847)608-3131
2125 S. First St., Champaign, IL 61820 (217)278-5800
2009 Mall St., Collinsville, IL 62234 (618)346-5120
9511 Harrison St., Des Plaines, IL 60016 (847)294-4000
5407 N. University St., Arbor 113, Peoria, IL 61614 (309)693-5462
2309 W. Main St., Suite 116, Marion, IL 62959 (618)993-7200
100 W. Randolph, Suite 11-300, Chicago, IL 60601 (312)814-6026

City Water, Light & Power
Ash Impoundments
Springfield, Sangamon County, Illinois

Structural Stability Assessment for Coal Combustion Residuals Surface Impoundments

October 2016

Prepared for:
City Water, Light & Power
3100 Stevenson Drive
Springfield, Illinois 62703

Prepared by:

ANDREWS
ENGINEERING INC
3300 Ginger Creek Drive
Springfield, IL 62711
Tel: (217) 787-2334; Fax: (217) 787-9495

TABLE OF CONTENTS

1. INTRODUCTION

City Water, Light and Power (CWLP) Lakeside Ash Pond and Dallman Ash Pond are coal combustion residuals (CCR) surface impoundments. An assessment of the structural stability for the CCR surface impoundments was conducted as required by 40 CFR Part 257.73:

257.73(d) *Periodic structural stability assessments. (1) The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with:*

257.73(f) *(1) Initial assessments. Except as provided by paragraph (f)(2) of this section, the owner or operator of the CCR unit must complete the initial assessments required by paragraphs (a)(2), (d), and (e) of this section no later than October 17, 2016. The owner or operator has completed an initial assessment when the owner or operator has placed the assessment required by paragraphs (a)(2), (d), and (e) of this section in the facility's operating record as required by § 257.105(f)(5), (10), and (12).*

Analysis performed herein for the Initial Structural Stability Assessment of the existing ash ponds at Springfield City Water, Light and Power, Lakeside and Dallman Ash Ponds, Springfield, Illinois, as required per 40 CFR 257.73(d). Information reviewed for this report includes the following documents:

- Coal Ash Impoundment Site Assessment Final Report (May 2011)
- Historical Aerial Photographs (April 1995 – March 2014)
- Engineering Report: Proposed Embankment Modification; CWLP Ash Disposal Area (July 1987).
- Construction Grading Plan for the Dallman Ash Pond (August 1976)

2. CCR UNIT INFORMATION

Both the Lakeside Ash Pond and the Dallman Ash Pond are owned and operated by CWLP. The ponds are operated under National Pollutant Discharge Elimination System (NPDES) Permit Number IL0024767.

The Lakeside Ash Pond is primarily a diked embankment with some incising along the east perimeter and was placed into service prior to 1958. The original Lakeside Ash Pond was been divided into four separate ponds since it was expanded vertically in 1988: three lime softening ponds and the settling pond. The current Lakeside Ash Pond is approximately 27.6 acres and ceased receiving ash in 2009.

The eastern portion of the original Lakeside Ash Pond is incised. The entire ash pond abuts the Lake Springfield dam to the south. The original portion of the ash pond abuts the Unit 1 landfill and the clarification pond to the north. The only portions of the Lakeside Ash Pond with open downstream slopes are the west dike of the original ash pond, and the vertical expansion berms, which were constructed on the east, west and south boundaries of the ash pond.

The second impoundment, the Dallman Ash Pond, which is a diked embankment, was placed into service in approximately 1976 and is approximately 34.5 acres. Fly ash and bottom ash are sluiced to the Dallman Ash Pond with raw lake water.

The entire Dallman Ash Pond is partially incised. Material from the center of the ash pond was excavated and utilized in the construction of the dikes. The Dallman Ash Pond abuts the CWLP landfills to the east and the clarification pond to the south. The only open downstream slopes of the Dallman Ash Pond are on the west and south dikes.

Settled water from both the Dallman Ash Pond and Lakeside Ash Pond flow into opposite sides of a Clarification Pond before being discharged to Sugar Creek at Outfall 004 pursuant to the aforementioned NPDES permit.

3. FOUNDATION

The Sugar Creek historically meandered across the site, generally from the west to east with an overall flow direction to the north. During the construction of the ash ponds, the creek was abandoned and relocated to the west of the site. The old creek bed was filled with different types of soil, ranging from cohesive soils characterized as silty clays, to granular fill characterized as poorly graded silty to clayey sands. Prior to the area development, the upper layer of soil at the site consisted of mainly brown, light brown, and brownish-gray silty clays and clayey silts having soft to stiff consistency. This includes all eolian soils (loess) deposited near the surface, isolated pockets and lenses of fine grained silty to clayey sand at some locations and alluvial silts and silty clays.

According to the construction plan drawings for the Dallman Ash Pond, dikes were constructed on areas of the old creek bed. According to notes on these drawings, the creek bed in these areas was over-excavated by at least 4.0 feet below the existing channel banks and bottom. These excavations were then filled in with cohesive material and compacted to at least 90 percent of optimum density as determined under AASHTO-T99 at optimum moisture.

Although design information is limited for the surface impoundments, a stability analysis was performed by Testing Service Corporation (TSC) in 1994 for the design of the adjacent Unit 2 Landfill. The landfill is located in the northeastern half of the site, which is directly adjacent to the east of the Dallman Ash Pond and north of the Lakeside Ash Pond. This analysis included a review of all of the subsurface studies performed at the site (72 borings in total) as well as five additional borings drilled as part of the stability analysis study. Laboratory testing completed on cohesive soil samples from these five borings included analyses on: moisture content, in-place dry density, unconfined compressive strength, and Atterberg limits. In addition, one sample was selected for triaxial shear testing, and another for direct shear testing.

The TSC analysis for Unit 2 included an evaluation of settlement and bearing capacity for the foundation, and mass stability for the various excavated and constructed slopes of the landfill. Both static and seismic conditions for short- and long-term scenarios were evaluated using the geologic data acquired from the aforementioned study. The safety factors resulting from these

analyses exceeded all requirements for new solid waste landfills in Illinois under 35 Ill. Adm. Code 811.304.

The geologic characteristics at the site were determined via subsurface boring programs related to permitting and monitoring of the landfill units as well as the drilling conducted for the monitoring program currently implemented for the ash impoundments. The geologic characteristics were determined to be consistent throughout the site as described in the initial paragraph to this Section. The structural characteristics of the soils also apply to the entire site, which includes the ash ponds.

4. SLOPE PROTECTION

4.1 Lakeside Ash Pond

Both the upstream and downstream slopes of the Lakeside Ash Pond are vegetated to protect the slopes against surface erosion. During the 2016 Annual Inspection, no significant signs of erosion were observed on any of the slopes and no observations of significant erosion was noted during any of the weekly inspections prior to the Annual Inspection.

4.2 Dallman Ash Pond

The downstream slope of the Dallman Ash Pond is vegetated to protect against surface erosion. Riprap was placed on the bottom portion of the downstream slope. Ruts and gullies on the downstream slopes, when observed, are immediately filled with soil and monitored during the weekly inspections. During the 2016 Annual Inspection, no significant signs of erosion were observed on any the upstream slopes and no observations of significant erosion on the upstream slopes was noted during any of the weekly inspections prior to the Annual Inspection.

5. DIKE COMPACTION

5.1 Documentation

5.1.1 Lakeside Ash Pond

No as-built construction documentation is available for the Lakeside Ash Pond. No construction plans are available for the original construction of the Lakeside Ash Pond. Construction plans for the vertical expansion (Engineering Report: Proposed Embankment Modification; CWLP Ash Disposal Area, July 1987) do call for the expansion berms to be constructed by placing cohesive material in thin lifts of 6 to 8 inches and compacted.

5.1.2 Dallman Ash Pond

No as-built construction documentation is available for the Dallman Ash Pond. Notes in the construction plan drawings do call for dike materials to be compacted to "at least 90% of the minimum density at optimum moisture as determined by AASHTO-T99."

5.2 Slope Stability Analyses

A slope stability analyses was performed as part of the Initial Safety Factor Assessment performed by Andrews Engineering, Inc. (AEI) for both the Lakeside Ash Pond and Dallman Ash Pond using available geotechnical data for the site. The analyses indicate that Lakeside and Dallman Ash Ponds provide factors of safety equal to or greater than minimum values as required by 40 CFR 257.73(e).

6. VEGETATED SLOPE HEIGHT

6.1 Lakeside Ash Pond

No as-built construction documentation is available for the Lakeside Ash Pond. No construction plans are available for the original construction of the Lakeside Ash Pond. Construction plans for the vertical expansion (Engineering Report: Proposed Embankment Modification; CWLP Ash Disposal Area, July 1987) do not specify a thickness for the vegetated slope layer.

6.2 Dallman Ash Pond

No as-built construction documentation is available for the Dallman Ash Pond. Notes in the construction plan drawings do call for a 6-inch layer of seeded topsoil be placed on the top of all upstream and downstream slopes.

7. SPILLWAYS

Neither ash pond has constructed or natural spillways.

8. HYDRAULIC STRUCTURES

8.1 Lakeside Ash Pond

During the vertical expansion, an outlet structure was constructed through the northern berm of the Lakeside Ash Pond, which drains into the adjacent clarification pond. The outlet is constructed with a 24-inch diameter reinforced concrete pipe (RCP). The length of the pipe is approximately 60 feet. The pipe was bedded in compacted cohesive material and an anti-seep collar at approximately halfway through the berm. The outlet appears to be structurally sound, with no observed signs of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris.

8.2 Dallman Ash Pond

An outlet structure was constructed through the southern dike of the Dallman Ash Pond, which drains into the adjacent clarification pond. The outlet is constructed with a 24-inch diameter high density polyethylene (HDPE) pipe. The length of the pipe is approximately 120 feet. No other details are available on the installation of the outlet. The outlet appears to be structurally sound, with no observed signs of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris.

9. ADJACENT BODIES OF WATER

Both Lakeside Ash Pond and Dallman Ash Pond are adjacent to the Clarification Pond to the south and the north, respectively. In addition, the Sugar Creek is adjacent to both ash ponds to the west. The Initial Safety Factor Assessment was performed by AEI, which determined the safety factors for the Dallman Ash Pond and Lakeside Ash pond for both long- and short-term scenarios. These analyses were performed with the assumptions that the Clarification Pond was drained, and also that the Sugar Creek had nearly zero flow at approximately 520 feet.

10. OBSERVATIONS

As reported in the 2016 Annual Inspection, signs of erosion have been periodically observed on the north and west outer berms of the Dallman Ash Pond in the forms of ruts and gullies that typically range from 6- to 24-inches deep. The erosion appears to be caused by stormwater flow collecting at points along the top of the berm before flowing down the outer slope in concentrated streams. Ruts and gullies are immediately filled with soil and monitored in the observed locations.

Indications of seepage have been observed on outer berms of the Lakeside Ash Pond, between the top of the original pond berms and the vertical expansion berms. These range from staining or dampness to areas with noticeable drainage. Signs of seepage have been observed along the west berm, as well as isolated portions on the east and west portions of the north berm of the Lakeside Ash Pond.

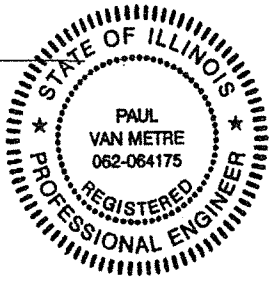
No other visual indications of actual or potential structural weaknesses of the surface impoundments have been observed. Based on the review of historical aerial photographs completed during the 2016 Annual Inspection, there were no observed indications of mass movement on any of the constructed berms for the surface impoundments.

11. STATEMENT

This Structural Stability Assessment for Coal Combustion Residuals Surface Impoundments was completed for CWLP by Andrews Engineering, Inc. in accordance with the requirements under 40 CFR Part 257.81.

Paul M. Van Metre, P.E.

10-14-2016
Date



City Water, Light & Power
Ash Impoundments
Springfield, Sangamon County, Illinois

Inflow Design Flood Control Report for Coal Combustion Residuals Surface Impoundments

October 2016

Prepared for:
City Water, Light & Power
3100 Stevenson Drive
Springfield, Illinois 62703

Prepared by:

ANDREWS ENGINEERING INC
3300 Ginger Creek Drive
Springfield, IL 62711
Tel: (217) 787-2334; Fax: (217) 787-9495

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

City Water, Light and Power (CWLP) ash ponds are coal combustion residuals (CCR) surface impoundments, which include both the Lakeside and Dallman ash ponds. A plan for the inflow design flood control system plans for the CCR surface impoundments was conducted as required by 40 CFR Part 257.82:

> *257.82* *(c)(1) Content of the plan. The owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(4).*
>
> *257.82* *(c)(3)(i) Existing CCR surface impoundments. The owner or operator of the CCR unit must prepare the initial inflow design flood control system plan no later than October 17, 2016.*

Andrews Engineering, Inc. (AEI) performed the review of information, which included the following documents:

- Coal Ash Impoundment Site Assessment Final Report (May 2011)
- Historical Aerial Photographs (April 1995 – March 2014)
- Engineering Report: Proposed Embankment Modification; CWLP Ash Disposal Area (July 1987).
- Construction Grading Plan for the Dallman Ash Pond (August 1976)

2. CCR UNIT INFORMATION

Both the Lakeside Ash Pond and the Dallman Ash Pond are owned and operated by CWLP. The ponds are operated under National Pollutant Discharge Elimination System (NPDES) Permit Number IL0024767.

The Lakeside Ash Pond is primarily a diked embankment with some incising along the east perimeter and was placed into service prior to 1958. The original Lakeside Ash Pond was been divided into four separate ponds since it was expanded vertically in 1988: three lime softening ponds and the settling pond. The current Lakeside Ash Pond is approximately 27.6 acres and ceased receiving ash in 2009.

The second impoundment, the Dallman Ash Pond, which is a diked embankment, was placed into service in approximately 1976 and is approximately 34.5 acres. Fly ash and bottom ash are sluiced to the Dallman Ash Pond with raw lake water.

Settled water from both the Dallman Ash Pond and Lakeside Ash Pond flow into opposite sides of a Clarification Pond before being discharged to Sugar Creek at Outfall 004 pursuant to the aforementioned NPDES permit.

3. INFLOW

Both the Dallman Ash Pond and the Lakeside Ash Ponds are diked surface impoundments built vertically above the existing grades. Both CCR units are built in a manner in which there is no surficial flow of stormwater into the pond during precipitation events. Therefore, the only water that would flow into the pond during a precipitation event is that which falls directly into the ponds. Ditches located adjacent to the south and east of the impoundments route surface water around the impoundment area ultimately discharging to the South Fork of Sugar Creek. The creek is present along the west and much of the north periphery of the Dallman Ash Pond.

4. FLOOD CONTROL DESIGN

According to the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 2, Version 3, the 100-year, 24 hour rainfall estimate for the site location is 6.22 inches (See Appendix A).

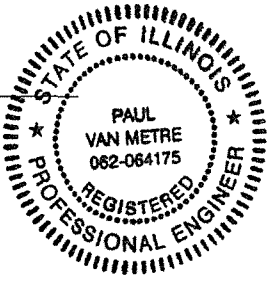
Both ash ponds contain at least 6.22 inches of freeboard, and therefore do not require any additional flood controls. The normal pool level for the Dallman Ash Pond is 545.5 feet with a maximum elevation of 554.0 feet, yielding a typical freeboard of 8.5 feet. The normal pool level for the Lakeside Ash Pond is 564.0 feet with a maximum elevation of 565.0 feet, yielding a typical freeboard of 1.0 feet.

5. STATEMENT

This Inflow Design Flood Control Report for Coal Combustion Residuals Surface Impoundments was completed for CWLP by Andrews Engineering, Inc. in accordance with the requirements under 40 CFR Part 257.82.

Paul M. Van Metre, P.E.

10-14-2016
Date



APPENDIX A

Precipitation Frequency Data

NOAA Atlas 14, Volume 2, Version 3
Location name: Springfield, Illinois, USA*
Latitude: 39.7642°, Longitude: -89.5979°
Elevation: 540.91 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.398 (0.365-0.438)	0.474 (0.434-0.521)	0.566 (0.518-0.621)	0.637 (0.581-0.699)	0.726 (0.660-0.794)	0.796 (0.721-0.871)	0.863 (0.778-0.943)	0.933 (0.837-1.02)	1.02 (0.913-1.12)	1.09 (0.969-1.20)
10-min	0.619 (0.567-0.681)	0.741 (0.677-0.814)	0.879 (0.805-0.966)	0.983 (0.897-1.08)	1.11 (1.01-1.22)	1.21 (1.09-1.32)	1.30 (1.17-1.42)	1.39 (1.25-1.52)	1.51 (1.34-1.65)	1.59 (1.41-1.74)
15-min	0.759 (0.695-0.834)	0.906 (0.828-0.995)	1.08 (0.988-1.19)	1.21 (1.10-1.33)	1.37 (1.25-1.50)	1.49 (1.35-1.64)	1.61 (1.46-1.76)	1.73 (1.55-1.89)	1.88 (1.67-2.06)	1.99 (1.76-2.18)
30-min	1.00 (0.919-1.10)	1.21 (1.11-1.33)	1.48 (1.35-1.62)	1.68 (1.53-1.84)	1.94 (1.76-2.12)	2.13 (1.93-2.34)	2.33 (2.10-2.55)	2.53 (2.27-2.76)	2.79 (2.48-3.05)	2.99 (2.64-3.27)
60-min	1.23 (1.12-1.35)	1.49 (1.36-1.63)	1.85 (1.70-2.04)	2.14 (1.95-2.35)	2.51 (2.28-2.75)	2.81 (2.55-3.08)	3.11 (2.81-3.40)	3.43 (3.08-3.75)	3.85 (3.43-4.21)	4.20 (3.71-4.59)
2-hr	1.45 (1.33-1.59)	1.76 (1.61-1.94)	2.21 (2.02-2.42)	2.56 (2.33-2.80)	3.03 (2.76-3.31)	3.42 (3.10-3.73)	3.81 (3.44-4.15)	4.23 (3.79-4.61)	4.80 (4.27-5.24)	5.28 (4.66-5.75)
3-hr	1.54 (1.41-1.69)	1.87 (1.71-2.05)	2.34 (2.14-2.58)	2.72 (2.48-2.99)	3.25 (2.95-3.56)	3.68 (3.32-4.02)	4.13 (3.70-4.51)	4.61 (4.11-5.04)	5.29 (4.66-5.78)	5.84 (5.11-6.39)
6-hr	1.81 (1.66-1.98)	2.18 (2.00-2.40)	2.73 (2.51-3.00)	3.18 (2.91-3.48)	3.80 (3.46-4.15)	4.30 (3.89-4.69)	4.84 (4.35-5.27)	5.40 (4.83-5.88)	6.20 (5.49-6.74)	6.86 (6.03-7.47)
12-hr	2.11 (1.94-2.29)	2.54 (2.34-2.77)	3.16 (2.92-3.45)	3.66 (3.37-3.98)	4.35 (3.99-4.73)	4.91 (4.48-5.33)	5.50 (4.98-5.96)	6.12 (5.51-6.63)	6.99 (6.23-7.57)	7.70 (6.81-8.34)
24-hr	2.42 (2.25-2.61)	2.93 (2.73-3.16)	3.66 (3.41-3.95)	4.24 (3.94-4.56)	5.00 (4.65-5.38)	5.60 (5.20-6.02)	6.22 (5.75-6.67)	6.84 (6.33-7.35)	7.70 (7.10-8.27)	8.37 (7.70-8.97)
2-day	2.84 (2.64-3.06)	3.43 (3.20-3.69)	4.26 (3.97-4.59)	4.91 (4.57-5.28)	5.76 (5.35-6.20)	6.44 (5.97-6.92)	7.12 (6.58-7.65)	7.81 (7.21-8.39)	8.75 (8.06-9.39)	9.48 (8.72-10.2)
3-day	3.00 (2.80-3.22)	3.62 (3.38-3.90)	4.50 (4.20-4.84)	5.18 (4.82-5.56)	6.08 (5.65-6.52)	6.79 (6.30-7.27)	7.50 (6.95-8.03)	8.22 (7.60-8.81)	9.20 (8.48-9.85)	9.96 (9.17-10.7)
4-day	3.17 (2.96-3.39)	3.82 (3.57-4.10)	4.74 (4.43-5.09)	5.45 (5.08-5.84)	6.39 (5.95-6.84)	7.13 (6.63-7.62)	7.88 (7.31-8.42)	8.63 (7.99-9.23)	9.65 (8.91-10.3)	10.4 (9.63-11.2)
7-day	3.75 (3.50-4.00)	4.49 (4.21-4.81)	5.51 (5.15-5.89)	6.27 (5.86-6.70)	7.25 (6.77-7.75)	8.01 (7.46-8.55)	8.77 (8.15-9.36)	9.52 (8.84-10.2)	10.5 (9.76-11.2)	11.3 (10.4-12.1)
10-day	4.24 (3.97-4.52)	5.08 (4.77-5.43)	6.18 (5.80-6.61)	7.00 (6.56-7.48)	8.07 (7.55-8.62)	8.89 (8.30-9.49)	9.70 (9.05-10.4)	10.5 (9.79-11.2)	11.6 (10.8-12.4)	12.4 (11.5-13.2)
20-day	5.72 (5.40-6.06)	6.84 (6.46-7.26)	8.23 (7.77-8.74)	9.24 (8.72-9.80)	10.5 (9.94-11.2)	11.5 (10.9-12.2)	12.5 (11.7-13.3)	13.5 (12.6-14.3)	14.7 (13.8-15.6)	15.7 (14.6-16.6)
30-day	7.11 (6.73-7.53)	8.49 (8.04-8.99)	10.1 (9.59-10.7)	11.3 (10.7-12.0)	12.8 (12.1-13.5)	13.9 (13.1-14.7)	15.0 (14.1-15.9)	16.0 (15.1-17.0)	17.4 (16.3-18.5)	18.5 (17.3-19.6)
45-day	8.95 (8.51-9.43)	10.7 (10.1-11.2)	12.6 (12.0-13.3)	14.0 (13.3-14.7)	15.7 (14.9-16.5)	17.0 (16.1-17.9)	18.2 (17.2-19.2)	19.4 (18.3-20.4)	21.0 (19.8-22.1)	22.1 (20.8-23.3)
60-day	10.6 (10.1-11.2)	12.6 (12.0-13.3)	14.8 (14.1-15.6)	16.4 (15.5-17.2)	18.3 (17.4-19.3)	19.8 (18.7-20.8)	21.2 (20.0-22.3)	22.5 (21.3-23.7)	24.3 (22.9-25.5)	25.5 (24.1-26.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

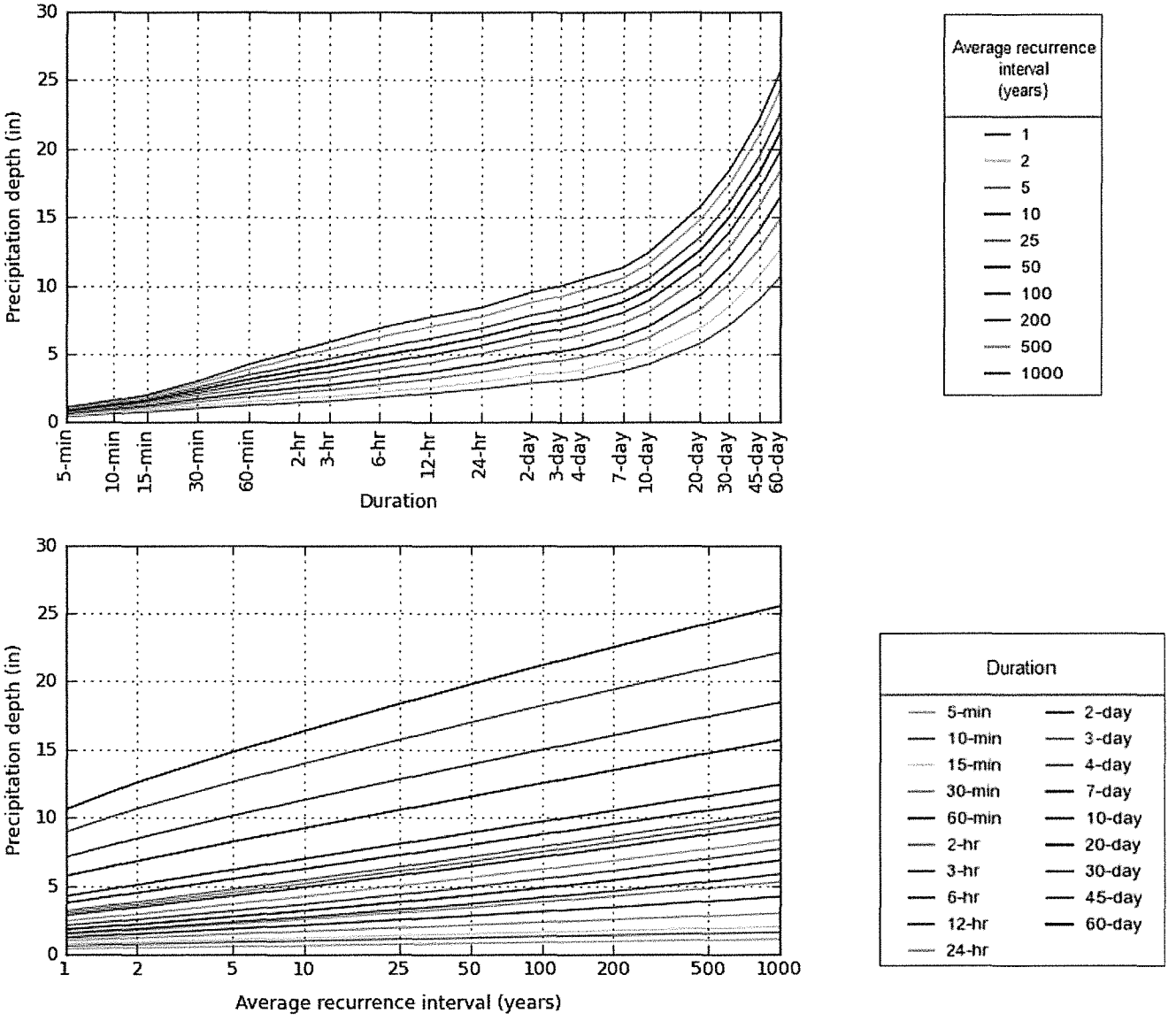
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 39.7642°, Longitude: -89.5979°



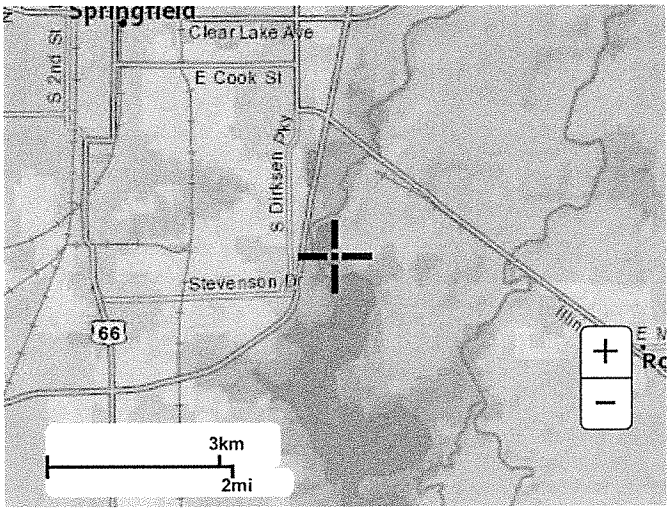
NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Thu Sep 29 19:40:36 2016

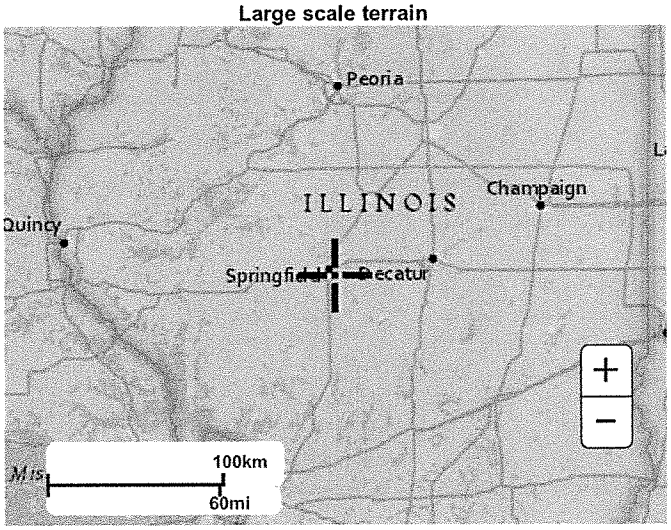
Back to Top

Maps & aerials

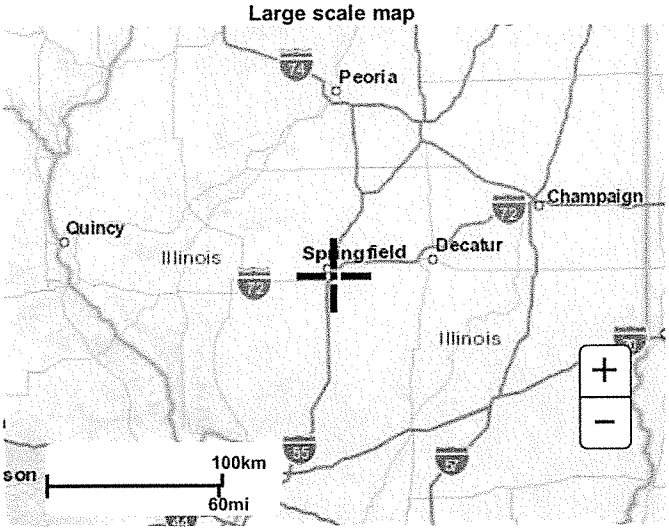
Small scale terrain



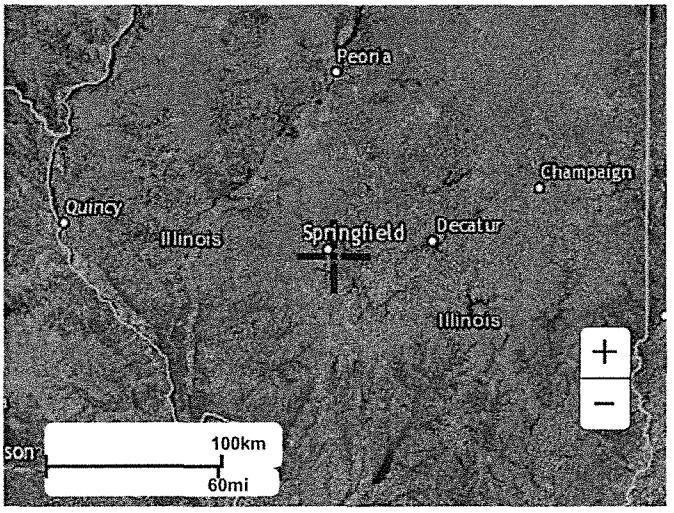
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

ANDREWS ENGINEERING, INC.

May 15, 2018

P.J. Becker
Environmental Health and Safety
City Water Light and Power
201 East Lake Shore Drive
Springfield, Illinois 62703

Re: City Water Light and Power
Potable Well Survey

Dear Mr. Becker:

A potable water well survey was completed at the request of City Water, Light and Power (CWLP) concerning the coal combustion residuals impoundments (CCR).

The search distance for this potable water well survey can be limited to 2,500-feet in the downgradient direction. This search distance is based upon the maximum allowable setback zone for a potable water well as identified in Section 14.3(f) of the Illinois Environmental Protection Act. However, as provided below, the search extended to the first water well encountered downgradient of the impoundments, located near Illinois Route 29 at a distance of approximately 3,400-feet.

Based on groundwater elevation data from numerous monitoring wells and piezometers located between and adjacent to the CWLP CCR impoundments, groundwater movement in the vicinity of the CCR impoundments is generally from the south-southwest to the north-northeast, approximately paralleling the Sugar Creek basin.

Using the Illinois EPA's web-based Geographic Information System (GIS) database (http://illinois-epa.maps.arcgis.com/apps/webappviewer/index.html?id=4d37a05f5ba441f1b30dab54ccb81fc8) in the Source Water Assessment Program (SWAP) a search for potable water wells within 2,500-feet downgradient of the CCR impoundments was completed.

The Illinois EPA's SWAP GIS database system identifies community water supply wells and other potable wells (private, semi-private and non-community water supply wells) include data from the following sources:

- Illinois EPA, Division of Public Water Supplies;
- Illinois State Geological Survey (ISGS);
- Illinois State Water Survey; and
- Illinois Department of Public Health.

Based upon this potable water well search, no private, semi-private and non-community water supply wells are located within 2,500-feet downgradient of the CCR impoundments. **Attachment 1** includes screen-captures of the Illinois EPA's SWAP GIS database system well

EXHIBIT
tabbies
L

query for the subject CCR impoundments. These screen captures depict the two closest well locations. These wells are discussed below.

Within the Sugar Creek basin, the nearest downgradient potable water well is located approximately 3,400-feet north-northeast of the CWLP CCR impoundments. The owner of this well is identified as Mr. William Bartels (API 121672620900). Installed September 25, 2001, this well is 55-feet deep and screened within material described as "shale fracture/clay." The ISGS boring log for this well is included in **Attachment 1**. Using the Sangamon County Tax Assessors database (http://tax.co.sangamon.il.us/SangamonCountyWeb/app/searchByParcelNumber.action) the current owners of the property on which this well is installed are identified as Kenneth and Tianne Roy. The Sangamon County Tax Parcel Viewer & Property Tax Web Site (http://gismaps.co.sangamon.il.us/tpv/) identifies this well as being located on improved commercial property.

The owner of the other potable water well, located a little more than 2,500-feet north-northwest of the CCR impoundments was identified as Mr. Raymond Fiskas (API 121670148100). The well was installed December 1, 1965, is 24-feet deep, and screened within material described as "hardpan." The ISGS boring log for this well is included in **Attachment 1**. A query for Raymond Fiskas using the Sangamon County Tax Assessors database did not produce any results. Furthermore, a review of the Sangamon County Tax Parcel Viewer & Property Tax Web Site identified the current property owner of this property as the State of Illinois Department of Transportation. While this well is located north of the CCR impoundments, it appears to be just west and outside of the Sugar Creek basin, and as such most likely not hydraulically downgradient of the CCR impoundments.

There is no reason to believe that potable wells exist within 2,500-feet of the CCR impoundments that were not identified as part of this potable water well survey.

Should you have any questions or require further information, please contact me at (217) 787-2334. Thank you.

Sincerely,

Mahlon Hewitt, L.P.G.
Senior Project Geologist

MTH:jld

ATTACHMENT 1

SWAP GIS Database Query and ISGS Boring Log

Illinois EPA SWAP GIS Database Query
CWLP – Springfield, Illinois
William Bartels - API 121672620900

ILLINOIS STATE GEOLOGICAL SURVEY

Private Water Well	Top	Bottom
black topsoil	0	5
gray silt	5	11
brown clay (H2o @ 18'-22')	11	22
brown till	22	25
soft gray shale	25	32
hard gray shale fracture @ 43'	32	55
Total Depth		**55**

Casing: 6" PVC SDR 21 from -1' to 18'
36" CONCRETE from 18' to 55'

Grout: HOLE PLUG from 16 to 17.

Grout: BUCKSHOT from 17 to 55.

Water from shale fracture/clay at 18' to 43'.

Owner Address: 3596 East State Rt. 29 Springfield, IL

Address of well: Rt. 29
Springfield, IL

Location source: Location from permit

Permit Date: August 13, 2001 **Permit #:**

COMPANY Wiesenhofer, Andrew

FARM Bartels, William

DATE DRILLED September 25, 2001 **NO.**

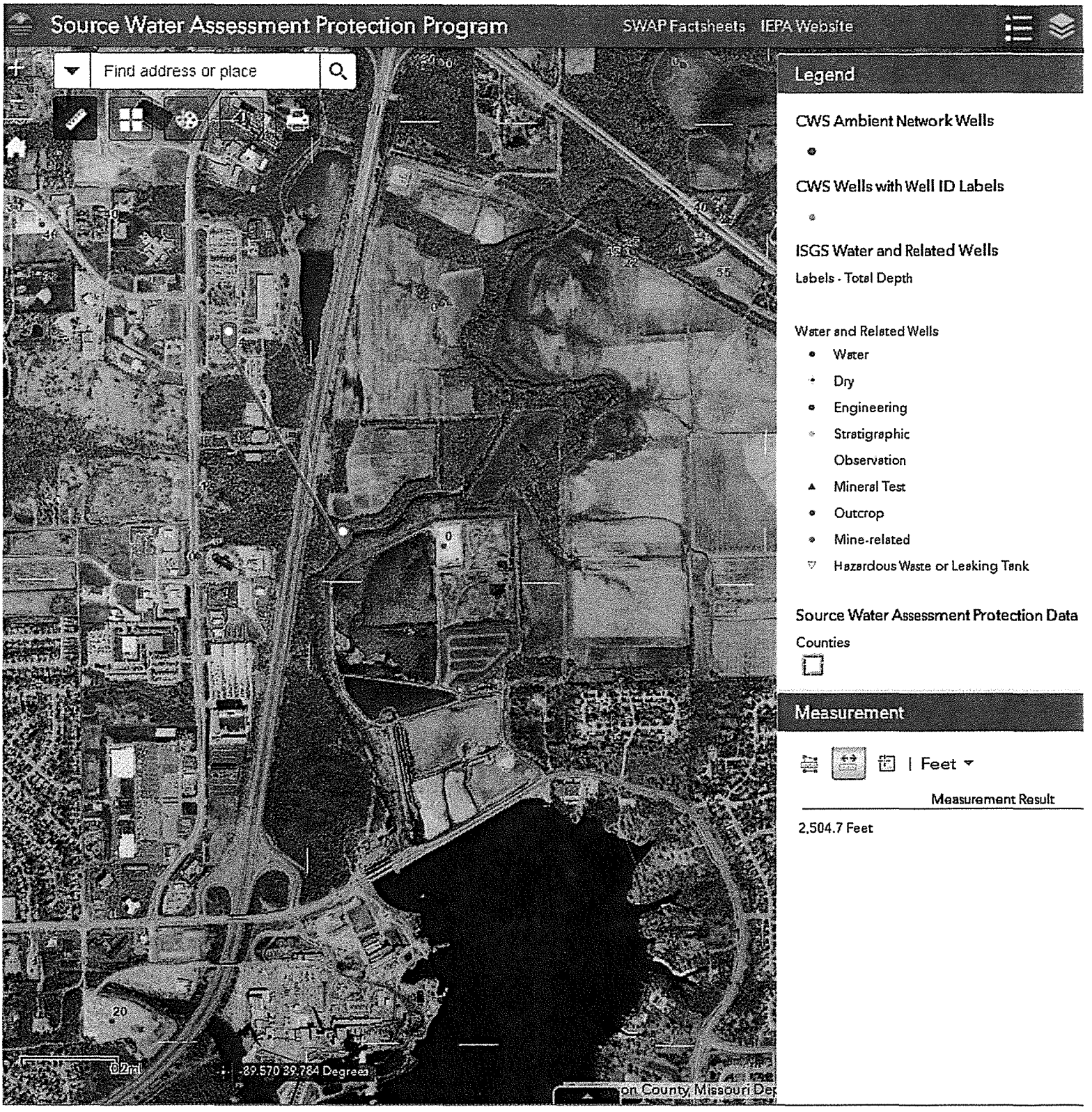
ELEVATION 0 **COUNTY NO.** 26209

LOCATION SW NE SW

LATITUDE 39.777352 **LONGITUDE** -89.587243

COUNTY Sangamon **API** 121672620900 **6 - 15N - 4W**

Illinois EPA SWAP GIS Database Query
CWLP – Springfield, Illinois
Raymond Fiskas - API 121670148100



ILLINOIS STATE GEOLOGICAL SURVEY

Water Well	Top	Bottom
s.s. #52306	0	0
top soil	0	3
yellow clay	3	18
brown clay	18	19
hardpan	19	24
Total Depth		**24**

Casing: 36" CONCRETE from 0' to 20'

Water from hardpan at 19' to 24'.
Static level 10' below casing top which is 0' above GL
Pumping level 0' when pumping at 20 gpm for 0 hours

Driller's Log filed
Sample set # 52306 (1' - 24')

Owner Address:
Location source: Location from the driller

Permit Date: **Permit #:**

COMPANY owner
FARM Fiskas, Raymond L.
DATE DRILLED January 1, 1965 **NO.** 1
ELEVATION 0 **COUNTY NO.** 01481
LOCATION 430'N line, 320'E line of NW SE SW
LATITUDE 39.775264 **LONGITUDE** -89.606181
COUNTY Sangamon **API** 121670148100 1 - 15N - 5W