BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

NOTICE OF FILING

To: Pollution Control Board, Attn: Clerk
100 West Randolph Street
James R. Thompson Center
Suite 11-500
Chicago, Illinois 60601-3218
PCB.Clerks@illinois.gov

Division of Legal Counsel
Illinois Environmental Protection Agency
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
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PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board the attached **PETITION FOR REVIEW OF ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S NON-CONCURRENCE WITH ALTERNATIVE SOURCE DEMONSTRATION UNDER 35 ILL. ADM. CODE PART 845 AND MOTION FOR STAY**; **APPEARANCES OF JOSHUA MORE, BINA JOSHI, AND SAMUEL RASCHE**; and a **CERTIFICATE OF SERVICE**, copies of which are herewith served upon you.

/s/ *Samuel A. Rasche*
Dated: January 12, 2024

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ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

APPEARANCE OF JOSHUA R. MORE
AND CONSENT TO E-MAIL SERVICE

I, Joshua R. More, hereby enter my appearance on behalf of ILLINOIS POWER RESOURCES GENERATING, LLC and authorize the service of documents on me by email in lieu of receiving paper documents in the above-captioned proceeding. My email address to receive service is as follows:

Joshua.More@afslaw.com

/s/ *Joshua R. More*
Joshua R. More

Dated: January 12, 2024

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BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

APPEARANCE OF BINA JOSHI
AND CONSENT TO E-MAIL SERVICE

I, Bina Joshi, hereby enter my appearance on behalf of ILLINOIS POWER RESOURCES GENERATING, LLC and authorize the service of documents on me by email in lieu of receiving paper documents in the above-captioned proceeding. My email address to receive service is as follows:

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/s/ *Bina Joshi*
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Dated: January 12, 2024

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BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

APPEARANCE OF SAMUEL A. RASCHE
AND CONSENT TO E-MAIL SERVICE

I, Samuel A. Rasche, hereby enter my appearance on behalf of ILLINOIS POWER RESOURCES GENERATING, LLC and authorize the service of documents on me by email in lieu of receiving paper documents in the above-captioned proceeding. My email address to receive service is as follows:

Sam.Rasche@afslaw.com

/s/ *Samuel A. Rasche*
Samuel A. Rasche

Dated: January 12, 2024

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BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

PETITION FOR REVIEW OF ILLINOIS ENVIRONMENTAL PROTECTION AGENCY'S NON-CONCURRENCE WITH ALTERNATIVE SOURCE DEMONSTRATION UNDER 35 ILL. ADM. CODE PART 845 AND MOTION FOR STAY

Petitioner Illinois Power Resources Generating, LLC ("IPRG" or "Petitioner"), pursuant to Sections 105.200 *et seq.* and 845.650(e) of Title 35 of the Illinois Administrative Code, 35 Ill. Adm. Code §§ 105.200 *et seq.* and § 845.650(e), appeals the final decision of the Illinois Environmental Protection Agency ("IEPA" or the "Agency") that did not concur with the Alternative Source Demonstration for the Duck Creek Gypsum Management Facility Pond submitted to the Agency on November 11, 2023 (the "Duck Creek ASD"). IEPA's non-concurrence is stated in a letter from IEPA Bureau of Water Groundwater Section Manager Michael Summers to IPRG dated December 6, 2023, and served upon IPRG on December 11, 2023, via U.S. Mail, which is attached as **Exhibit A** (the "IEPA Denial"). As detailed in Section II below, IEPA's Denial is contrary to the applicable regulations and arbitrary and capricious. For the reasons set forth in Section III below, Petitioner also requests a partial stay of Part 845 requirements as they apply to the exceedances at issue in this Petition.

In support of this Petition and Motion for Stay, IPRG states as follows:

I. BACKGROUND

Regulatory Background

1. IEPA regulates coal combustion residuals ("CCR") surface impoundments under 35 Ill. Adm. Code. Part 845 ("Part 845").[1] Part 845 includes requirements for regular groundwater monitoring. 35 Ill. Adm. Code § 845.650.

2. If, during groundwater monitoring, one or more constituents are detected and confirmed to be in exceedance of the groundwater protection standards in Section 845.600 ("GWPS"), a series of additional steps are triggered.

3. Within 60 days after detecting an exceedance of a GWPS, an owner or operator may submit an Alternative Source Demonstration ("ASD") to IEPA demonstrating "that a source other than the CCR surface impoundment caused the contamination and the CCR surface impoundment did not contribute to the contamination, or that the exceedance of the GWPS resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction." 35 Ill. Adm. Code § 845.650(e).

4. The ASD must "include a report that contains the factual or evidentiary basis for any conclusions and a certification of accuracy by a qualified professional engineer." *Id.*

5. IEPA must send a public notice of the ASD, and members of the public may submit written comments to IEPA within 14 days of the notice. *Id.*

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[1] Subsequent references in this petition to "Section 845.xxx" or "§ 845.xxx" shall be to 35 Ill. Adm. Code, Part 845, unless otherwise specified.

6. Within 30 days after receiving an ASD, IEPA must provide a written response to the owner or operator of the CCR surface impoundment either concurring or not with the ASD. If IEPA concurs, the owner or operator must continue groundwater monitoring, but is not required to take additional actions in connection with the identified exceedance, including initiating an assessment of corrective measures. If IEPA does not concur, the owner or operator may petition the Board for review of the non-concurrence. *Id.*

7. Other requirements are prompted in the absence of an ASD, or in the event an ASD is denied and a stay is not granted. For example, within 90 days after detecting an exceedance of a GWPS, the owner or operator of the CCR surface impoundment must initiate an assessment of corrective measures. 35 Ill. Adm. Code § 845.660(a). The owner or operator must, within 90 days of initiating its assessment of corrective measures (or up to 60 days longer if an extension is requested and granted), submit to the Agency an assessment of corrective measures. *Id.* at § 845.660(a)(2). Within a year of completing the assessment of corrective measures, an owner or operator must submit a construction permit application and corrective action plan to IEPA identifying the selected remedy. *Id* at § 845.670(b).

B. IPRG's Alternative Source Demonstration

8. IPRG owns and operated the now retired Duck Creek Power Plant ("Duck Creek") located in Fulton County, Illinois, approximately 9 miles southeast of the town of Canton. Duck Creek includes the Gypsum Management Facility Pond ("GMF Pond"), a CCR surface impoundment regulated under Part 845.

9. On September 12, 2023, groundwater monitoring at Duck Creek identified a GWPS exceedance for pH at well G60L (the "pH Exceedance"). IPRG notified IEPA of its groundwater monitoring results, including the pH Exceedance, placed the information in its operating record,

and contracted with an environmental consultant to further investigate the cause of the GWPS exceedance. Duck Creek Power Plant Gypsum Management Facility ("GMF") Pond; IEPA ID # W0578010001-04, Groundwater Monitoring Data and Detected Exceedances 2023 Quarter 2 (September 12, 2023), available at https://www.luminant.com/documents/ccr/il-ccr/Duck-Creek/2023/2023-Duck%20Creek%20GMF%202023%202nd%20Qtr%2035%20IAC%20845%20GW%20report-Duck%20Creek-GMF%20Pond-W0578010001%E2%80%9004.pdf.

10. On November 11, 2023, IPRG submitted the Duck Creek ASD to IEPA. The Duck Creek ASD concluded that sources other than the GMF Pond were responsible for the pH Exceedance. The Duck Creek ASD is attached as **Exhibit B**.

11. The Duck Creek ASD identified three lines of evidence to demonstrate that the GMF Pond is not the cause of or contributing to the pH Exceedance. First, the Duck Creek ASD demonstrated that "the GMF Pond has a double geomembrane liner designed to prevent CCR contact with groundwater." Exhibit B at 7. The Duck Creek ASD explains that the GMF Pond liner system includes two 60-mil high-density polyethylene ("HDPE") geomembrane liners, multiple layers of non-woven geotextile filter fabric, a 12 to 24-inch soil cushion layer, a 12-inch sand layer, a geosynthetic clay layer, and a 36-inch compacted clay layer. *Id.* Because this IEPA-approved system "far exceeds the design criteria for a composite liner for CCR surface impoundments established by 35 I.A.C. § 845.400," the Duck Creek ASD concluded that "the GMF Pond is not the source of the pH exceedance." *Id.*

12. Second, the Duck Creek ASD demonstrated that "boron concentrations in compliance groundwater monitoring wells do not exceed background groundwater limits." *Id.* The Duck Creek ASD explained that boron is an "indicator of CCR impacts to groundwater due to its

leachability from CCR, low occurrence as an anthropogenic contaminant, and mobility in groundwater" and that source water samples from the GMF Pond indicate that "boron is a site-specific key indicator for CCR." *Id.* at 8. Accordingly, "[i]f boron concentrations in CCR source water are present above background groundwater concentrations, then groundwater impacted by CCR would be expected to contain" elevated boron concentrations. *Id.* at 7-8. Because boron levels are elevated in the GMF Pond source water but no elevated boron levels have been detected in compliance monitoring wells (including well G60L), the Duck Creek ASD concluded that "the GMF Pond is not the source of the pH GWPS exceedance at G60L." *Id.*

13. Third, the Duck Creek ASD included a technical memorandum demonstrating the likely influence of a "localized pocket of native peat is an alternative source of the pH exceedance." *Id.* at 7. The native peat deposit was "identified in boring logs immediately upgradient of" the single compliance well with the pH GWPS exceedance (well G60L). The Duck Creek ASD utilized "[m]ultivariate statistical analysis of the groundwater and GMF Pond source water data, review of ionic composition of both, and literature review" and concluded that the pH Exceedance likely "is due to the influence of a localized, native peat deposit located upgradient of the well." *Id.* at 8. Using a principal component analysis, the Duck Creek ASD showed that "the groundwater signature at G60L is similar to background and compliance well signatures and distinct from the source water signature. *Id.* Additionally, the ion composition of the groundwater in well G60L is "similar to the major ion composition of nearby groundwater" and "inconsistent with influence from source water due to due to a low proportion of chloride, an indicator of CCR impacts in groundwater." *Id.*

14. Finally, the technical memorandum included as Appendix C to the Duck Creek ASD explained that a "localized peat unit" is located "immediately upgradient of G60L" and that

"[p]eat rich soils in connection with groundwater are known to produce water chemistries with lower pH and higher sulfate concentrations." *Id.* at Appendix C, pp. 5-6. Further, the technical memorandum identified a "vertical component to the hydraulic gradient in this area . . . which is consistent with a flow path from the peat unit . . . towards the well screen of G60L" and "[o]ther monitoring wells also exhibit" characteristics "supporting the conclusion that this region is influenced by . . . the local native peat, rather than the GMF pond." *Id.* Accordingly, the technical memorandum concluded that the "combination of hydraulic gradients, aqueous and solid phase geochemistry, and empirical field observations at this location supports the conclusion that local peat is likely the source of the low pH at G60L." *Id*. at Appendix C, p. 6.

15. For the above reasons, the Duck Creek ASD concluded that the evidence "demonstrated that the GMF Pond is not the source of the pH exceedance at G60L and the GMF pond has not contributed to the exceedance." *Id.* at 9.

C. The IEPA Denial

16. On December 6, 2023, IEPA sent a two-page letter notifying IPRG of IEPA's non-concurrence with the Duck Creek ASD (the "IEPA Denial"). The IEPA Denial states that IEPA "does not concur" due to two "data gaps." **Exhibit A**. The two listed data gaps according to IEPA are:

17. First, "[s]ource characterization of the CCR at the GMF Pond must include total solids sampling in accordance with SW846" ("Data Gap 1"). *Id*

18. Second, "[c]haracterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with ASD" ("Data Gap 2"). *Id.*

19. The IEPA Denial did not include any additional explanation or analysis.

II. Discussion

20. IEPA's bases for its non-concurrence, the two "Data Gaps," are each arbitrary and capricious and not supported by IEPA's regulatory authority under Section 845.650.

A. There are no data gaps in the ASD

21. IEPA's Denial unreasonably demands data and analysis that is not required by Section 845.650. The regulation requires only that IPRG submit a "demonstration . . . that a source other than the CCR surface impoundment caused the contamination and the CCR surface impoundment did not contribute to the contamination." 35 Ill. Adm. Code § 845.650(e). In support of the demonstration, the regulations require that an ASD "include a report that contains the factual or evidentiary basis for any conclusions and a certification of accuracy by a qualified professional engineer." *Id.* The Duck Creek ASD report does just that through a scientifically supported analysis that contains multiple lines of evidence and is certified by a qualified professional engineer. **Exhibit B.** *See also*, Declaration of Mindy Hahn at 2-4 (December 12, 2023), attached as **Exhibit C**. The information identified by IEPA's "Data Gaps" is not necessary to form a "factual and evidentiary basis" for the conclusions reached in an ASD. The information would not lead to a different result, and the fact the data was not submitted is inadequate to support the Agency's nonconcurrence with the Duck Creek ASD.

1. <u>"Data Gap 1"</u>

22. "Data Gap 1" demands that the Duck Creek ASD should have included a "source characterization of the CCR at the GMF Pond" including "total solids sampling in accordance with SW846." **Exhibit A**. However, there is no requirement in Part 845 that source characterization of CCR for an ASD be conducted "in accordance with SW846," and IEPA's Denial provides no justification for its demand. Further, from a technical basis, the porewater analysis conducted in the Duck Creek ASD is a more appropriate and accurate method to characterize the GMF source material's impact on groundwater than SW846.

23. There is no legal requirement that a source characterization for purposes of an ASD conducted under Section 845.650(e) utilize SW846. Method SW846 is incorporated by reference into Part 845 by Section 845.150. However, inclusion in the general "incorporations by reference" section of Part 845 does not create an affirmative obligation to use SW846 in all circumstances. The Board has explained that where Illinois rules incorporate analytical methods by reference via a "centralized listing of incorporations by reference" such as Section 845.150, "Illinois rules further indicate where each method is used *in the body of the substantive provisions*." *See In the Matter of: SDWA Update, USEPA Amendments (January 1, 2013 through June 30, 2013)*, R 14-8, slip op. at 24-25 (Jan. 23, 2014) (emphasis added). Further, Chapter 2 of SW846 states that the methods in that document are not "mandatory" unless specifically specified as such by regulation. United States Environmental Protection Agency ("USEPA"), *SW-846 Update V*, (July 2014) at 1.[2] USEPA guidance also makes clear that SW846 is only legally required where "explicitly specified" in a regulation. USEPA, *Disclaimer for Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*, (July 2014), at 1.[3] The only substantive provision of Part 845 specifically requiring analysis using SW846 is Section 845.640(e), which applies to analyzing groundwater monitoring samples under a groundwater monitoring program and is not at issue here. 35 Ill. Adm. Code § 845.640(e). There is no requirement to use SW846 under Section 845.650(e). The plain language of the rules does not require the utilization of SW846 for purposes of source characterization for an ASD, and IEPA has provided no justification for any alternative interpretation.

[2] Available at https://www.epa.gov/sites/default/files/2015-10/documents/chap2_1.pdf.
[3] Available at https://www.epa.gov/sites/default/files/2015-10/documents/disclaim.pdf.

24. Additionally, source characterization of the GMF was conducted using the best scientifically available procedure. As detailed in the Duck Creek ASD, "CCR porewater most accurately represents the mobile constituents associated with the waste management activity within the [GMF Pond] and is "representative of the waters . . . that could be potential contributions to groundwater observed in compliance monitoring wells." **Exhibit B** at 5-6. Laboratory leach tests such as those prescribed by SW846 are less direct and less appropriate for understanding the potential impact of a release because, unlike porewater, they are not representative of the actual water quality from a CCR surface impoundment that would mix with groundwater. **Exhibit C** at 10-12. Additionally, it is difficult for laboratory leach tests such as those included in SW846 to accurately capture the relationship to the original conditions within the CCR surface impoundment for pH. *Id.* pH is dependent on local geochemistry and varies with redox reactions and biological activity. Accordingly, it is difficult to simulate the naturally occurring geochemistry and microbial impacting pH in a laboratory. *Id.* .

25. The IEPA Denial is not clear regarding what procedure under SW846 IEPA believes should have been utilized for source characterization including total solids sampling in accordance with SW846. **Exhibit A**. However, no method under SW846 would have been preferable to or provide more appropriate information than the source characterization methodology utilized for the Duck Creek ASD. *Id.* at 10-12. That sampling would have included a laboratory simulation of potential leachate from material in the GMF Pond, while the methodology utilized for the Duck Creek ASD included an analysis of actual and direct measurements of field porewater and leachate quality at the GMF Pond. *Id.* at 11-14.

26. If source characterization of CCR at the GMF Pond did include total solids sampling in accordance with SW846, it would not be expected to change the results of the Duck Creek ASD. *Id.* at 12.

27. IEPA's denial of the Duck Creek ASD based on "Data Gap 1" is accordingly arbitrary and capricious.

2. "Data Gap 2"

28. "Data Gap 2" demands that the Duck Creek ASD should have provided a characterization "in accordance with 35 IAC 845.640 of [the] alternative source . . ." **Exhibit A**. However, there is no requirement to conduct groundwater sampling of an alternative source in accordance with Section 845.640 as part of an ASD as suggested by IEPA. IEPA has not provided any justification for its demands related to the alternative source characterization and the information sought by "Data Gap 2" is unnecessary to support the Duck Creek ASD.

29. IEPA's assertion that the regulations require direct groundwater sampling of an alternative source ignores the reality that exceedances may be caused by complex geochemical and biological conditions (such as the influence of peat deposits on downgradient geochemical conditions the Duck Creek ASD identified as the likely source of the pH Exceedance at G60L), which cannot be directly sampled as contemplated by Section 845.640. *See* **Exhibit B** at 4-5, 8; Exhibit **C** at 12-14.

30. The Duck Creek ASD included a detailed explanation of how each conclusion was reached and the evidence supporting each conclusion, and provided significant data as attachments as well as references to any report or other document referred to or relied on. This is more than sufficient to provide the "factual and evidentiary basis" required by Section 845.650(e). No provision of Part 845 requires that an ASD be supported by a characterization of the alternative sources "in accordance with" the groundwater monitoring requirements of § 845.640, and IEPA

has provided no justification or support for its one-size-fits-all interpretation of the precise data required.

31. The facts and evidence provided with the Duck Creek ASD are supportive of a conclusion that the GMF Pond is not a cause of or contributing to the pH Exceedance, that the influence of local peat on groundwater chemistry is a likely cause of the pH Exceedance, and that additional data collection would not change the conclusions reached by the Duck Creek ASD. **Exhibit C** at 12-14.

32. As noted above in Section I.B., the Duck Creek ASD was prepared using a multiple lines of evidence approach for the development of ASDs at CCR sites. **Exhibit B** at 3. Following this approach, the Duck Creek ASD reviewed and analyzed site specific hydraulic conductivity based on the GMF Pond's geomembrane liner, evaluated indicators that groundwater had been impacted by CCR, and engaged in geochemical analysis and empirical observations at and near well G60L. **Exhibit B** at 7-9. The Duck Creek ASD used these facts and this evidence to develop multiple lines of evidence supporting the conclusions that (1) the GMF Pond is not the source of and has not contributed to the pH Exceedance and (2) the influence of local peat deposits is a likely alternative source. **Exhibit B** at 9. As part of its identification of the influence of localized peat as a likely alternative source, the Duck Creek ASD includes evidence regarding empirical field observations of a localized peat unit in the immediate vicinity of G60L, a literature review regarding the impact of peat-rich soils on groundwater, an evaluation of other monitoring wells located near the local peat, and an analysis of local variation in carbonate content and its influence on the impact of peat on pH. **Exhibit B**, Appendix C at 5.

33. The Duck Creek ASD's use of site-specific information and identification of specific geochemical conditions is more than sufficient to provide the "demonstration" required

by the rules. IEPA's request for a complete characterization of the alternative source using the groundwater monitoring requirements of § 845.640 is unfounded and unexplained. Further, as detailed above, IEPA's request is impractical for alternative sources such as here where the impacts on groundwater quality may not be apparent through the type of sampling envisioned by Section 845.640. Accordingly, IEPA's use of "Data Gap 2" as a grounds for nonconcurrence is arbitrary and capricious.

B. IEPA's Denial imposes practically infeasible requirements.

34. IEPA's interpretation of Section 845.650(e) is further unreasonable because "Data Gaps" 1 and 2 demand complex sampling and analysis that cannot feasibly be completed within the timeframes contemplated by the regulations, if at all. Section 845.650(e) requires owners and operators to submit an ASD within 60 days after detecting a GWPS exceedance. The regulations further require IEPA to reach a final decision within 30 days after receiving an ASD. 35 Ill Adm. Code § 845.650(e)(4).

35. "Data Gap 1" requests that IPRG provide source characterization of the CCR at the GMF Pond that includes "total solids sampling in accordance with SW846." **Exhibit A**. Such a characterization, which contains scientific limitations, could take approximately 20-22 weeks to complete. **Exhibit D**, Declaration of Cynthia Vodopivec at 1. There would be no reason for an owner or operator to begin such a characterization until after a GWPS exceedance is detected. Thus, even if IPRG anticipated IEPA's request for this data and began the CCR source characterization at the exact moment the GWPS exceedance is detected, the characterization could not reasonably be completed until months *after* IEPA's deadline to reach a final decision on the Duck Creek ASD (let alone IPRG's deadline to submit an ASD).

36. "Data Gap 2" requests a full characterization of the alternative source "in accordance with 35 IAC 845.640[.]" **Exhibit A**. Such sampling and analysis would likely take at

least 20-22 weeks. **Exhibit D** at X.[4] Again, there is no regulatory requirement that IPRG conduct such analysis, and thus there would have been no reason for IPRG to begin any such characterization until a GWPS exceedance is detected. Once again, even if IPRG had fully anticipated IEPA's requests, it would not have been able to complete the analysis until months past the deadline to submit an ASD. Even then, the direct sampling contemplated by Section 845.640 is not practical where an exceedance is caused by the influence of natural materials on local geochemistry and not the discharge of a conservative solute from a source area. **Exhibit C** at 12-13.

37. The data the IEPA Denial categorizes as "gaps" in the Duck Creek ASD could not feasibly be completed before the prescribed deadline for submitting an ASD, if at all. IEPA's interpretation that Section 845.650 requires these characterizations would thus make the entire ASD provision meaningless, as it would be impossible for any owner or operator to submit a sufficient ASD.

38. Accordingly, IEPA's Denial is arbitrary and capricious and also ignores reality.

39. Furthermore, even if the data requested was required to be collected elsewhere under Part 845, there is no requirement in Section 845.650 that such data be used in connection with an ASD. Here, qualified professionals used best available information to develop an ASD within the regulatory deadline and in conformance with regulatory requirements. Certainly, additional lines of evidence could be added to the ASD analysis; however, professional judgment

[4] Undertaking the steps required to provide the information IEPA seeks through "Data Gaps" 1 and 2 would also be costly: collecting the information requested by "Data Gap 1" would likely cost approximately $150,000-$175,000, while "Data Gap 2" would cost approximately $105,000. **Exhibit D** at 1. While cost is not a driver of actions taken for completing an ASD, as Dr. Hahn explains, accepted scientific practice is to not develop costly additional lines of evidence when sufficient evidence exists from other, better lines of evidence to support a conclusion. **Exhibit C** at 2-3.

and practicality dictate that every possible line of evidence need not and cannot be developed. **Exhibit C** at 2-3. Doing so would take an unreasonable amount of time. Additionally, doing so is unnecessary when existing information is sufficient to support the conclusion that an alternative source caused the contamination detected and that the CCR surface impoundment at issue did not contribute to that contamination. *Id.* at 12-14.

III. MOTION FOR PARTIAL STAY

40. Because Part 845 does not authorize an automatic stay, IPRG asks the Board to stay the requirements of Sections 845.650(d), 845.660, 845.670, and 845.680 for the pH Exceedance at issue in this Petition until the later of (a) the Board's final resolution of this Petition, or (b) if this Petition is granted, IEPA's issuance of a concurrence.

A. The Board has authority to issue a stay.

41. The Board has long recognized its authority under Illinois law to issue discretionary stays. *See Community Landfill Co. and City of Morris v. IEPA*, PCB 01-48, PCB 01-49 (consol.), slip op. at 4 (Oct. 19, 2000); *see also, e.g., Ill. Power Generating Co. v. IEPA*, PCB 16-60, slip op. at 1 (Dec. 17, 2015). Section 845.650(e)(7), which authorizes a petition for review of an IEPA nonconcurrence with an ASD, "would be rendered meaningless" if the Board had no authority to stay the associated regulations. *See Id.* An IEPA nonconcurrence with an ASD triggers corrective measure requirements that must be initiated within a short timeframe, likely far before the Board reaches a final resolution of this petition.[5]

42. Further, the rules specifically contemplate that the Board may stay certain regulatory requirements pending resolution of a petition for review: "The filing of a petition for

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[5] Section 845.660(a) requires: "The assessment of corrective measures must be initiated within 90 days after finding [of any GWPS exceedance]" and the "assessment of corrective measures must be completed and submitted to the Agency within 90 days after initiation of assessment of corrective measures . . ."

review under subsection (e)(7) does not automatically stay any requirements of this Part as to the owner or operator, including the 90-day deadline to initiate an assessment of corrective measures (see Section 845.660(a)(1)).” Section 845.650(e)(7). If the Board had no authority to stay the corrective measure requirements, there would have been no need for the rules to specify that the stay is not automatic.

B. A partial stay is appropriate under Illinois law.

43. The Board considers four factors[6] when determining whether to grant a discretionary stay of a final Agency decision:

- **a.** a certain and clearly ascertainable right needs protection;
- **b.** irreparable injury will occur without injunction;
- **c.** adequate remedy at law exists;
- **d.** a probability of success on the merits.

PCB 16-60, slip op. at 2 (Dec. 17, 2015), citing *Community Landfill Co. and City of Morris v. IEPA*, PCB 01-48, PCB 01-49 (consol.), slip op. at 4 (Oct. 19, 2000). The Board need not find that all of these factors exist in order to grant a discretionary stay. *Id.* The Board will also consider the likelihood of environmental harm should stay be granted. *Id.*, citing *Motor Oils Refining Co. v. IEPA*, PCB 89-116, slip op. at 2 (Aug. 31, 1989).

44. For the reasons stated in this Petition, a stay is necessary to protect IPRG’s right to appeal the IEPA Denial and to prevent IPRG from being unlawfully and unreasonably required to comply with costly and potentially unnecessary corrective measure requirements before it is able

[6] When reviewing a request for a discretionary stay in the context of a permit appeal or appeal of final agency decision, the Board has held that “although there are no specific standards set by the Board for issuing stays, Illinois law provides for standards under which such equitable relief is appropriate.” *Motor Oils Refining Co. v. IEPA*, PCB 89-116, slip op. at 1 (Aug. 31, 1989), *citing Junkunc v. S.J. Advanced Technology & Mfg.*, 101 Ill. Dec. 671, 498 N.E.2d 1179 (Ill. App. 1 Dist. 1986).

to exercise its right to appeal and be heard by the Board. Accordingly, IPRG has an ascertainable right that needs protection.

45. IPRG will suffer irreparable injury if it is subject to the corrective measure requirements of Sections 845.650(d), 845.660, 845.670, and 845.680 for the pH Exceedance at issue in this Petition. Compliance with these requirements would require IPRG to expend resources to complete assessments of corrective measures, prepare corrective action plans and take other steps under Part 845 for alleged discharges that, as explained in detail in the Duck Creek ASD and this Petition, likely never occurred. The assessments of corrective measures alone would likely cost approximately $35,000. **Exhibit D** at 1. Selecting an appropriate remedy and developing a corrective action plan could cost approximately an additional $400,000. *Id*. If IPRG complied with the corrective measure requirements for pH at the Duck Creek GMF Pond and then succeeded on the merits of this Petition, costs, as well as time and other resources, would be lost. *Id*. Thus, IPRG would suffer irreparable injury.

46. IPRG has no other adequate remedy at law to prevent these injuries or to contest the IEPA Denial.

47. It is also likely that IPRG will succeed on the merits of this Petition. IPRG has demonstrated by a preponderance of the evidence that an alternative source other than the GMF Pond is responsible for the pH Exceedances and that the GMF Pond did not contribute to that contamination as evidenced through the thorough analysis of a qualified professional engineer, and IPRG is prepared to demonstrate that IEPA's nonconcurrence was arbitrary and capricious and/or inconsistent with applicable laws and regulations. *See, e.g.,* **Exhibit B**; **Exhibit C**.

48. Finally, no harm to human health or the environment will result from a stay of these requirements. The exceedance is limited to a single monitoring well. As demonstrated in the Duck

Creek ASD and this Petition, the Duck Creek GMF Pond is not the source of the pH Exceedance. Notably, the IEPA Denial does not suggest that IEPA believes the GMF Pond is the cause of or is contributing to the GWPS exceedances – rather, the IEPA Denial is based on alleged "data gaps." **Exhibit A**. Moreover, the corrective measure requirements of Sections 845.650(d), 845.660, 845.670, and 845.680 include an assumption that the impoundment under assessment is at least a partial cause of the exceedances.[7] It is impossible to complete a corrective action assessment or to determine the optimal corrective action for a source that is not the cause of the exceedances, and to do so would provide no benefit to human health and the environment. Further, IPRG has conducted a human health and risk assessment for the GMF Pond demonstrating that there are "no complete exposure pathways for humans" at the GMF Pond because "[g]roundwater beneath the . . . GMF [Pond] flows into the [Duck Creek Cooling Pond]" which is "owned by IPRG, and access to it is restricted." Human Health and Ecological Risk Assessment, Duck Creek Power Plant, Gypsum Management Facility (GMF) and Bottom Ash Basin (BAB), Canton, Illinois at 16, 31 (Jul. 28, 2022), available at https://www.luminant.com/documents/ccr/Illinois/Duck-Creek/2022/Duck%20Creek%20GMF%20Closure%20Construction%20Permit%20Application.pdf. The risk assessment further demonstrated that no ecological exposure pathway is "expected to pose an unacceptable risk to ecological receptors. *Id.* at 31. Lastly, IPRG has been and will continue to be subject to the groundwater monitoring requirements of Section 845.650, which ensures that any changes in circumstances during the stay that could pose a risk to human health or the environment will be quickly identified and responded to in accordance with Part 845.

[7] *See, e.g.*, Section 845.660(a) (". . .the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases, and to restore the affected area.").

IV. <u>CONCLUSION</u>

49. For the above reasons, IPRG respectfully requests that the Board stay the requirements of Sections 845.650(d), 845.660, 845.670, and 845.680 relating to the pH Exceedance at issue in this Petition until the later of (a) the Board's final resolution of this Petition, or (b) if this Petition is granted, IEPA's issuance of a concurrence. Moreover, IPRG respectfully requests that the Board grant this Petition for Review and remand to IEPA to issue a new final written response concurring with the Duck Creek ASD.

Respectfully submitted,

/s/ Joshua R. More
Joshua R. More

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Attorneys for Illinois Power Resources Generating, LLC

BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

CERTIFICATE OF SERVICE

I, the undersigned, certify that on this 12th day of January, 2024:

I have electronically served a true and correct copy of the attached Petition for Review of Illinois Environmental Protection Agency's Non-Concurrence with Alternative Source Demonstration Under 35 Ill. Admin. Code Part 845 and Motion for Stay and Appearances of Joshua R. More, Bina Joshi, and Samuel A. Rasche by electronically filing with the Clerk of the Illinois Pollution Control Board and by e-mail upon the following persons:

Pollution Control Board, Attn: Clerk
100 West Randolph Street
James R. Thompson Center
Suite 11-500
Chicago, Illinois 60601-3218
PCB.Clerks@illinois.gov

Division of Legal Counsel
Illinois Environmental Protection Agency
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
epa.dlc@illinois.gov

My e-mail address is sam.rasche@afslaw.com

The number of pages in the e-mail transmission is 471.

The e-mail transmission took place before 5:00 p.m.

/s/ Samuel A. Rasche
Samuel A. Rasche

Dated: January 12, 2024

ARENTFOX SCHIFF LLP
Joshua R. More
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Attorneys for Illinois Power Resources Generating, LLC

BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

ILLINOIS POWER RESOURCES GENERATING, LLC Petitioner **v.** **ILLINOIS ENVIRONMENTAL PROTECTION AGENCY** Respondent.	**PCB 2024-________**

INDEX OF EXHIBITS

Exhibit A	Letter from Michael Summers, P.G., Manager, Groundwater Section, Division of Public Water Supplies, Bureau of Water, Illinois Environmental Protection Agency to Dianna Tickner, Illinois Power Resources Generating (December 6, 2023)
Exhibit B	Ramboll, 35 I.A.C. § 845.650(e): Alternative Source Demonstration, Duck Creek Power Plant, Canton, Illinois, IEPA ID: W0578010001-04 (November 11, 2023).
Exhibit C	Declaration of Melinda W. Hahn, PhD (January 12, 2024)
Exhibit D	Declaration of Cynthia Vodopivec on behalf of Illinois Power Resources Generating, LLC (January 12, 2024)

Exhibit A

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 · (217) 782-3397
JB PRITZKER, GOVERNOR JOHN J. KIM, DIRECTOR

217-782-1020

December 6, 2023

Dianna Tickner
Electric Energy, Inc.
1500 Eastport Plaza Drive
Collinsville, Illinois 62234

Re: Duck Creek Power Plant GMF Pond – W0578010001-04
Alternative Source Demonstration Submittal

Dear Ms. Tickner:

The purpose of this correspondence is to notify you that the Illinois Environmental Protection Agency (Illinois EPA) does not concur with the Duck Creek GMF Pond Alternative Source Demonstration (ASD) dated November 11, 2023. The Illinois EPA does not concur due to the following data gaps:

1. Source characterization of the CCR at the GMF Pond must include total solids sampling in accordance with SW846.
2. Characterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with the ASD.

If you have any questions, please contact: Matthew Garee Illinois EPA, Bureau of Water, PWS #13, P.O. Box 19276, Springfield, Illinois 62794-9276. If you have any questions concerning the investigation described above, please call 217-782-1020.

Sincerely,

Michael Summers, P.G.
Manager, Groundwater Section
Division of Public Water Supplies
Bureau of Water

cc: Matthew Garee
Lauren Hunt
Francisco Herrera
WPC Files 06M

CC2: Jenny Cassel via email
Andrew Rehn via email
Faith Bugel via email
Mychal Ozaeta via email
Lauren Piette via email

Exhibit B

Luminant

Illinois Power Resources Generating, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

November 11, 2023
Illinois Environmental Protection Agency
DWPC – Permits MC#15
Attn: 35 I.A.C. § 845.650(e) Alternative Source Demonstration Submittal
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Duck Creek GMF Pond; IEPA ID # W0578010001-04

Dear Mr. LeCrone:

In accordance with Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.650(e), Illinois Power Resources Generating, LLC (IPRG) is submitting this Alternative Source Demonstration (ASD) for exceedances observed from the Quarter 2 2023 sampling event at the Duck Creek GMF Pond, identified by Illinois Environmental Protection Agency (IEPA) ID No. W0578010001-04.

This ASD is being submitted within 60 days from the date of determination of an exceedance of a groundwater protection standard (GWPS) for constituents listed in 35 I.A.C. § 845.600. As required by 35 I.A.C. § 845.650 (e)(1), the ASD was placed on the facility's website within 24 hours of submittal to the agency.

One hard copy is provided with this submittal.

Sincerely,

Dianna Tickner

Dianna Tickner
Sr. Director – Decommission and Demolition

Enclosures
Alternate Source Demonstration, Quarter 2 2023, East Ash Pond Joppa Power Plant, Joppa Illinois

Intended for
Illinois Power Resources Generating, LLC

Date
November 11, 2023

Project Number
1940103649-005

35 I.A.C. § 845.650(E): ALTERNATIVE SOURCE DEMONSTRATION

DUCK CREEK POWER PLANT
CANTON, ILLINOIS
IEPA ID: W0578010001-04

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: November 11, 2023

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: November 11, 2023

Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
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CONTENTS

TABLES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternative Source Demonstration
bgs	below ground surface
CCR	coal combustion residuals
cm/s	centimeters per second
DCPP	Duck Creek Power Plant
E001	Event 1
EPRI	Electric Power Research Institute
GCL	geosynthetic clay liner
GMF Pond	Gypsum Management Facility Pond
GWPS	groundwater protection standard
HDPE	high-density polyethylene
IEPA	Illinois Environmental Protection Agency
LOE(s)	line(s) of evidence
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NRT/OBG	Natural Resource Technology, an OBG Company
oz/yd^2	ounce per square yard
PCA	Principal component analysis
PMP	potential migration pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
TDS	total dissolved solids
UA	Uppermost Aquifer
UTL	Upper Tolerance Limit

1. INTRODUCTION

Under Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(e), within 60 days from the date of determination of an exceedance of a groundwater protection standard (GWPS) for constituents listed in 35 I.A.C. § 845.600, an owner or operator of a coal combustion residuals (CCR) surface impoundment may complete a written demonstration that a source other than the CCR surface impoundment caused the contamination and the CCR surface impoundment did not contribute to the contamination, or that the exceedance of the GWPS resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction (Alternative Source Demonstration [ASD]).

This ASD has been prepared on behalf of Illinois Power Resources Generating, LLC, by Ramboll Americas Engineering Solutions, Inc (Ramboll), to provide pertinent information pursuant to 35 I.A.C. § 845.650(e) for the Duck Creek Power Plant (DCPP) Gypsum Management Facility Pond (GMF Pond) located near Canton, Illinois.

The first quarterly sampling event (Event 1 [E001]) was completed on May 15, 2023, and analytical data were received on July 14, 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), comparison of statistically derived values with the GWPSs described in 35 I.A.C. § 845.600 to determine exceedances of the GWPS was completed by September 12, 2023, within 60 days of receipt of the analytical data (Ramboll, 2023a). The statistical determination identified the following GWPS exceedances at compliance groundwater monitoring wells:

- pH at well G60L

Pursuant to 35 I.A.C. § 845.650(e), the lines of evidence (LOEs) presented in Section 3 demonstrate that sources other than the GMF Pond were the cause of the pH GWPS exceedance listed above and the GMF Pond has not contributed to the exceedance. A localized native peat deposit located upgradient of G60L is an alternative source of the pH exceedance. This ASD was completed by November 11, 2023, within 60 days of determination of the exceedances (September 12, 2023), as required by 35 I.A.C. § 845.650(e). This ASD has been completed in conformance with guidance provided in the Electric Power Research Institute (EPRI) guidance for development of ASDs at CCR sites (EPRI, 2017), and the United States Environmental Protection Agency (USEPA)'s Solid Waste Disposal Facility Criteria: Technical Manual (USEPA, 1993).

2. BACKGROUND

2.1 Site Location and Description

The DCPP is located in Fulton County, in central Illinois, approximately 9 miles southeast of the town of Canton. Duck Creek Cooling Pond is located east of the power plant and the GMF Pond with agricultural land surrounding the entire property.

2.2 Geology and Hydrogeology

The DCPP geologic and hydrogeologic setting is fully characterized and described in the October 25, 2021 operating permit application (Burns McDonnell, 2021) and January 28, 2022 closure construction permit application (Golder, 2022). Those materials are incorporated herein by reference. The summary below is obtained from published sources, hydrogeologic investigation data, and boring data collected during site investigations conducted from 2005 to 2021 (Natural Resource Technology, an OBG Company [NRT/OBG], 2017; Ramboll, 2021a).

Regionally, the DCPP is positioned on the glacial uplands above the Illinois River in the Ancient Illinois Floodplain of the Till Plains Section of the Central Lowland Province. The undisturbed unlithified materials consist of loess, diamictons, and lacustrine/alluvial deposits. The area is flat to gently rolling uplands that are dissected by deeply incised streams that are tributaries to major river systems.

Several large former surface coal mines are present in the vicinity. Strip mining in the region since the 1930s disrupted the natural stratigraphy down to the Springfield (No. 5) Coal unit. The strip mining activity produced rough topography from soil piles and depressions, often ponded with water. Unlithified materials are present in the excavated strip mine spoils and have been mixed due to the surface mining activities. Mining operations in the area have ceased.

The uppermost bedrock stratum in the area is the Carbondale Formation of the Kewanee Group of the Pennsylvanian System. The Carbondale Formation consists primarily of shaley siltstone and silty shale and includes the Springfield (No. 5) Coal and other coal units. Bedrock occurs within approximately 50 feet of the ground surface in this area.

Quaternary deposits in the Canton area consist mainly of loess, diamictons, and lacustrine/alluvial deposits that were deposited during Illinoian and Wisconsinan glaciations. Four hydrostratigraphic units have been identified at the DCPP based on stratigraphic relationships and common hydrogeologic characteristics, and are summarized as follows (beginning at the ground surface):

- CCR: This unit is composed of gypsum CCR, present within the GMF Pond at a thickness ranging from less than 1 to 22 feet. The thickest areas of gypsum are to the north and west within the GMF Pond and thin toward the south end of the GMF Pond. This material is considered to be homogeneous because the scrubber operations at the facility have not materially changed over the 10-year operating period (2009-2019).
- Uppermost Aquifer (UA): At the GMF Pond, this unit includes the Peoria/Roxanna Loess, the upper Radnor Till, and shallow sands. These units are hydraulically connected and underlain by a thick till sequence of the Radnor Till. The shallow sand zone is the primary migration pathway within these hydraulically connected formations. The shallow sands are laterally extensive across the site, vary in thickness from less than 1 to 18 feet, and are generally

located at an elevation of 570 to 590 feet North American Vertical Datum of 1988 (NAVD88). The shallow sand is saturated. During construction of the GMF Pond, sand was completely removed everywhere it was encountered (mainly the northeast corner and southwest corner of the pond), putting the base of the liner in contact with clay of the lower Radnor Till. Sand outside the GMF Pond footprint remains in place.

  - The Peoria/Roxanna Loess within the UA has been identified as a potential migration pathway (PMP). While the primary migration pathway (*i.e.*, the UA) is the shallow sand of the UA, impacts have the potential to migrate within groundwater in the overlying Peoria/Roxanna Loess. The PMP is saturated at depths of 3.5 to 11 feet below ground surface (bgs). While the PMP and UA are hydraulically connected, groundwater flow in the PMP is expected to be primarily vertical, with the majority of the horizontal migration expected to occur within the UA.

- Lower Confining Unit: Underlying the UA, the lower Radnor Till is approximately 42 to 58 feet thick. Previous hydrogeologic studies indicate discontinuous sand lenses observed within the till are not hydraulically connected to the UA.
- Bedrock Confining Unit: The bedrock encountered across the site consists of low permeability shaley siltstone, silty shale, and coal beds of the Carbondale Formation, and is estimated to have a thickness of approximately 300 to 400 feet.

Groundwater elevations (referenced to NAVD88) in the UA near the GMF Pond are shown on Figure 1. Groundwater elevations were measured on May 8, 2023, prior to a combined sampling event at the DCPP for the three CCR units located there and for multiple monitoring programs required by both federal and state regulatory agencies. Groundwater elevations from UA wells at the GMF Pond ranged from 616.72 to 588.23 feet NAVD88.

2.3 GMF Pond Groundwater and Porewater Monitoring

The monitoring system for the GMF Pond is shown on Figure 1. Monitoring wells G02S, G50S, and G51S are used to monitor background groundwater quality for the GMF Pond. These wells are located north (G02S), northwest (G50S), and west (G51S) of the GMF Pond. The compliance monitoring wells screened in the UA are G54S, G57S, G60S, and G64S. The compliance monitoring wells screened in the PMP are G54L, G60L, and G64L (Ramboll, 2021b).

Groundwater samples are collected and analyzed in accordance with the Multi-Site Sampling and Analysis Plan (Ramboll, 2023b). Statistical evaluation of analytical data is performed in accordance with Multi-Site Statistical Analysis Plan (Ramboll, 2022).

GMF Pond source water samples are collected from the GMF Pond at location X301, a riser pipe from the ring drain present above the upper liner that collects gypsum contact water and pond surface water. The most recent pond water sample was collected from X301 on January 16, 2023. Prior to performing hydrogeologic investigations in 2021, Ramboll completed a review of existing data to determine whether sufficient information existed to meet the requirements of 35 I.A.C. § 845. Based on review of the limited extent of gypsum visible through time on aerial photographs, identifying visible differences (color) in surficial materials, and capturing a representative spatial distribution, a single porewater well location was identified (Figure 2) with consideration for health & safety risks associated with accessing locations where gypsum was present. Location XTPW02 is a temporary monitoring well installed in the gypsum within the pond for collection of porewater (Figure 2). CCR porewater most accurately represents the mobile constituents associated with the waste management activity within the CCR SI (EPRI, 2017). XTPW02 was last sampled in June of 2021. In this double lined surface impoundment the samples from the ring drain riser and the porewater well (collectively referred to herein as “source water”) are representative of the waters present above the double lined system that could be potential contributions to groundwater observed in compliance monitoring wells.

3. ALTERNATIVE SOURCE DEMONSTRATION: LINES OF EVIDENCE

As allowed by 35 I.A.C. § 845.650(e), this ASD demonstrates that sources other than the GMF Pond (the CCR unit) caused the pH exceedance at G60L. LOEs supporting this ASD include the following:

1. The GMF Pond has a double geomembrane liner designed to prevent CCR contact with groundwater.
2. Boron concentrations in compliance groundwater monitoring wells do not exceed background groundwater limits.
3. Geochemical analysis and empirical observations at and near G60L demonstrate that a localized pocket of native peat is an alternative source of the pH exceedance.

These LOEs are described and supported in greater detail below.

3.1 LOE #1: The GMF Pond Has a Double Geomembrane Liner Designed to Prevent CCR Contact with Groundwater

Construction of the GMF Pond was in accordance with Water Pollution Control Permit 2017-EO-62336 granted by the Illinois Environmental Protection Agency (IEPA). The GMF Pond liner system includes the following components:

- 60-mil high-density polyethylene (HDPE) geomembrane liner
- Minimum 12-inch soil cushion layer (up to 24 inches thick in select areas on the side slope)
- 4 ounce per square yard (oz/yd^2) non-woven geotextile filter fabric
- 12-inch highly permeable granular drainage sand layer
- 10 oz/yd^2 non-woven geotextile filter fabric
- 60-mil HDPE geomembrane liner
- Geosynthetic clay liner (GCL) with a manufacturer's certified maximum hydraulic conductivity of 5×10^{-9} centimeters per second (cm/s)
- 36-inch compacted clay layer with a maximum hydraulic conductivity of 9×10^{-7} cm/s based upon laboratory testing of samples collected from the site

Supporting information for the hydraulic conductivity of the compacted clay and GCL is provided in Appendix A.

The IEPA-approved GMF Pond double geomembrane liner system far exceeds the design criteria for a composite liner for CCR surface impoundments established by 35 I.A.C. § 845.400, suggesting that the GMF Pond is not the source of the pH exceedance.

3.2 LOE #2: Boron Concentrations in Compliance Groundwater Monitoring Wells Do Not Exceed Background Groundwater Limits

Boron is a potential indicator of CCR impacts to groundwater due to its leachability from CCR, low occurrence as an anthropogenic contaminant, and mobility in groundwater (Electric Power Research Institute [EPRI], 2012). If boron concentrations in CCR source water are present above background groundwater concentrations, then groundwater impacted by CCR would be expected to contain boron concentrations elevated above the background groundwater Upper Tolerance Limit (UTL). The UTL is a statistically derived upper bound on background groundwater concentrations calculated for comparing compliance well results to background groundwater. Source water samples collected from the GMF Pond have elevated boron concentrations, indicating that boron is a site-specific key indicator for CCR (Appendix B). Boron concentrations measured in compliance monitoring wells during the first quarterly sampling event (Ramboll, 2023a) are summarized in Table A below. All compliance wells had concentrations of boron below the UTL (0.21 milligrams per liter [mg/L]) calculated for background groundwater, indicating that compliance wells have not been affected by CCR in the GMF Pond. Therefore, the GMF Pond is not the source of the pH GWPS exceedance at G60L.

Table A. Summary of Boron Concentrations Measured in Compliance Wells during the first quarterly sampling event.

	G54S	G54L	G57S	G60L	G60S	G64L	G64S
Boron (mg/L) (Background Groundwater UTL=0.21 mg/L)	0.062	0.095	<0.01	0.042	0.030	0.031	0.014

3.3 LOE #3: Geochemical Analysis and Empirical Observations at and Near G60L Demonstrate that a Localized Pocket of Native Peat is an Alternative Source of the pH Exceedance

Multivariate statistical analysis of the groundwater and GMF Pond source water data, review of ionic composition of both, and literature review were performed by Life Cycle Geo, LLC (2023) to support the conclusion that the pH exceedance at G60L is due to the influence of a localized, native peat deposit located upgradient of the well. Details of the analysis are included as Appendix C. The following conclusions were made based on the results of the evaluation:

- Principal component analysis (PCA) shows that the groundwater signature at G60L is similar to background and compliance well groundwater signatures and distinct from the source water signature.
- The major ion composition of groundwater at G60L is inconsistent with influence from source water due to a low proportion of chloride, an indicator of CCR impacts in groundwater, and is similar to the major ion composition of nearby groundwater.
- A localized native peat deposit located upgradient of G60L is an alternative source of the pH exceedance based on literature review of peat influence on groundwater conditions, evaluation of other wells downgradient of the peat deposit (including hydraulic gradients and aqueous and solid-phase geochemistry), and the absence of CCR indicators boron and chloride.

4. CONCLUSIONS

Based on the three LOEs below, it has been demonstrated that the GMF Pond is not the source of the pH exceedance at G60L and the GMF Pond has not contributed to the exceedance.

1. The GMF Pond has a double geomembrane liner designed to prevent CCR contact with groundwater.
2. Boron concentrations in compliance groundwater monitoring wells do not exceed background groundwater limits.
3. Geochemical analysis and empirical observations at and near G60L demonstrate that a localized pocket of native peat is an alternative source of the pH exceedance.

This information serves as the written ASD prepared in accordance with 35 I.A.C. § 845.650(e), demonstrating that the pH exceedance observed at G60L during the first quarterly sampling event was not due to the GMF Pond and is attributable to local peat deposits. Therefore, assessment of corrective measures is not required for pH at the GMF Pond.

5. REFERENCES

Burns McDonnell, 2021. Initial Operating Permit, Duck Creek GMF Pond, October 25, 2021.

Electric Power Research Institute [EPRI], 2012. Groundwater Quality Signatures for Assessing Potential Impacts from Coal Combustion Product Leachate, Report 1017923. October 2012.

Electric Power Research Institute (EPRI), 2017. Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites. EPRI, Palo Alto, CA. 3002010920.

Golder Associates USA, Inc., 2022, Part 845 Construction Permit Application for the Gypsum Management Facility Pond, Duck Creek Power Plant, January 25, 2022.

Life Cycle Geo, LLC, 2023. Technical Memorandum: Geochemical Analysis of Duck Creek Groundwater In Support of an Alternate Source Demonstration (ASD). October 10, 2023.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017. *Hydrogeologic Monitoring Plan. Duck Creek GMF Pond – CCR Unit ID 203, Duck Creek Landfill – CCR Unit ID 204. Duck Creek Power Station, Canton, Illinois*. Illinois Power Resources Generating, LLC. October 17, 2017.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021a. *Hydrogeologic Site Characterization Report. Duck Creek Power Plant, Gypsum Management Facility Pond, Canton, Illinois.* Illinois Power Generating Company. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. Groundwater Monitoring Plan for the Gypsum Management Facility Pond, Duck Creek Power Plant, Canton, Illinois. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022. *Multi-Site Statistical Analysis Plan.* December 28, 2022.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2023a. *35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances: 2023 Quarter 2. Gypsum Management Facility (GMF) Pond, Duck Creek Power Plant, Canton, Illinois.* September 12, 2023.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2023b. *Multi-Site Sampling and Analysis Plan, Revision 1*. October 10, 2023.

United States Environmental Protection Agency (USEPA), 1993. Solid Waste Disposal Facility Criteria: Technical Manual EPA530-R-93-017. Solid Waste and Emergency Response (5305). November 1993.

FIGURES

PROJECT: 169000XXXX | DATED: 10/13/2023 | DESIGNER: GALARNMC Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Duck_Creek\GMF_Pond_203\2023_GMF_POND_203.aprx

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
PORE WATER WELL
CCR SOURCE WATER SAMPLE
MONITORING WELL
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 150 300 Feet

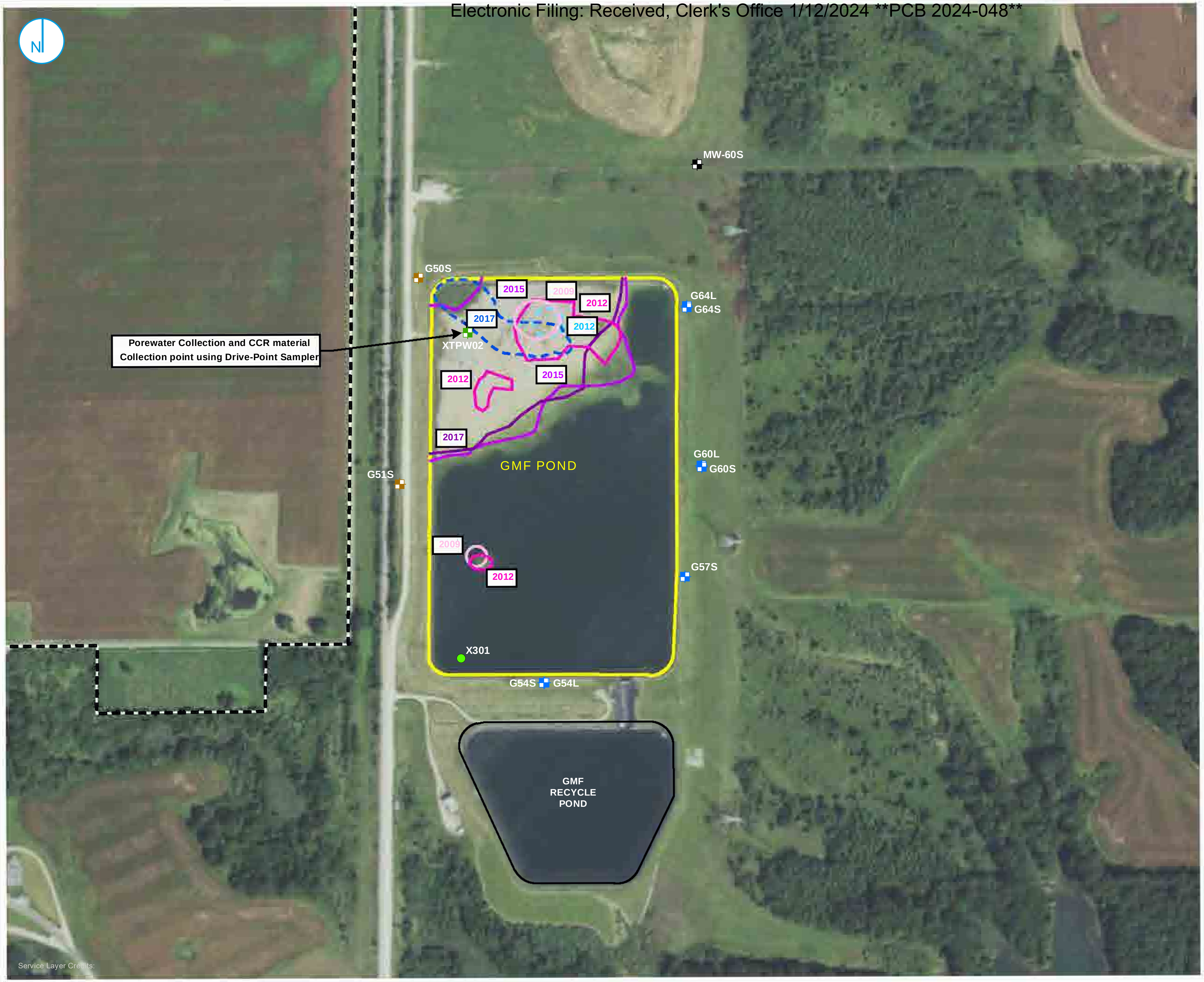
NOTES:
1. PARENTHESES INDICATES WELL NOT USED FOR CONTOURING
2.ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

SAMPLING LOCATIONS AND POTENTIOMETRIC SURFACE MAP MAY 8, 2023

FIGURE 1

ALTERNATIVE SOURCE DEMONSTRATION
GMF POND
DUCK CREEK POWER PLANT
CANTON, ILLINOIS

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.



COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
PORE WATER WELL
CCR SOURCE WATER SAMPLE
MONITORING WELL
APPROXIMATE LIMITS OF ASH BASED ON 2009 AERIAL
APPROXIMATE LIMITS OF ASH BASED ON 2012 AERIAL
APPROXIMATE LIMITS OF ASH BASED ON 2015 AERIAL
APPROXIMATE LIMITS OF ASH BASED ON 2017 AERIAL
APPROXIMATE LIMITS OF VARIANCE IN CCR MATERIAL COLORATION AS OBSERVED IN 2012 AERIAL
APPROXIMATE LIMITS OF VARIANCE IN CCR MATERIAL COLORATION AS OBSERVED IN 2017 AERIAL
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

0 175 350 Feet

CCR CHARACTERIZATION

ALTERNATIVE SOURCE DEMONSTRATION
DUCK CREEK POWER STATION
CANTON, ILLINOIS

FIGURE 2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845\Duck_Creek\GMFP\2023\Figure 2_Proposed CCR Characterization Points.mxd

PROJECT: 169000XXXX | DATED: 11/8/2023 | DESIGNER: GALARNMC

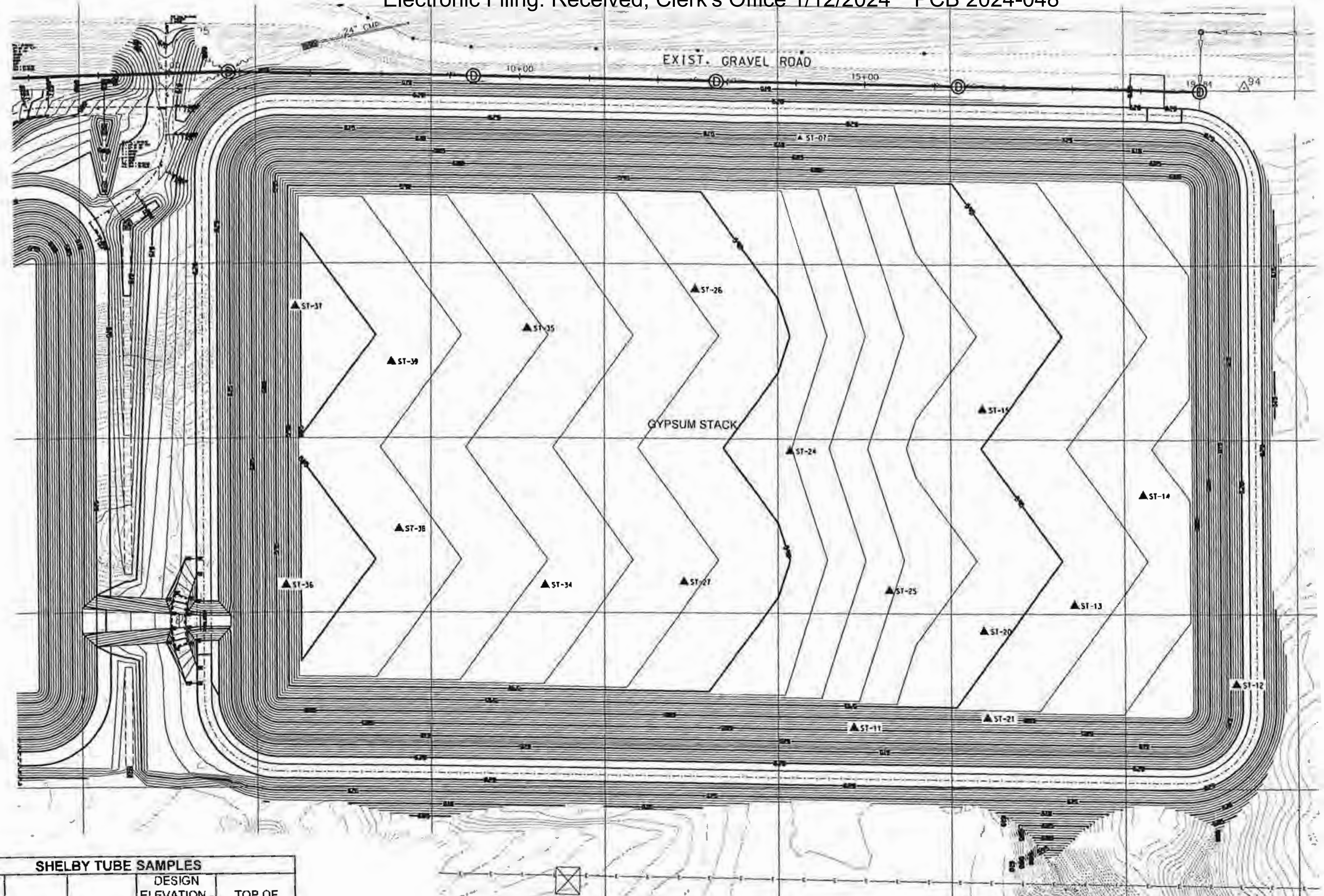
APPENDIX A
GMF POND LINER HYDRAULIC CONDUCTIVITY SUPPORTING INFORMATION

COMPACTED CLAY PERMEABILITY TESTING SUMMARY AND SAMPLE LOCATIONS

Full Scale Soil Liner Permeability Testing Summary

Gypsum Stack Acceptance Report
Gypsum Management Facility
AERG Duck Creek Power Generating Station
Fulton County, Illinois

Date	Sample No.	Easting	Northing	Design Elevation - Top of Soil Liner	Top of Sample Elevation	Permeability Result (1.0 x 10^{-4} cm/sec max.)	Pass/ Fail	Lift
7/28/2008	ST-07	69.21	15533.46	610.98	608.68	3.9 x 10^{-8}	PASS	1
8/1/2008	ST-11	913.80	15609.93	602.03	601.21	9.8 x 10^{-7}	PASS	3
8/1/2008	ST-12	850.80	16161.49	614.17	612.23	2.5 x 10^{-8}	PASS	2
9/10/2008	ST-13	737.41	15927.94	593.51	593.87	1.9 x 10^{-7}	PASS	3/4
9/10/2008	ST-14	579.64	16027.96	594.50	594.92	2.3 x 10^{-7}	PASS	4/5
9/10/2008	ST-15	457.62	15795.25	592.68	591.59	5.0 x 10^{-7}	PASS	3
9/27/2008	ST-20	775.12	15796.90	592.67	592.88	2.3 x 10^{-7}	PASS	4
9/27/2008	ST-21	899.66	15801.58	597.38	597.05	1.0 x 10^{-7}	PASS	3
10/5/2008	ST-24	517.60	15517.36	588.92	588.99	4.6 x 10^{-7}	PASS	4
10/5/2008	ST-25	717.24	15661.41	590.85	591.20	1.6 x 10^{-7}	PASS	4
10/13/2008	ST-26	286.74	15381.59	587.11	587.47	4.4 x 10^{-8}	PASS	4/5
10/13/2008	ST-27	705.94	15365.23	586.78	587.10	9.0 x 10^{-8}	PASS	5
10/22/2008	ST-34	710.76	15163.62	585.18	585.26	1.8 x 10^{-7}	PASS	4
10/22/2008	ST-35	343.17	15138.39	584.81	584.93	1.2 x 10^{-7}	PASS	5
10/23/2008	ST-36	711.00	14792.60	589.17	588.30	7.6 x 10^{-7}	PASS	3
10/23/2008	ST-37	311.60	14806.40	585.21	584.41	2.1 x 10^{-7}	PASS	3
11/2/2008	ST-38	630.45	14953.47	583.52	583.79	8.6 x 10^{-9}	PASS	4
11/2/2008	ST-39	390.91	14942.74	583.41	583.58	1.1 x 10^{-7}	PASS	4



SHELBY TUBE SAMPLES				
SAMPLE NO.	EASTING	NORTHING	DESIGN ELEVATION - TOP OF SOIL LINER	TOP OF SAMPLE ELEVATION
ST-07	69.21	15533.46	610.98	608.68
ST-11	913.80	15609.93	602.03	601.21
ST-12	850.80	16161.49	614.17	612.23
ST-13	737.41	15927.94	593.51	593.87
ST-14	579.64	16027.96	594.50	594.92
ST-15	457.62	15795.25	592.68	591.59
ST-20	775.12	15796.90	592.67	592.88
ST-21	899.66	15801.58	597.38	597.05
ST-24	517.60	15517.36	588.92	588.99
ST-25	717.24	15661.41	590.85	591.20
ST-26	286.74	15381.59	587.11	587.47
ST-27	705.94	15365.23	586.78	587.10
ST-34	710.76	15163.62	585.18	585.26
ST-35	343.17	15138.39	584.81	584.93
ST-36	711.00	14792.60	589.17	588.30
ST-37	311.60	14806.40	585.21	584.41
ST-38	630.45	14953.47	583.52	583.79
ST-39	390.91	14942.74	583.41	583.58

LEGEND

▲ SHELBY TUBE SAMPLE LOCATION

N

0' 60' 120'

SCALE: 1" = 60'

HANSON

NOTICE OF LIMITED RESPONSIBILITY

REFERENCE DRAWINGS

C180-C102

DESCRIPTION

SCALE

SOIL LINER PERMEABILITY TESTING ACCEPTANCE REPORT
DUCK CREEK GYPSUM STACK
CCB MANAGEMENT FACILITY

SITE: DUCK CREEK POWER STATION

C180-C106

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	8/1/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-7-1
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy clayey silt (tr. c. sand & sm. gravel).	DEPTH (FT):	0.0-0.5

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	1032.24			
SPECIMEN HEIGHT (IN)	4.530			
DIAMETER (IN)	2.877	TARE + WET SOIL (G)	128.36	1085.01
AREA (SQ IN)	6.501	TARE + DRY SOIL (G)	111.93	938.43
VOLUME (CU IN)	29.449	TARE (G)	3.71	50.13
WET DENSITY (PCF)	133.53	WATER (G)	16.43	146.58
DRY DENSITY (PCF)	115.93	DRY SOIL (G)	108.22	888.30
WT. DRY SOIL (G)	896.18	WATER CONTENT (%)	15.18	16.50
VOLUME DRY SOIL (CU	20.255			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	31.22	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	4.9	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.9	% COMPACTION	N/A	
1/4 PORE VOLUME	37.66	PRESSURE HEAD (CM H2O)	344.56	
Initial Degree of Saturation	90.31	PANEL NUMBER	5	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 8/7/2008
BORING #: N/A
SAMPLE #: ST-7-1
DEPTH (FT): 0.0-0.5

SPECIMEN HEIGHT (IN) 4.530
DIAMETER (IN) 2.877
AREA (SQ IN) 6.501

HEIGHT OF HEAD (PSI) 4.9
PRESSURE HEAD (CM H2O) 344.555064
PANEL NUMBER 5

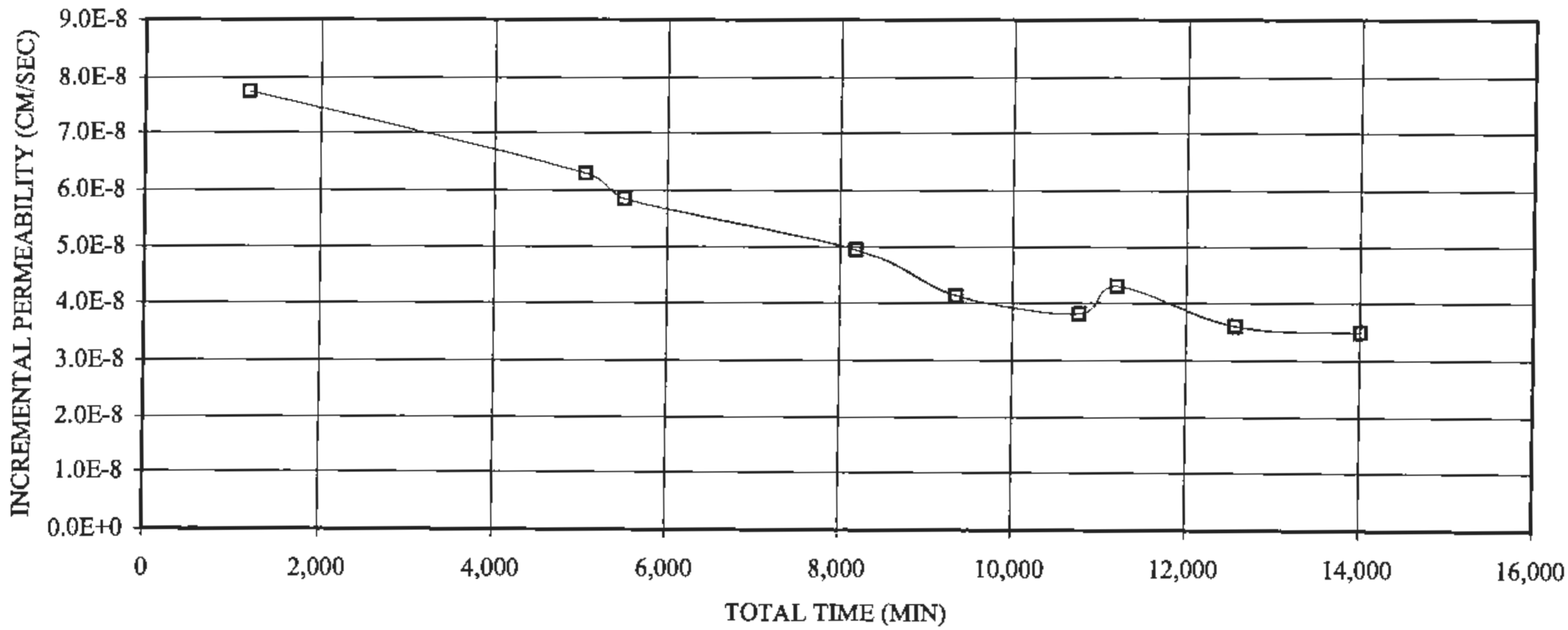
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
8/7/2008	12:53:30	8/8/2008	8:37:00	6.90	6.9000	1183.50	1183.50	7.74E-08	7.74E-08
8/8/2008	16:34:00	8/11/2008	8:59:00	18.30	25.2000	3865.00	5048.50	6.28E-08	7.01E-08
8/11/2008	9:01:30	8/11/2008	16:35:25	2.00	27.2000	453.92	5502.42	5.85E-08	6.62E-08
8/11/2008	16:35:25	8/13/2008	13:14:20	10.00	37.2000	2678.92	8181.33	4.95E-08	5.69E-08
8/13/2008	13:14:20	8/14/2008	8:31:50	3.60	40.8000	1157.50	9338.83	4.13E-08	4.98E-08
8/14/2008	8:31:50	8/15/2008	8:21:15	4.10	44.9000	1429.42	10768.25	3.81E-08	4.30E-08
8/15/2008	8:23:30	8/15/2008	15:36:00	1.40	46.3000	432.50	11200.75	4.30E-08	4.08E-08
8/19/2008	10:17:05	8/20/2008	8:59:45	3.70	50.0000	1362.67	12563.42	3.60E-08	3.90E-08
8/20/2008	8:59:45	8/21/2008	9:03:15	3.80	53.8000	1443.50	14006.92	3.49E-08	3.80E-08

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	8/7/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-7-1
		DEPTH (FT):	0.0-0.5

SPECIMEN HEIGHT (IN)	4.530	HEIGHT OF HEAD (PSI)	4.9
DIAMETER (IN)	2.877	PRESSURE HEAD (CM H2O)	344.555064
AREA (SQ IN)	6.501	PANEL NUMBER	5



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities — Ameren

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	Gypsum Stack
Location	Fulton Co, IL
Sampler(s) / Phone	Ryne Fiorito / 217-414-4056
Turnaround Time	Standard [ ] Rush [X] Date Required: 08/06/08
P.O. # or Invoice To	Ameren Energy
Contact Person	Dave Boyce Ameren Construction Mgr.

Analysis and/or Method Requested: Permeability per liner spec.

Remarks or Observations

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	Permeability per liner spec.						Remarks or Observations
ST-07	07/28/08		S	1	X						
Shelby Tube											
of clay liner											

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
[signature]	07/28/08	17:20	[signature]	7/28/08	17:26	
[signature]	07/29/08	08:00	[signature]	7/29/08	08:00	

Special Instructions:

 Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

HANSON®

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	8/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST11-2
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt / so. clay & sm. gr.	DEPTH (FT):	0.5-1.0

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	829.20			
SPECIMEN HEIGHT (IN)	3.844			
DIAMETER (IN)	2.833	TARE + WET SOIL (G)	162.38	899.17
AREA (SQ IN)	6.304	TARE + DRY SOIL (G)	144.62	772.92
VOLUME (CU IN)	24.231	TARE (G)	3.71	50.01
WET DENSITY (PCF)	130.37	WATER (G)	17.76	126.25
DRY DENSITY (PCF)	115.77	DRY SOIL (G)	140.91	722.91
WT. DRY SOIL (G)	736.39	WATER CONTENT (%)	12.60	17.46
VOLUME DRY SOIL (CU IN)	16.643			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	31.313	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	4.1	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.5	% COMPACTION	N/A
1/4 PORE VOLUME	31.08	PRESSURE HEAD (CM H2O)	288.301176
Initial Degree of Saturation	74.65	PANEL NUMBER	4
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 8/13/2008
BORING #: N/A
SAMPLE #: ST11-2
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.844
DIAMETER (IN) 2.833
AREA (SQ IN) 6.304

HEIGHT OF HEAD (PSI) 4.1
PRESSURE HEAD (CM H2O) 288.301176
PANEL NUMBER 4

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
8/14/2008	13:37:50	8/14/2008	16:24:45	14.80	14.8000	166.92	166.92	1.23E-06	1.23E-06
8/15/2008	8:56:00	8/15/2008	15:42:10	40.33	55.1300	406.17	573.08	1.38E-06	1.30E-06
8/19/2008	10:55:50	8/20/2008	6:52:10	91.02	146.1500	1196.33	1769.42	1.06E-06	1.22E-06
8/20/2008	6:54:20	8/20/2008	17:24:40	46.99	193.1400	630.33	2399.75	1.03E-06	1.16E-06
8/20/2008	17:25:40	8/21/2008	9:09:10	62.90	256.0400	943.50	3343.25	9.25E-07	1.01E-06
8/21/2008	9:12:15	8/21/2008	17:16:00	29.60	285.6400	483.75	3827.00	8.49E-07	9.36E-07
8/21/2008	17:16:50	8/22/2008	8:31:45	69.19	354.8300	914.92	4741.92	1.05E-06	9.41E-07

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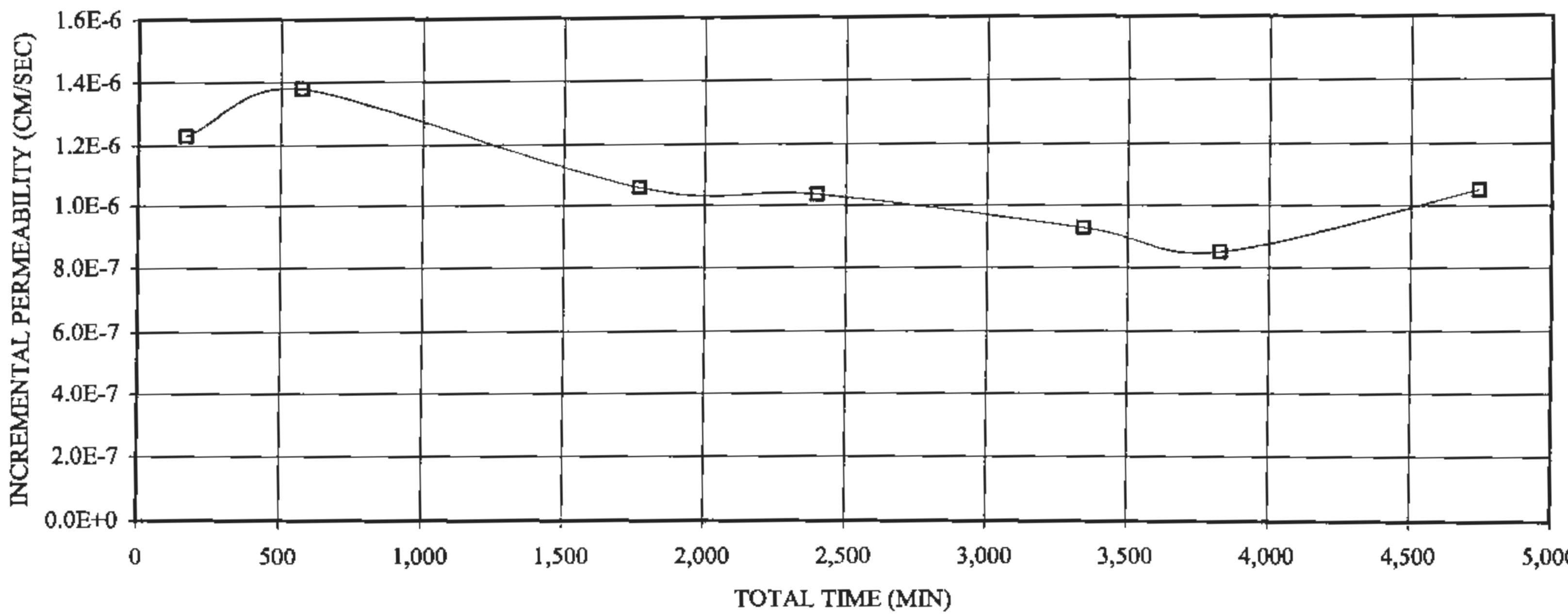
Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	8/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST11-2
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.844	HEIGHT OF HEAD (PSI)	4.1
DIAMETER (IN)	2.833	PRESSURE HEAD (CM H2O)	288.301176
AREA (SQ IN)	6.304	PANEL NUMBER	4



HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	8/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST12-1
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt / so. clay & sm. gravel.	DEPTH (FT):	0.0-0.5

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	1036.96			
SPECIMEN HEIGHT (IN)	4.586			
DIAMETER (IN)	2.874	TARE + WET SOIL (G)	173.55	1059.87
AREA (SQ IN)	6.487	TARE + DRY SOIL (G)	154.28	912.57
VOLUME (CU IN)	29.751	TARE (G)	3.71	3.68
WET DENSITY (PCF)	132.78	WATER (G)	19.27	147.3
DRY DENSITY (PCF)	117.72	DRY SOIL (G)	150.57	908.89
WT. DRY SOIL (G)	919.31	WATER CONTENT (%)	12.80	16.21
VOLUME DRY SOIL (CU IN)	20.778			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	30.16071313	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	4.9	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.6	% COMPACTION	N/A
1/4 PORE VOLUME	36.76	PRESSURE HEAD (CM H2O)	344.555064
Initial Degree of Saturation	80.01	PANEL NUMBER	8
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 6/23/2008
BORING #: N/A
SAMPLE #: ST12-1
DEPTH (FT): 0.0-0.5

SPECIMEN HEIGHT (IN) 4.586
DIAMETER (IN) 2.874
AREA (SQ IN) 6.487

HEIGHT OF HEAD (PSI) 4.9
PRESSURE HEAD (CM H2O) 344.555064
PANEL NUMBER 8

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
8/14/2008	9:20:45	8/15/2008	8:57:30	2.80	2.8000	1416.75	1416.75	2.66E-08	2.66E-08
8/15/2008	8:57:30	8/15/2008	15:43:50	0.90	3.7000	406.33	1823.08	2.98E-08	2.82E-08
8/19/2008	11:01:30	8/20/2008	9:06:30	3.20	6.9000	1325.00	3148.08	3.25E-08	3.12E-08
8/20/2008	9:06:30	8/21/2008	9:13:10	3.00	9.9000	1446.67	4594.75	2.79E-08	3.02E-08
8/21/2008	9:13:10	8/22/2008	8:35:00	2.70	12.6000	1401.83	5996.58	2.59E-08	2.69E-08
8/22/2008	8:35:00	8/25/2008	9:04:15	8.30	20.9000	4349.25	10345.83	2.57E-08	2.58E-08
8/25/2008	9:07:15	8/26/2008	8:37:00	2.80	23.7000	1409.75	11755.58	2.67E-08	2.62E-08
8/26/2008	8:37:00	8/27/2008	10:41:30	3.00	26.7000	1564.50	13320.08	2.58E-08	2.63E-08
8/27/2008	10:41:30	8/28/2008	8:14:15	2.40	29.1000	1292.75	14612.83	2.50E-08	2.54E-08
8/28/2008	8:14:15	8/29/2008	8:24:45	2.60	31.7000	1450.50	16063.33	2.41E-08	2.46E-08
8/29/2008	8:24:45	9/2/2008	10:09:10	10.30	42.0000	5864.42	21927.75	2.36E-08	2.39E-08
9/2/2008	10:06:10	9/3/2008	8:18:00	2.10	44.1000	1331.83	23259.58	2.12E-08	2.24E-08
9/3/2008	8:19:15	9/4/2008	8:25:10	2.80	46.9000	1445.92	24705.50	2.61E-08	2.36E-08
9/4/2008	8:25:10	9/5/2008	9:19:45	2.80	49.7000	1494.58	26200.08	2.52E-08	2.56E-08
9/5/2008	9:19:45	9/8/2008	8:32:00	7.30	57.0000	4272.25	30472.33	2.30E-08	2.41E-08

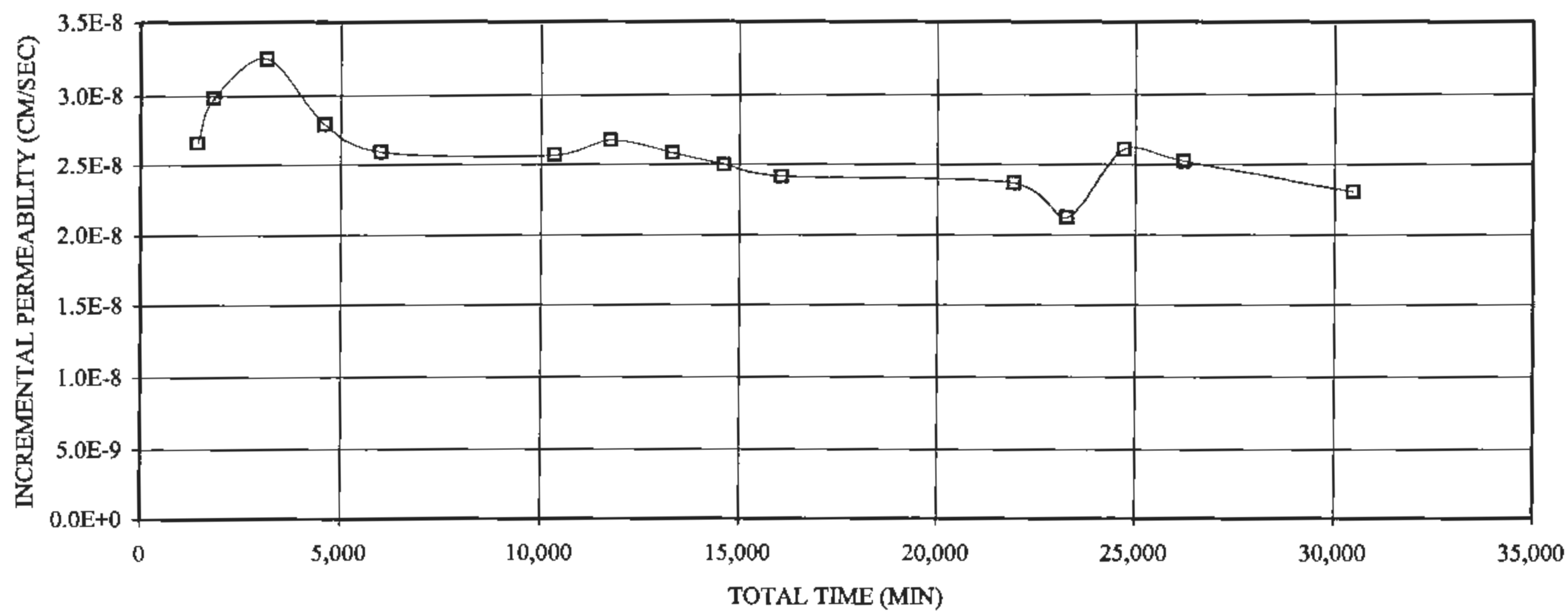
HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	6/23/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST12-1
		DEPTH (FT):	0.0-0.5

SPECIMEN HEIGHT (IN)	4.586	HEIGHT OF HEAD (PSI)	4.9
DIAMETER (IN)	2.874	PRESSURE HEAD (CM H2O)	344.555064
AREA (SQ IN)	6.487	PANEL NUMBER	8



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Ameren

Gypsum Management and CCB Landfill Facilities

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	Gypsum Stack
Location	Fulton County, IL
Sampler(s) / Phone	Ryan Fiorito 217-414-4056
Turnaround Time	Standard [ ] Rush [X] Date Required:
P.O. # or Invoice To	Ameren Energy
Contact Person	Dave Boyce, Ameren Construction Mgr.

Analysis and/or Method Requested: Permeability per clay liner spec.

Remarks or Observations

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	Permeability per clay liner spec.						Remarks or Observations
ST-11 Clay Liner Lift 4	08/01/08	15:15	S	1							
ST-12 Clay Liner Lift 2	08/01/08	15:30	S	1							

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

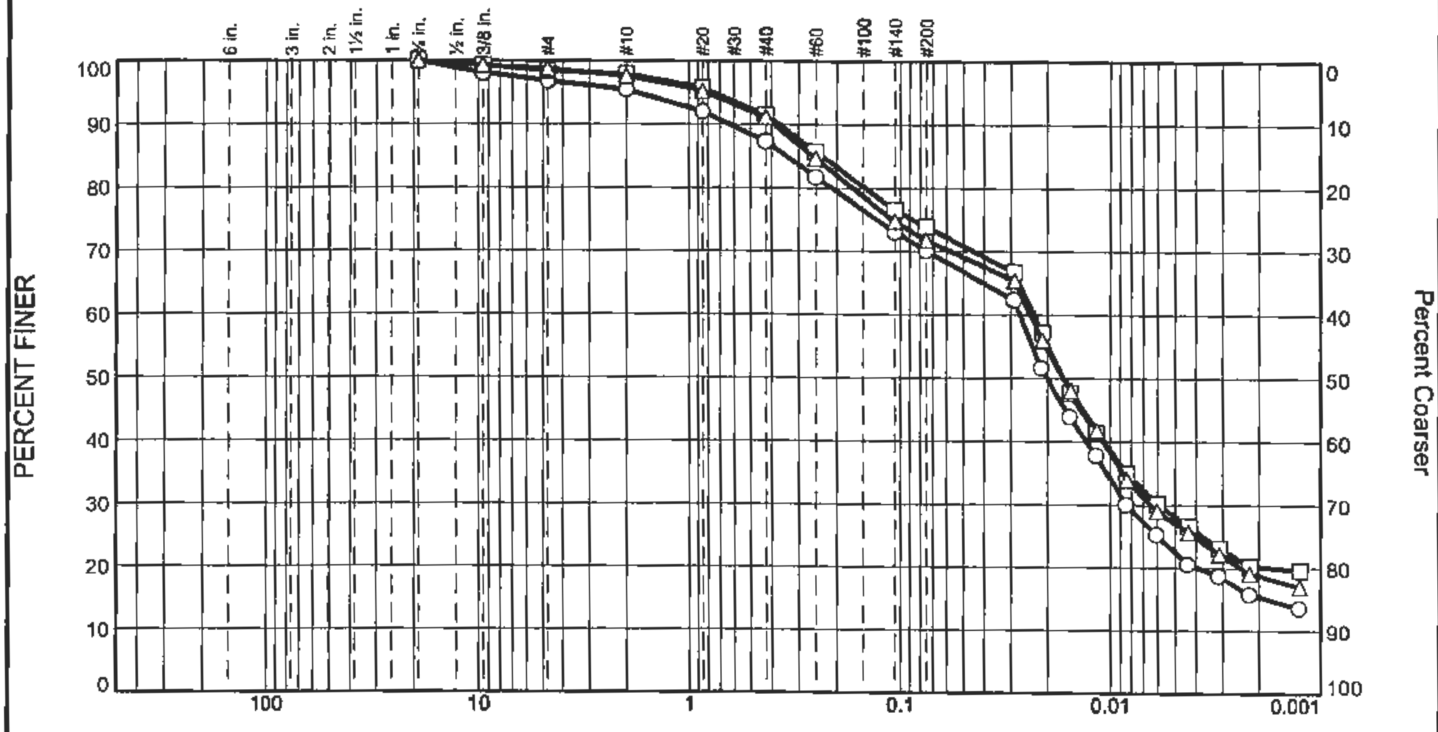
Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
[signature]	08/01/08	16:12	[signature]	8/1/08	4:12	HAND
[signature]	8/1/08	18:09	[signature]	8/1/08	18:09	"

Special Instructions:

Page 1 of 1 Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

#CRITICAL

Particle Size Distribution Report



	% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
○	0.0	0.0	3.1	1.4	8.1	17.2	47.6	22.6
□	0.0	0.0	1.6	0.5	6.4	17.6	45.6	28.3
△	0.0	0.0	1.3	1.1	6.5	19.3	44.6	27.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	24	16	0.3388	0.0271	0.0200	0.0084	0.0018			
□	28	14	0.2337	0.0231	0.0167	0.0059				
△	28	14	0.2585	0.0241	0.0167	0.0064				

	Material Description	USCS	AASHTO
○		CL	A-4(3)
□		CL	
△		CL	A-6(7)

Project No. 03S5010 **Client:** Ameren
Project: Duck Creek Gypsum Stack CQA
○ **Sample Source:** CL ST-7,11 & 12 **Depth:** 0.00' - 0.50' **Sample No.:** ST7-1
□ **Sample Source:** CL ST-7,11 & 12 **Depth:** 0.50' - 1.00' **Sample No.:** ST11-2
△ **Sample Source:** CL ST-7,11 & 12 **Depth:** 0.00' - 0.50' **Sample No.:** ST12-1

Remarks:
○F.M.=0.66
□F.M.=0.46
△F.M.=0.49

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Figure

Tested By: TCJ **Checked By:** RIN

GRAIN SIZE DISTRIBUTION TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.00' - 0.50'
Sample Number: ST7-1
Liquid Limit: 24
Plastic Limit: 16
USCS Classification: CL
AASHTO Classification: A-4(3)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
327.74	0.00	0.00	3			
			2			
			1.5			
			1			
			.75	0.00	100.0	0.0
			.375	6.27	98.1	1.9
			#4	10.32	96.9	3.1
			#10	14.74	95.5	4.5
49.46	0.00	0.00	#20	1.80	92.0	8.0
			#40	4.20	87.4	12.6
			#60	7.10	81.8	18.2
			#140	11.60	73.1	26.9
			#200	13.10	70.2	29.8

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 95.5
Weight of hydrometer sample =50.00
Hygroscopic moisture correction:
- **Moist weight and tare =** 48.49
- **Dry weight and tare =** 48.13
- **Tare weight =** 16.01
- **Hygroscopic moisture =** 1.1%

Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.4	-2.0

Meniscus correction only = 0.0
Specific gravity of solids = 2.70
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.2	1.0235	1.0203	0.0129	23.5	10.1	0.0290	62.4	37.6
4.00	23.2	1.0200	1.0168	0.0129	20.0	11.0	0.0214	51.7	48.3
8.00	23.2	1.0175	1.0143	0.0129	17.5	11.7	0.0156	44.0	56.0
15.00	23.2	1.0155	1.0123	0.0129	15.5	12.2	0.0117	37.9	62.1
30.00	23.1	1.0130	1.0098	0.0129	13.0	12.9	0.0085	30.1	69.9
60.00	23.0	1.0115	1.0083	0.0130	11.5	13.3	0.0061	25.5	74.5
120.00	22.7	1.0100	1.0067	0.0130	10.0	13.6	0.0044	20.6	79.4
240.00	22.3	1.0095	1.0061	0.0131	9.5	13.8	0.0031	18.8	81.2
480.00	22.5	1.0085	1.0052	0.0130	8.5	14.0	0.0022	15.9	84.1
1465.00	23.7	1.0075	1.0045	0.0129	7.5	14.3	0.0013	13.7	86.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.1	3.1	1.4	8.1	17.2	26.7	47.6	22.6	70.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0018	0.0039	0.0084	0.0200	0.0271	0.2094	0.3388	0.6277	1.7673

Fineness Modulus
0.66

GRAIN SIZE DISTRIBUTION TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.50' - 1.00'
Sample Number: ST11-2
Liquid Limit: 28
Plastic Limit: 14
USCS Classification: CL

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
449.83	0.00	0.00	3			
			2			
			1.5			
			1			
			.75	0.00	100.0	0.0
			.375	3.33	99.3	0.7
			#4	7.19	98.4	1.6
			#10	9.42	97.9	2.1
49.02	0.00	0.00	#20	1.10	95.7	4.3
			#40	3.20	91.5	8.5
			#60	6.10	85.7	14.3
			#140	10.70	76.5	23.5
			#200	12.00	73.9	26.1

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 97.9
Weight of hydrometer sample =50.00
Hygroscopic moisture correction:
Moist weight and tare = 55.81
Dry weight and tare = 55.21
Tare weight = 15.47
Hygroscopic moisture = 1.5%
Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.4	-1.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.70
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.3	1.0240	1.0211	0.0129	24.0	9.9	0.0288	66.7	33.3
4.00	23.3	1.0210	1.0181	0.0129	21.0	10.7	0.0212	57.3	42.7
8.00	23.2	1.0180	1.0151	0.0129	18.0	11.5	0.0155	47.7	52.3
15.00	23.2	1.0160	1.0131	0.0129	16.0	12.1	0.0116	41.4	58.6
30.00	23.1	1.0140	1.0111	0.0129	14.0	12.6	0.0084	35.0	65.0
60.00	23.1	1.0125	1.0096	0.0129	12.5	13.0	0.0060	30.2	69.8
120.00	22.7	1.0115	1.0085	0.0130	11.5	13.3	0.0043	26.7	73.3
240.00	22.3	1.0105	1.0073	0.0131	10.5	13.5	0.0031	23.2	76.8
480.00	22.5	1.0095	1.0064	0.0130	9.5	13.8	0.0022	20.2	79.8
1468.00	23.6	1.0090	1.0062	0.0129	9.0	13.9	0.0013	19.6	80.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.6	1.6	0.5	6.4	17.6	24.5	45.6	28.3	73.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0018	0.0059	0.0167	0.0231	0.1465	0.2337	0.3699	0.7560

Fineness Modulus
0.46

GRAIN SIZE DISTRIBUTION TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.00' - 0.50'
Sample Number: ST12-1
Liquid Limit: 28
Plastic Limit: 14
USCS Classification: CL
AASHTO Classification: A-6(7)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
523.35	0.00	0.00	3			
			2			
			1.5			
			1			
			.75	0.00	100.0	0.0
			.375	4.31	99.2	0.8
			#4	6.73	98.7	1.3
			#10	12.55	97.6	2.4
49.50	0.00	0.00	#20	1.20	95.2	4.8
			#40	3.30	91.1	8.9
			#60	6.60	84.6	15.4
			#140	11.60	74.7	25.3
			#200	13.10	71.8	28.2

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 97.6
Weight of hydrometer sample =50.00
Hygroscopic moisture correction:
- **Moist weight and tare =** 42.60
- **Dry weight and tare =** 42.24
- **Tare weight =** 16.13
- **Hygroscopic moisture =** 1.4%

Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.5	-2.0

Meniscus correction only = 0.0
Specific gravity of solids = 2.70
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.3	1.0240	1.0208	0.0129	24.0	9.9	0.0288	65.5	34.5
4.00	23.3	1.0210	1.0178	0.0129	21.0	10.7	0.0212	56.0	44.0
8.00	23.2	1.0185	1.0153	0.0129	18.5	11.4	0.0154	48.1	51.9
15.00	23.2	1.0165	1.0133	0.0129	16.5	11.9	0.0115	41.8	58.2
30.00	23.2	1.0140	1.0108	0.0129	14.0	12.6	0.0084	33.9	66.1
60.00	23.0	1.0125	1.0093	0.0130	12.5	13.0	0.0060	29.1	70.9
120.00	22.7	1.0115	1.0082	0.0130	11.5	13.3	0.0043	25.7	74.3
240.00	22.3	1.0105	1.0071	0.0131	10.5	13.5	0.0031	22.2	77.8
480.00	22.4	1.0095	1.0061	0.0131	9.5	13.8	0.0022	19.2	80.8
1469.00	23.7	1.0085	1.0054	0.0129	8.5	14.0	0.0013	17.1	82.9

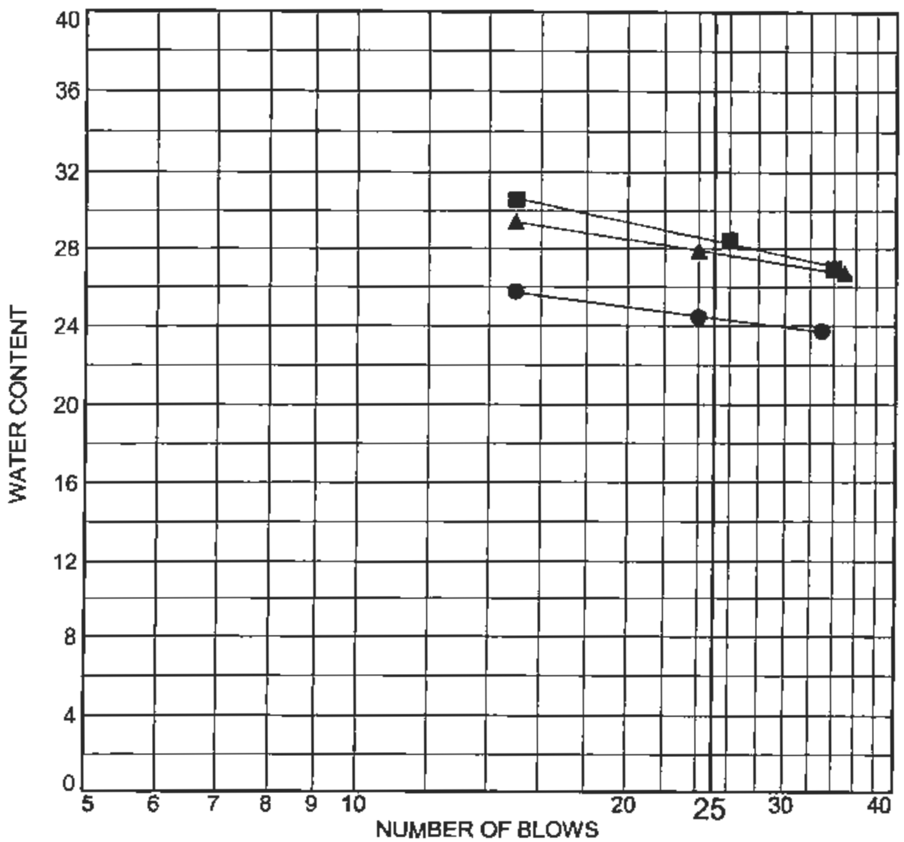
Fractional Components

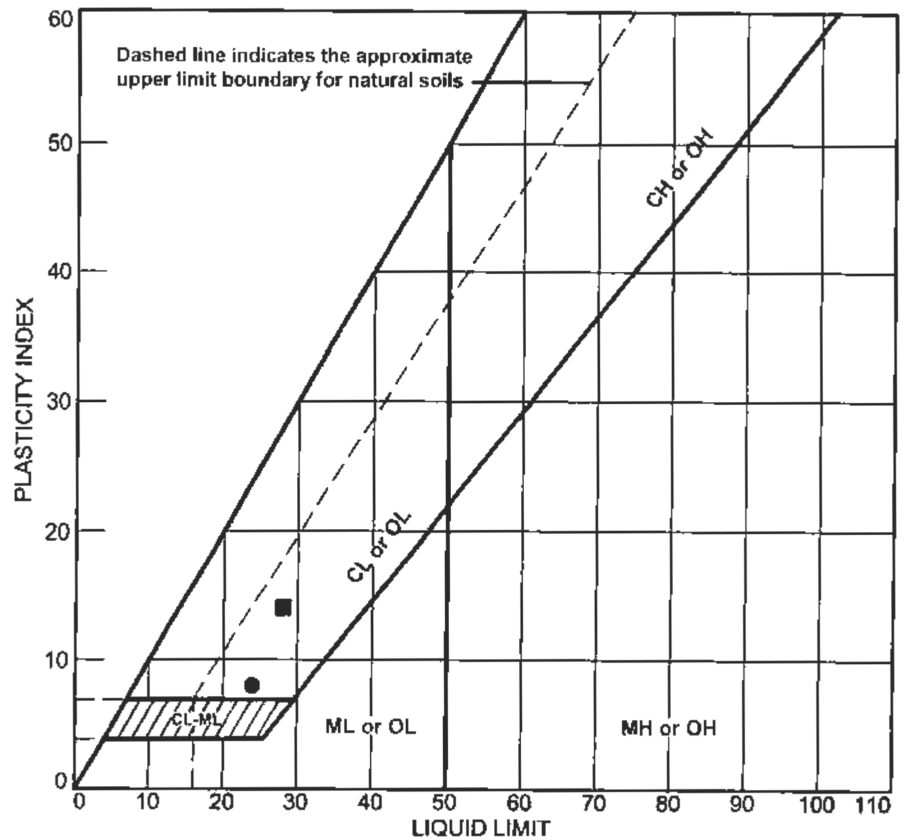
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.3	1.3	1.1	6.5	19.3	26.9	44.6	27.2	71.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0024	0.0064	0.0167	0.0241	0.1677	0.2585	0.3887	0.8171

Fineness Modulus
0.49

LIQUID AND PLASTIC LIMITS TEST REPORT





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	CL ST-7,11 & 12	ST7-1	0.00' - 0.50'	09-23-08	CL			24	8
■	CL ST-7,11 & 12	ST11-2	0.50' - 1.00'	09-23-08	CL			28	14
▲	CL ST-7,11 & 12	ST12-1	0.00' - 0.50'	09-23-08	CL			28	14

Client Ameren

Project Duck Creek Gypsum Stack CQA

Project No. 03S5010 Figure

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Tested By: ○ JCC □ KDE △ JCC **Checked By:** RIN

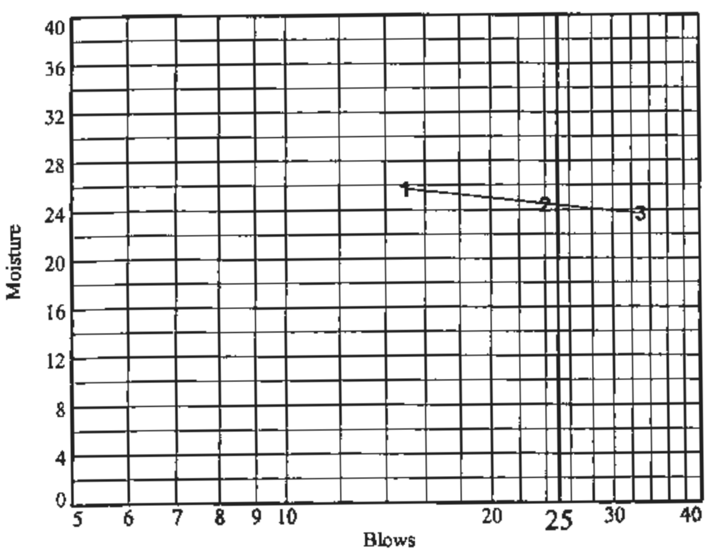
LIQUID AND PLASTIC LIMIT TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.00' - 0.50' **Sample Number:** ST7-1
Date: 09-23-08 **USCS Class.:** CL **AASHTO Class.:** A-4(3)
Tested by: JCC **Checked by:** RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.75	28.96	27.08			
Dry+Tare	26.96	26.30	24.86			
Tare	16.12	15.42	15.50			
# Blows	15	24	33			
Moisture	25.7	24.4	23.7			



Liquid Limit= 24
Plastic Limit= 16
Plasticity Index= 8

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.56	23.37			
Dry+Tare	21.59	22.38			
Tare	15.46	16.01			
Moisture	15.8	15.5			

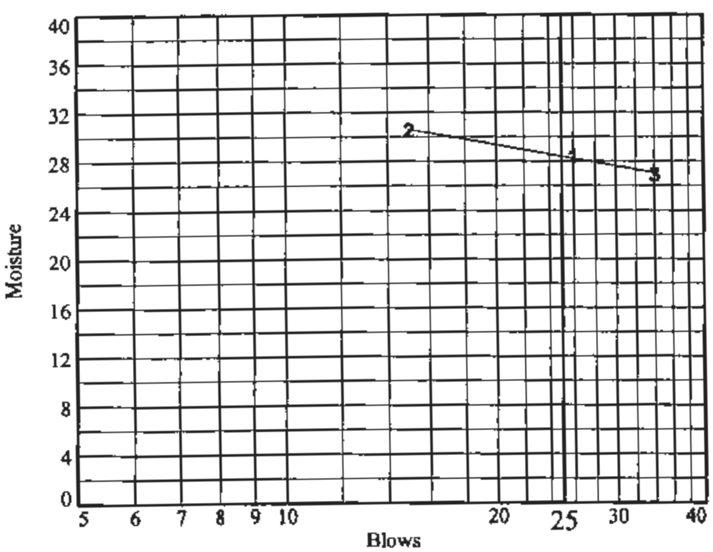
LIQUID AND PLASTIC LIMIT TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.50' - 1.00'
Sample Number: ST11-2
Date: 09-23-08
USCS Class.: CL
Tested by: KDE
Checked by: RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.60	23.57	23.14			
Dry+Tare	21.95	21.76	21.58			
Tare	16.15	15.84	15.79			
# Blows	26	15	34			
Moisture	28.4	30.6	26.9			



Liquid Limit= 28
Plastic Limit= 14
Plasticity Index= 14

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.66	23.53			
Dry+Tare	21.79	22.53			
Tare	15.42	15.44			
Moisture	13.7	14.1			

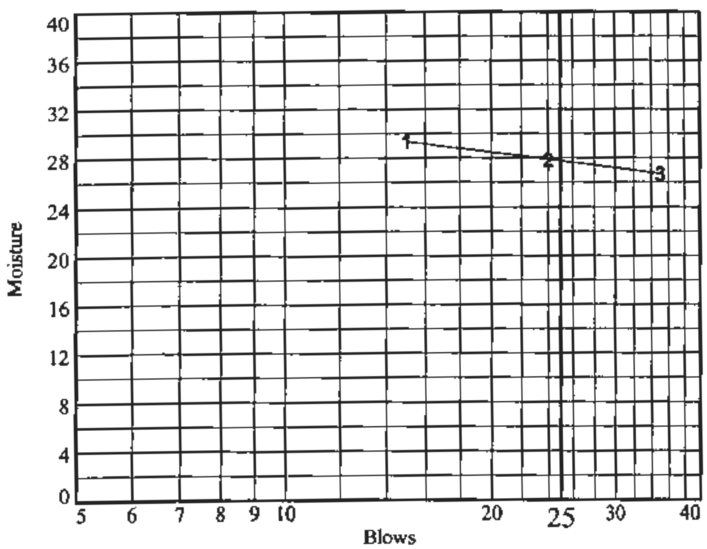
LIQUID AND PLASTIC LIMIT TEST DATA

9/30/2008

Client: Ameren
Project: Duck Creek Gypsum Stack CQA
Project Number: 03S5010
Location: CL ST-7,11 & 12
Depth: 0.00' - 0.50' **Sample Number:** ST12-1
Date: 09-23-08 **USCS Class.:** CL **AASHTO Class.:** A-6(7)
Tested by: JCC **Checked by:** RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.85	28.84	27.60			
Dry+Tare	26.71	26.09	25.12			
Tare	16.03	16.22	15.84			
# Blows	15	24	35			
Moisture	29.4	27.9	26.7			



Liquid Limit= 28
Plastic Limit= 14
Plasticity Index= 14

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.57	24.16			
Dry+Tare	21.68	23.07			
Tare	15.31	15.47			
Moisture	14.0	14.3			

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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/9/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-13-3 Lift 5
SAMPLE DESCRIPTION:	Yel. brn. & gray vf. sandy silt / so. clay	DEPTH (FT):	1.2-1.5

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	888.28			
SPECIMEN HEIGHT (IN)	3.798			
DIAMETER (IN)	2.859	TARE + WET SOIL (G)	49.12	951.45
AREA (SQ IN)	6.420	TARE + DRY SOIL (G)	44.00	845.08
VOLUME (CU IN)	24.382	TARE (G)	3.71	50.23
WET DENSITY (PCF)	138.79	WATER (G)	5.12	106.37
DRY DENSITY (PCF)	123.14	DRY SOIL (G)	40.29	794.85
WT. DRY SOIL (G)	788.13	WATER CONTENT (%)	12.71	13.38
VOLUME DRY SOIL (CU	17.813			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	26.94	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	4.1	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.9	% COMPACTION	N/A	
1/4 PORE VOLUME	26.91	PRESSURE HEAD (CM H2O)	288.30	
Initial Degree of Saturation	93.03	PANEL NUMBER	5	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/9/2008
BORING #: N/A
SAMPLE #: ST-13-3 Lift 5
DEPTH (FT): 1.2-1.5

SPECIMEN HEIGHT (IN) 3.798
DIAMETER (IN) 2.859
AREA (SQ IN) 6.420

HEIGHT OF HEAD (PSI) 4.1
PRESSURE HEAD (CM H2O) 288.301176
PANEL NUMBER 5

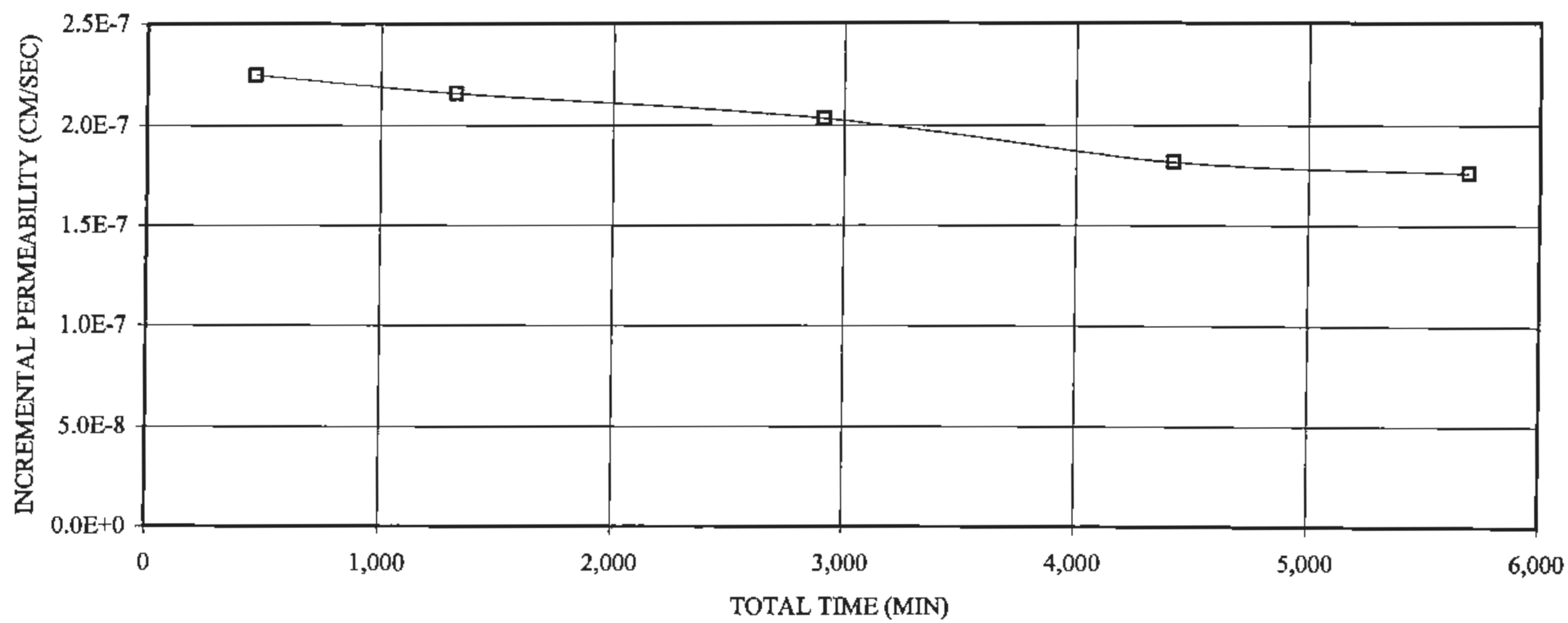
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/9/2008	8:54:45	10/9/2008	16:36:30	7.70	7.7000	461.75	461.75	2.25E-07	2.25E-07
10/9/2008	16:39:00	10/10/2008	7:00:45	13.80	21.5000	861.75	1323.50	2.16E-07	2.20E-07
10/10/2008	7:03:00	10/11/2008	9:31:00	24.00	45.5000	1588.00	2911.50	2.04E-07	2.15E-07
10/11/2008	9:34:00	10/12/2008	10:40:00	20.35	65.8500	1506.00	4417.50	1.82E-07	2.00E-07
10/12/2008	10:40:00	10/13/2008	7:52:00	16.65	82.5000	1272.00	5689.50	1.76E-07	1.87E-07
10/13/2008	7:52:00								

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/9/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-13-3 Lift 5
		DEPTH (FT):	1.2-1.5

SPECIMEN HEIGHT (IN)	3.798	HEIGHT OF HEAD (PSI)	4.1
DIAMETER (IN)	2.859	PRESSURE HEAD (CM H2O)	288.301176
AREA (SQ IN)	6.420	PANEL NUMBER	5



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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/3/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-14-2
SAMPLE DESCRIPTION:	Yel. brn. & gray vf. sandy silt / so. clay.	DEPTH (FT):	0.5-1.0

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	957.23			
SPECIMEN HEIGHT (IN)	4.162			
DIAMETER (IN)	2.863	TARE + WET SOIL (G)	42.76	1022.46
AREA (SQ IN)	6.436	TARE + DRY SOIL (G)	38.79	900.13
VOLUME (CU IN)	26.788	TARE (G)	3.72	50.14
WET DENSITY (PCF)	136.13	WATER (G)	3.97	122.33
DRY DENSITY (PCF)	122.28	DRY SOIL (G)	35.07	849.99
WT. DRY SOIL (G)	859.89	WATER CONTENT (%)	11.32	14.39
VOLUME DRY SOIL (CU IN)	19.435			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	27.45	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	4.5	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.9	% COMPACTION	N/A	
1/4 PORE VOLUME	30.13	PRESSURE HEAD (CM H2O)	316.42812	
Initial Degree of Saturation	80.78	PANEL NUMBER	4	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/10/2008
BORING #: N/A
SAMPLE #: ST-14-2
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 4.162
DIAMETER (IN) 2.863
AREA (SQ IN) 6.436

HEIGHT OF HEAD (PSI) 4.5
PRESSURE HEAD (CM H2O) 316.43
PANEL NUMBER 4

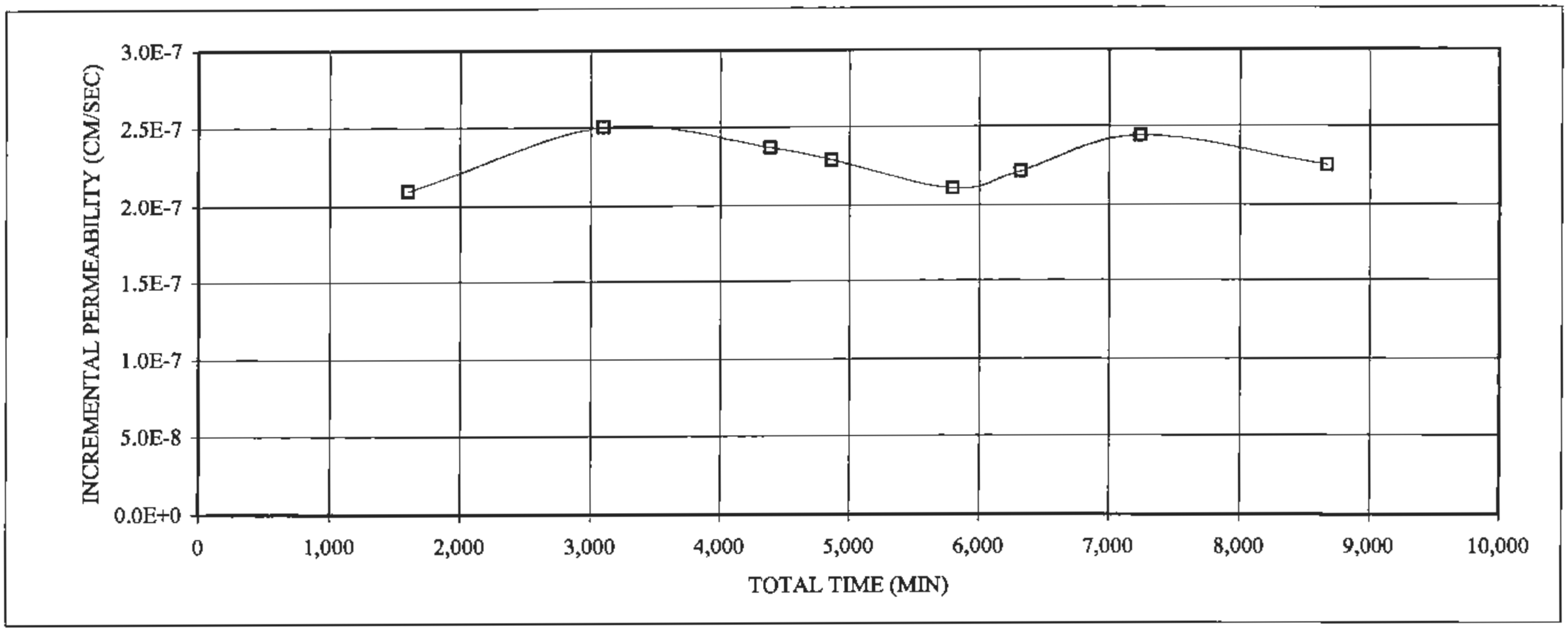
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/10/2008	6:57:00	10/11/2008	9:37:00	25.00	25.00	1600.00	1600.00	2.10E-07	2.10E-07
10/11/2008	9:39:00	10/12/2008	10:36:30	27.95	52.95	1497.50	3097.50	2.50E-07	2.30E-07
10/12/2008	10:36:30	10/13/2008	8:06:45	22.79	75.74	1290.25	4387.75	2.37E-07	2.32E-07
10/13/2008	8:06:45	10/13/2008	16:05:00	8.17	83.91	478.25	4866.00	2.29E-07	2.39E-07
10/13/2008	16:05:00	10/14/2008	7:36:00	14.62	98.53	931.00	5797.00	2.11E-07	2.26E-07
10/14/2008	7:36:00	10/14/2008	16:16:15	8.60	107.13	520.25	6317.25	2.22E-07	2.20E-07
10/14/2008	16:37:00	10/15/2008	7:58:00	16.77	123.90	921.00	7238.25	2.44E-07	2.25E-07
10/15/2008	8:17:00	10/16/2008	8:12:00	24.08	147.98	1435.00	8673.25	2.25E-07	2.30E-07

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/10/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-14-2
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	4.162	HEIGHT OF HEAD (PSI)	4.5
DIAMETER (IN)	2.863	PRESSURE HEAD (CM H2O)	316.43
AREA (SQ IN)	6.436	PANEL NUMBER	4



HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/3/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST15-1 Lift 3
SAMPLE DESCRIPTION:	Yel. brn. & gray vf. sandy silt / so. clay.	DEPTH (FT):	0.0-0.5

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	968.10			
SPECIMEN HEIGHT (IN)	4.274			
DIAMETER (IN)	2.856	TARE + WET SOIL (G)	52.95	1029.49
AREA (SQ IN)	6.408	TARE + DRY SOIL (G)	47.55	905.81
VOLUME (CU IN)	27.385	TARE (G)	3.7	49.33
WET DENSITY (PCF)	134.67	WATER (G)	5.4	123.68
DRY DENSITY (PCF)	119.91	DRY SOIL (G)	43.85	856.48
WT. DRY SOIL (G)	861.95	WATER CONTENT (%)	12.31	14.44
VOLUME DRY SOIL (CU IN)	19.481			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	28.861	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	4.6	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.8	% COMPACTION	N/A	
1/4 PORE VOLUME	32.38	PRESSURE HEAD (CM H2O)	323.46	
Initial Degree of Saturation	81.96	PANEL NUMBER	8	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/9/2008
BORING #: N/A
SAMPLE #: ST15-1 Lift 3
DEPTH (FT): 0.0-0.5

SPECIMEN HEIGHT (IN) 4.274
DIAMETER (IN) 2.856
AREA (SQ IN) 6.408

HEIGHT OF HEAD (PSI) 4.6
PRESSURE HEAD (CM H2O) 323.459856
PANEL NUMBER 8

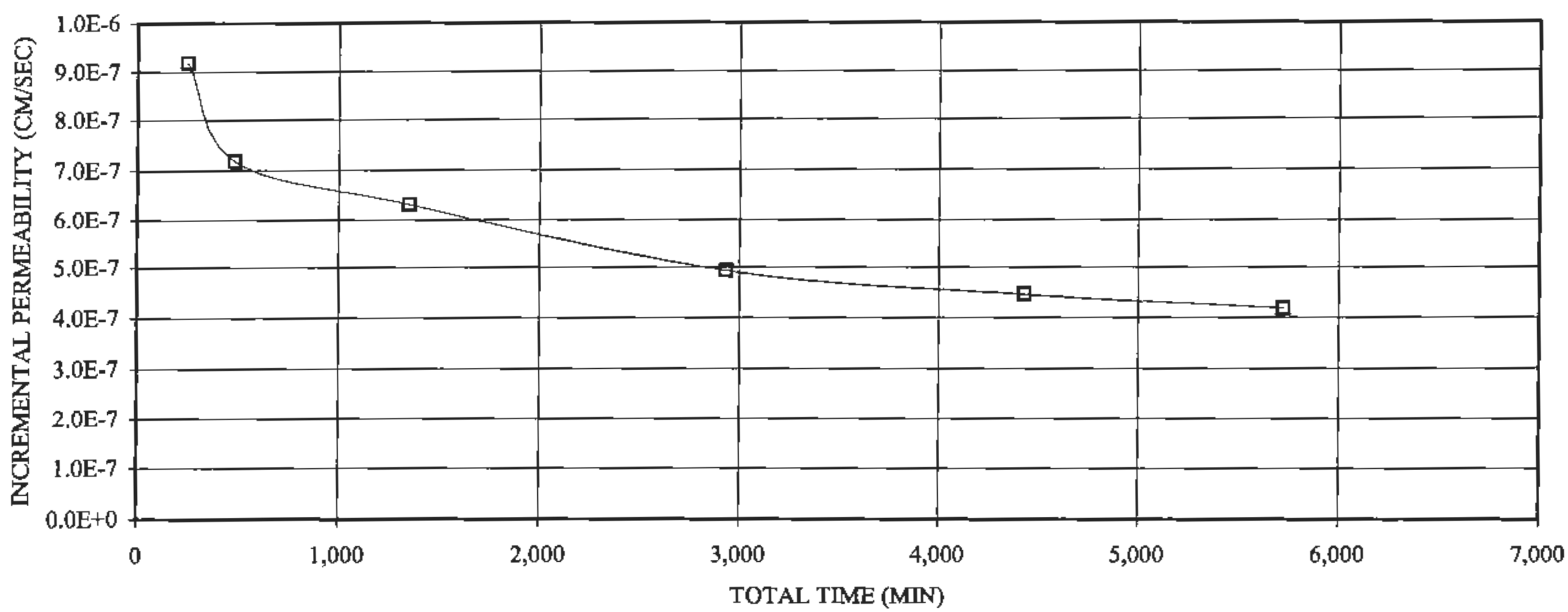
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/9/2008	8:33:00	10/9/2008	12:42:00	16.90	16.9000	249.00	249.00	9.18E-07	9.18E-07
10/9/2008	12:44:15	10/9/2008	16:40:00	12.50	29.4000	235.75	484.75	7.17E-07	8.18E-07
10/9/2008	16:48:00	10/10/2008	7:15:15	40.40	69.8000	867.25	1352.00	6.30E-07	7.55E-07
10/10/2008	7:18:15	10/11/2008	9:39:40	57.60	127.4000	1581.42	2933.42	4.93E-07	6.90E-07
10/11/2008	9:41:10	10/12/2008	10:34:35	49.20	176.6000	1493.42	4426.83	4.46E-07	5.72E-07
10/12/2008	10:36:10	10/13/2008	8:13:00	40.00	216.6000	1296.83	5723.67	4.17E-07	4.97E-07
10/13/2008	8:13:00								

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/9/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST15-1 Lift 3
		DEPTH (FT):	0.0-0.5

SPECIMEN HEIGHT (IN)	4.274	HEIGHT OF HEAD (PSI)	4.6
DIAMETER (IN)	2.856	PRESSURE HEAD (CM H2O)	323.459856
AREA (SQ IN)	6.408	PANEL NUMBER	8



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities Ameren

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	Gypsum Stock
Location	Canton, IL.
Sampler(s) / Phone	John Mansker/D. Lamb 309-635-0268
Turnaround Time	Standard [ ] Rush [ ] Date Required: 1-Week
P.O. # or Invoice To	~~[illegible]~~ Ameren ENERGY
Contact Person	J. Mansker 309-635-0268/Dave Boyce - 309-668-3857

Analysis and/or Method Requested: Per Specification Table A-1

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	Per Specification Table A-1						Remarks or Observations
ST-014	9-10-08	18:30	S	1	X						Clay Liner Material
ST-013	9-10-08	18:00	S	1	X						" "
ST-015	9-10-08	19:00	S	1	X						" "

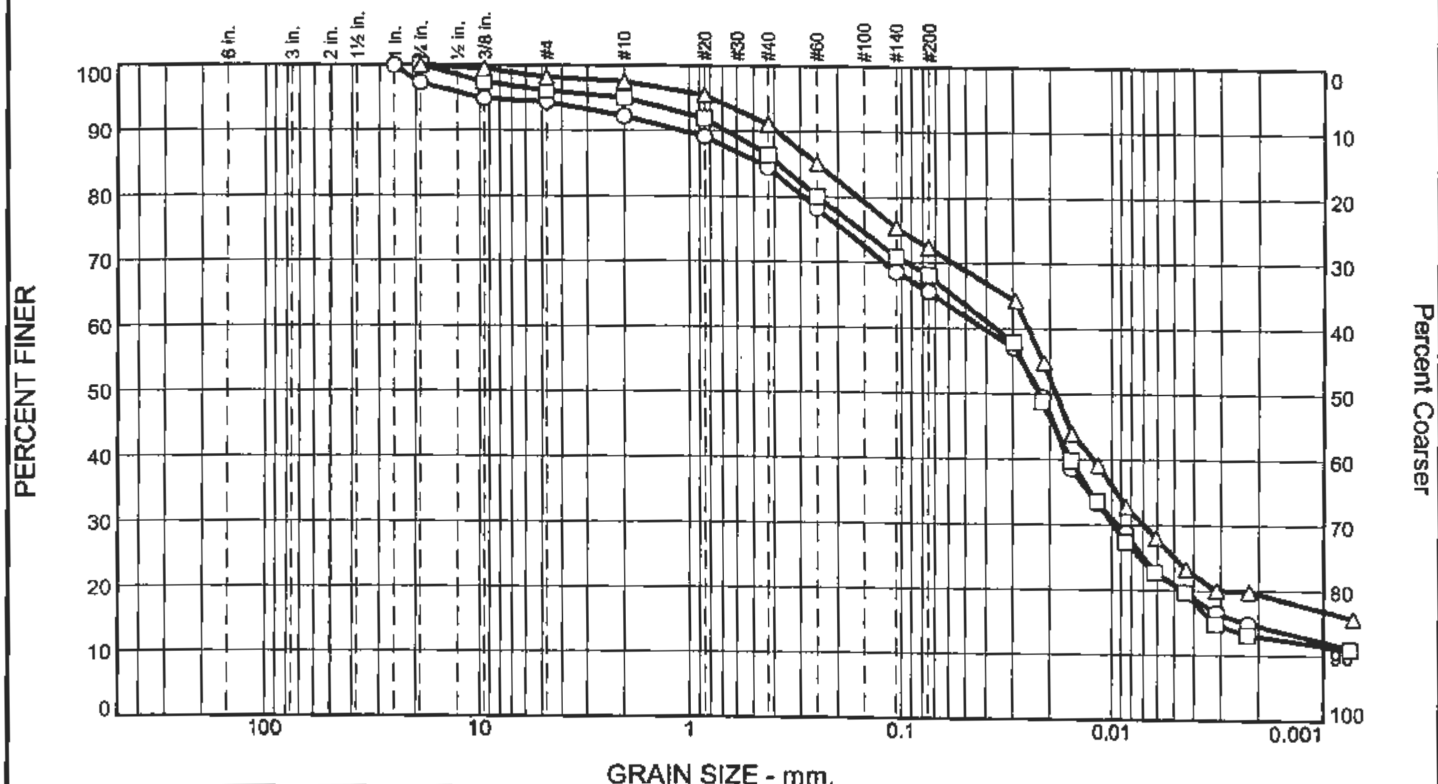
(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
[signature]	9-20-08	1:15 pm	Thomas Ruholl	9-20-08	1:13 pm	HAND
Thomas Ruholl	9-20-08	3:10 pm	[signature]	9-20-08	3:10	Hand.

Special Instructions:

 Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

Particle Size Distribution Report



	% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
○	0.0	2.7	2.9	2.1	7.8	18.9	44.7	20.9
□	0.0	0.0	3.9	1.1	8.6	18.3	47.3	20.8
△	0.0	0.0	1.8	0.6	6.5	18.8	47.1	25.2

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	16	0.4557	0.0408	0.0219	0.0092	0.0023			
□	21	16	0.3776	0.0360	0.0226	0.0098	0.0032			
△	25	15	0.2484	0.0253	0.0186	0.0069				

Material Description	USCS	AASHTO
○ Brn. & gray vf. sandy silt w/so. clay.	CL-ML	A-4(2)
□ Brn. & gray vf. sandy silt w/so. clay.	CL-ML	A-4(1)
△ Brn. & gray vf. sandy silt w/so. clay.	CL	A-4(5)

Project No. 03S5010 **Client:** Ameren

Project: Duck Creek CQA

○ **Sample Source:** Clay Liner **Depth:** 0.70' - 1.20' **Sample No.:** ST13-2 Lift 5

□ **Sample Source:** Clay Liner **Depth:** 0.50' - 1.00' **Sample No.:** ST14-2

△ **Sample Source:** Clay Liner **Depth:** 0.00' - 0.50' **Sample No.:** ST15-1 Lift 3

Remarks:
○F.M.=0.91
□F.M.=0.72
△F.M.=0.49

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.70' - 1.20' **Sample Number:** ST13-2 Lift 5
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Liquid Limit: 23 **Plastic Limit:** 16
USCS Classification: CL-ML **AASHTO Classification:** A-4(2)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
502.80	0.00	0.00	3			
			2			
			1.5			
			1	0.00	100.0	0.0
			.75	13.40	97.3	2.7
			.375	25.70	94.9	5.1
			#4	28.10	94.4	5.6
			#10	38.90	92.3	7.7
49.56	0.00	0.00	#20	1.68	89.1	10.9
			#40	4.15	84.5	15.5
			#60	7.52	78.3	21.7
			#140	12.71	68.6	31.4
			#200	14.33	65.6	34.4

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 92.3
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 46.64
Dry weight and tare = 46.26
Tare weight = 3.72
Hygroscopic moisture = 0.9%
Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.5	-2.0

Meniscus correction only = 0.0
Specific gravity of solids = 2.7
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x **Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.1	1.0225	1.0193	0.0129	22.5	10.3	0.0294	57.0	43.0
4.00	23.0	1.0200	1.0168	0.0130	20.0	11.0	0.0215	49.5	50.5
8.00	23.1	1.0163	1.0131	0.0129	16.3	12.0	0.0158	38.7	61.3
15.00	23.1	1.0145	1.0113	0.0129	14.5	12.5	0.0118	33.3	66.7
30.00	23.0	1.0130	1.0098	0.0130	13.0	12.9	0.0085	28.8	71.2
60.00	22.8	1.0110	1.0077	0.0130	11.0	13.4	0.0061	22.8	77.2
120.00	22.6	1.0100	1.0067	0.0130	10.0	13.6	0.0044	19.7	80.3
240.00	22.5	1.0090	1.0056	0.0130	9.0	13.9	0.0031	16.6	83.4
480.00	22.2	1.0085	1.0051	0.0131	8.5	14.0	0.0022	14.9	85.1
4343.00	23.2	1.0070	1.0038	0.0129	7.0	14.4	0.0007	11.2	88.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.7	2.9	5.6	2.1	7.8	18.9	28.8	44.7	20.9	65.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0023	0.0046	0.0092	0.0219	0.0408	0.2895	0.4557	1.0767	9.8304

Fineness Modulus
0.91

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.50' - 1.00'
Sample Number: ST14-2
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Liquid Limit: 21
Plastic Limit: 16
USCS Classification: CL-ML
AASHTO Classification: A-4(1)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
520.40	0.00	0.00	3			
			2			
			1.5			
			1			
			.75	0.00	100.0	0.0
			.375	13.40	97.4	2.6
			#4	20.20	96.1	3.9
			#10	25.90	95.0	5.0
49.68	0.00	0.00	#20	1.62	91.9	8.1
			#40	4.50	86.4	13.6
			#60	7.82	80.1	19.9
			#140	12.61	70.9	29.1
			#200	14.07	68.1	31.9

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 95.0
Weight of hydrometer sample =50
Hygroscopic moisture correction:
Moist weight and tare = 43.01
Dry weight and tare = 42.76
Tare weight = 3.71
Hygroscopic moisture = 0.6%
Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.4	-1.5

Meniscus correction only = 0.0
Specific gravity of solids = 2.7
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.0	1.0220	1.0191	0.0130	22.0	10.5	0.0297	57.9	42.1
4.00	23.1	1.0190	1.0161	0.0129	19.0	11.3	0.0217	48.8	51.2
8.00	23.2	1.0160	1.0131	0.0129	16.0	12.1	0.0159	39.8	60.2
15.00	23.1	1.0140	1.0111	0.0129	14.0	12.6	0.0119	33.7	66.3
30.00	22.9	1.0120	1.0090	0.0130	12.0	13.1	0.0086	27.4	72.6
60.00	22.8	1.0105	1.0075	0.0130	10.5	13.5	0.0062	22.8	77.2
120.00	22.7	1.0095	1.0065	0.0130	9.5	13.8	0.0044	19.6	80.4
240.00	22.5	1.0080	1.0049	0.0130	8.0	14.2	0.0032	14.9	85.1
480.00	22.3	1.0075	1.0043	0.0131	7.5	14.3	0.0023	13.2	86.8
4342.00	23.2	1.0065	1.0036	0.0129	6.5	14.6	0.0007	11.0	89.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.9	3.9	1.1	8.6	18.3	28.0	47.3	20.8	68.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0032	0.0046	0.0098	0.0226	0.0360	0.2485	0.3776	0.6672	1.9873

Fineness Modulus
0.72

GRAIN SIZE DISTRIBUTION TEST DATA

10/8/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.00' - 0.50'   **Sample Number:** ST15-1 Lift 3
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Liquid Limit: 25   **Plastic Limit:** 15
USCS Classification: CL   **AASHTO Classification:** A-4(5)

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
343.80	0.00	0.00	3			
			2			
			1.5			
			1			
			.75	0.00	100.0	0.0
			.375	1.80	99.5	0.5
			#4	6.20	98.2	1.8
			#10	8.40	97.6	2.4
49.47	0.00	0.00	#20	1.05	95.5	4.5
			#40	3.29	91.1	8.9
			#60	6.33	85.1	14.9
			#140	11.24	75.4	24.6
			#200	12.79	72.3	27.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 97.6
Weight of hydrometer sample =50
Hygroscopic moisture correction:
- **Moist weight and tare =** 22.65
- **Dry weight and tare =** 22.45
- **Tare weight =** 3.64
- **Hygroscopic moisture =** 1.1%

Table of composite correction values:

Temp., deg. C:	18.0	28.0
Comp. corr.:	-4.0	-2.0

Meniscus correction only = 0.0
Specific gravity of solids = 2.7
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x **Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
2.00	23.1	1.0235	1.0205	0.0129	23.5	10.1	0.0291	64.3	35.7
4.00	23.1	1.0205	1.0175	0.0129	20.5	10.9	0.0213	54.9	45.1
8.00	23.1	1.0170	1.0140	0.0129	17.0	11.8	0.0157	43.9	56.1
15.00	23.0	1.0155	1.0125	0.0130	15.5	12.2	0.0117	39.1	60.9
30.00	22.9	1.0135	1.0105	0.0130	13.5	12.7	0.0084	32.8	67.2
60.00	22.8	1.0120	1.0090	0.0130	12.0	13.1	0.0061	28.1	71.9
120.00	22.6	1.0105	1.0074	0.0130	10.5	13.5	0.0044	23.2	76.8
240.00	22.5	1.0095	1.0064	0.0130	9.5	13.8	0.0031	20.0	80.0
480.00	22.2	1.0095	1.0063	0.0131	9.5	13.8	0.0022	19.9	80.1
4534.00	23.2	1.0080	1.0050	0.0129	8.0	14.2	0.0007	15.8	84.2

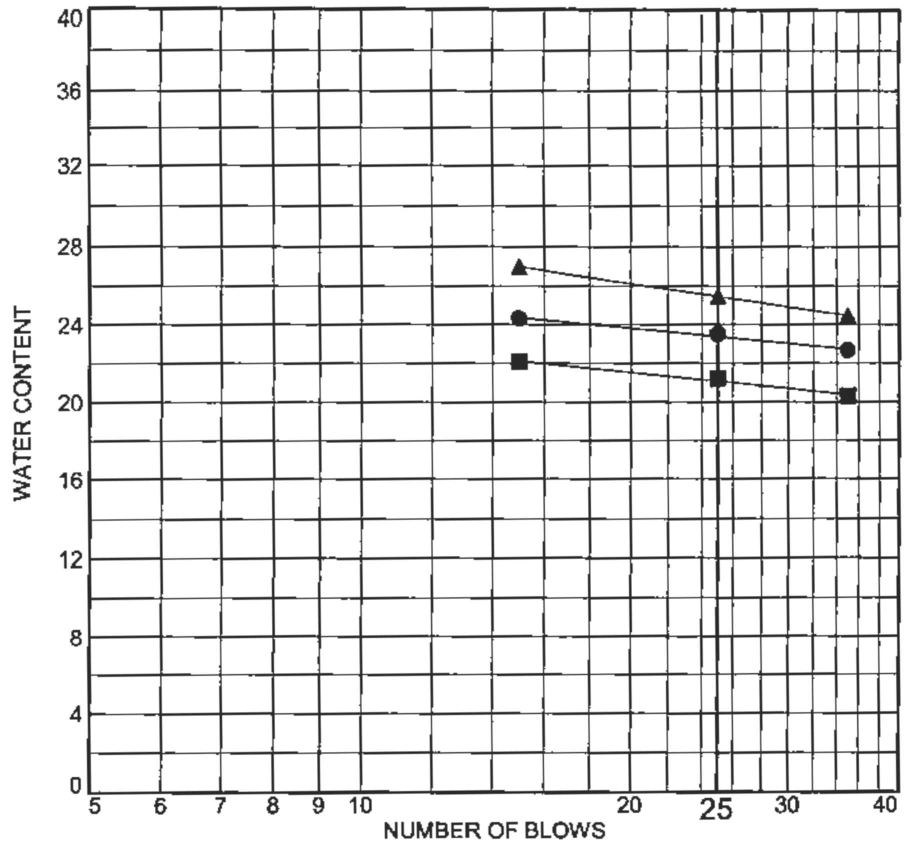
Fractional Components

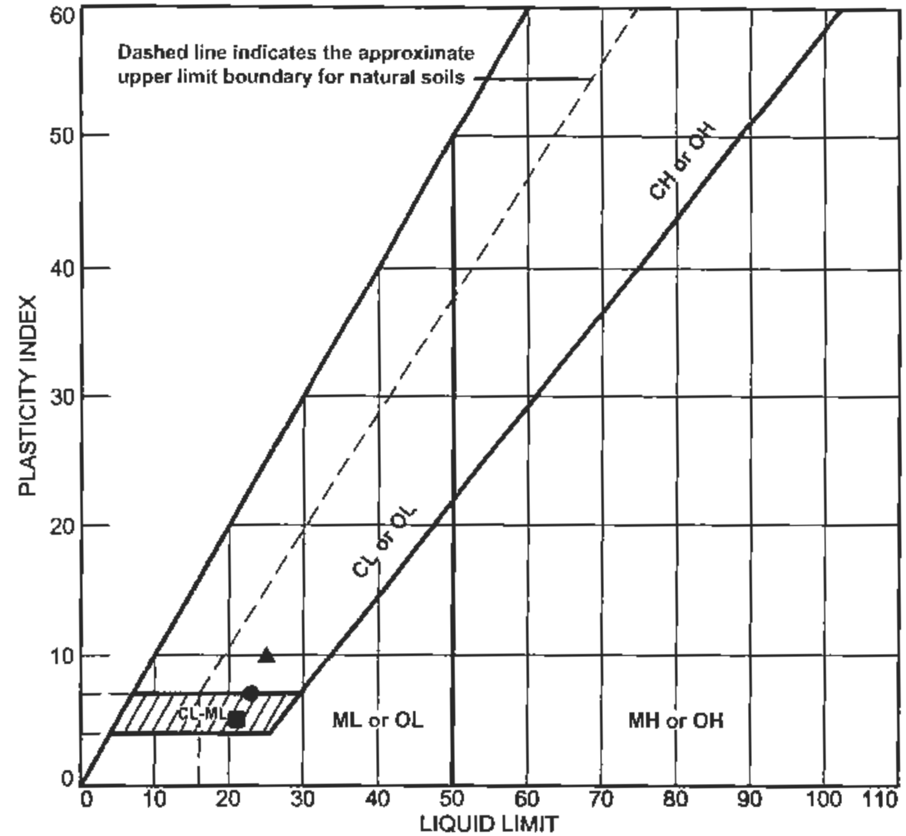
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.8	1.8	0.6	6.5	18.8	25.9	47.1	25.2	72.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0029	0.0069	0.0186	0.0253	0.1595	0.2484	0.3866	0.7876

Fineness Modulus
0.49

LIQUID AND PLASTIC LIMITS TEST REPORT





	SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PI
●	Clay Liner	ST13-2 Lift 5	0.70' - 1.20'	10-03-08	CL-ML	Brn. & gray vf. sandy silt w/so. clay.		23	7
■	Clay Liner	ST14-2	0.50' - 1.00'	10-3-08	CL-ML	Brn. & gray vf. sandy silt w/so. clay.		21	5
▲	Clay Liner	ST15-1 Lift 3	0.00' - 0.50'	10-03-08	CL	Brn. & gray vf. sandy silt w/so. clay.		25	10

Client Ameren

Project Duck Creek CQA

Project No. 03S5010 Figure

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Hanson Professional Services Inc.

Tested By: JCC **Checked By:** RIN

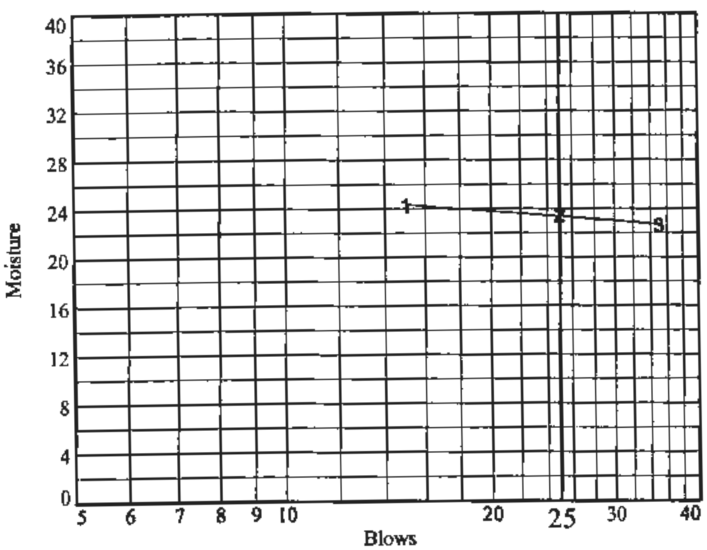
LIQUID AND PLASTIC LIMIT TEST DATA

10/10/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.70' - 1.20' **Sample Number:** ST13-2 Lift 5
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Date: 10-03-08 **USCS Class.:** CL-ML **AASHTO Class.:** A-4(2)
Tested by: JCC **Checked by:** RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	30.11	29.08	28.05			
Dry+Tare	27.37	26.48	25.74			
Tare	16.10	15.42	15.54			
# Blows	15	25	35			
Moisture	24.3	23.5	22.6			



Liquid Limit= 23
Plastic Limit= 16
Plasticity Index= 7

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	25.55	25.33			
Dry+Tare	24.14	24.02			
Tare	15.44	15.99			
Moisture	16.2	16.3			

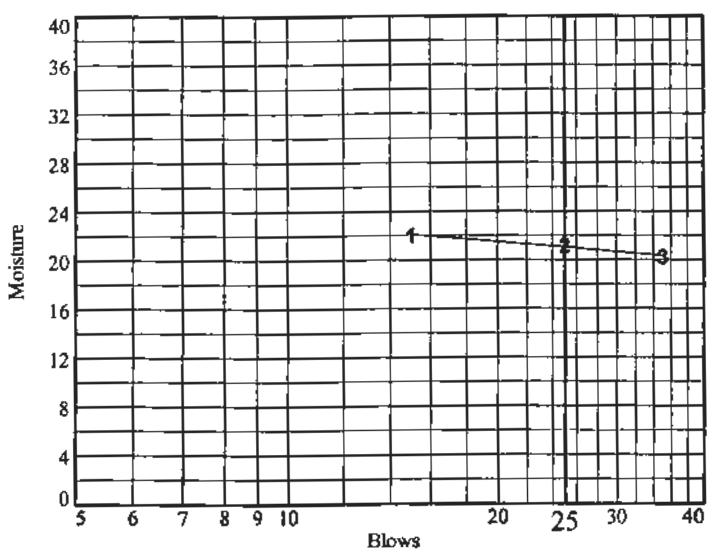
LIQUID AND PLASTIC LIMIT TEST DATA

10/10/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.50' - 1.00' **Sample Number:** ST14-2
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Date: 10-3-08 **USCS Class.:** CL-ML **AASHTO Class.:** A-4(1)
Tested by: JCC **Checked by:** RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	30.28	29.31	28.37			
Dry+Tare	27.56	26.90	26.21			
Tare	15.22	15.53	15.56			
# Blows	15	25	35			
Moisture	22.0	21.2	20.3			



Liquid Limit= 21
Plastic Limit= 16
Plasticity Index= 5

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	23.23	23.72		
Dry+Tare	22.17	22.66		
Tare	15.54	16.08		
Moisture	16.0	16.1		

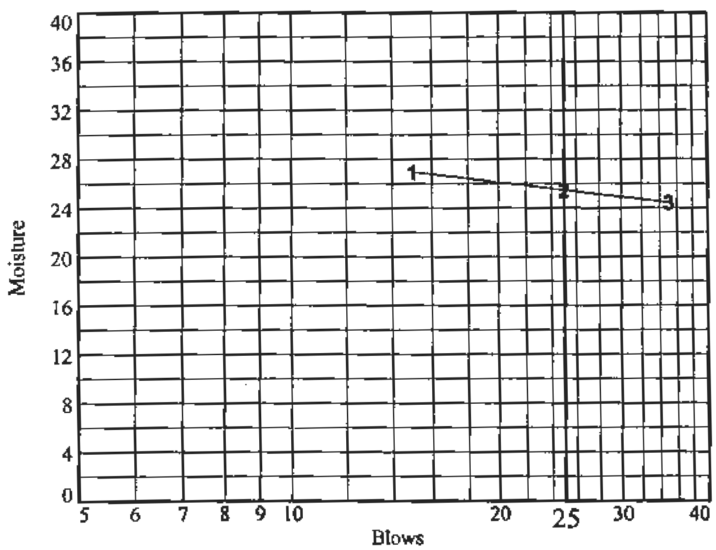
LIQUID AND PLASTIC LIMIT TEST DATA

10/10/2008

Client: Ameren
Project: Duck Creek CQA
Project Number: 03S5010
Location: Clay Liner
Depth: 0.00' - 0.50' **Sample Number:** ST15-1 Lift 3
Material Description: Brn. & gray vf. sandy silt w/so. clay.
Date: 10-03-08 **USCS Class.:** CL **AASHTO Class.:** A-4(5)
Tested by: JCC **Checked by:** RIN

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	30.20	29.00	28.14			
Dry+Tare	27.10	26.26	25.79			
Tare	15.61	15.50	16.18			
# Blows	15	25	35			
Moisture	27.0	25.5	24.5			



Liquid Limit= 25
Plastic Limit= 15
Plasticity Index= 10

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	22.45	22.76			
Dry+Tare	21.56	21.83			
Tare	15.89	15.61			
Moisture	15.7	15.0			

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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-020-2 Lift 5
SAMPLE DESCRIPTION:	Brn. gray vf. sandy silt (tr. clay, c. sand & sm. gravel).	DEPTH (FT):	0.8-1.2

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	833.63			
SPECIMEN HEIGHT (IN)	3.548			
DIAMETER (IN)	2.832	TARE + WET SOIL (G)	361.96	893.13
AREA (SQ IN)	6.299	TARE + DRY SOIL (G)	326.42	807.76
VOLUME (CU IN)	22.349	TARE (G)	3.71	50.17
WET DENSITY (PCF)	142.10	WATER (G)	35.54	85.37
DRY DENSITY (PCF)	128.00	DRY SOIL (G)	322.71	757.59
WT. DRY SOIL (G)	750.93	WATER CONTENT (%)	11.01	11.27
VOLUME DRY SOIL (CU	16.972			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	24.06	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	3.8	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.7	% COMPACTION	N/A	
1/4 PORE VOLUME	22.03	PRESSURE HEAD (CM H2O)	267.21	
Initial Degree of Saturation	93.86	PANEL NUMBER	5	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Floor)

TEST DATE: 10/18/2008
BORING #: N/A
SAMPLE #: ST-020-2 Lift 5
DEPTH (FT): 0.8-1.2

SPECIMEN HEIGHT (IN) 3.548
DIAMETER (IN) 2.832
AREA (SQ IN) 6.299

HEIGHT OF HEAD (PSI) 3.8
PRESSURE HEAD (CM H2O) 267.205968
PANEL NUMBER 5

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/18/2008	9:31:00	10/18/2008	11:39:30	3.00	3.0000	128.50	128.50	3.23E-07	3.23E-07
10/18/2008	11:41:30	10/19/2008	11:56:30	25.90	28.9000	1455.00	1583.50	2.46E-07	2.85E-07
10/19/2008	11:56:30	10/20/2008	8:15:00	19.61	48.5100	1218.50	2802.00	2.23E-07	2.64E-07
10/20/2008	8:15:00	10/20/2008	13:39:00	4.81	53.3200	324.00	3126.00	2.05E-07	2.25E-07
10/20/2008	13:39:00	10/20/2008	16:42:25	2.96	56.2800	183.42	3309.42	2.23E-07	2.17E-07
10/20/2008	16:44:15	10/21/2008	8:17:30	14.80	71.0800	933.25	4242.67	2.19E-07	2.16E-07
10/21/2008	8:17:30	10/21/2008	13:18:15	5.18	76.2600	300.75	4543.42	2.38E-07	2.27E-07

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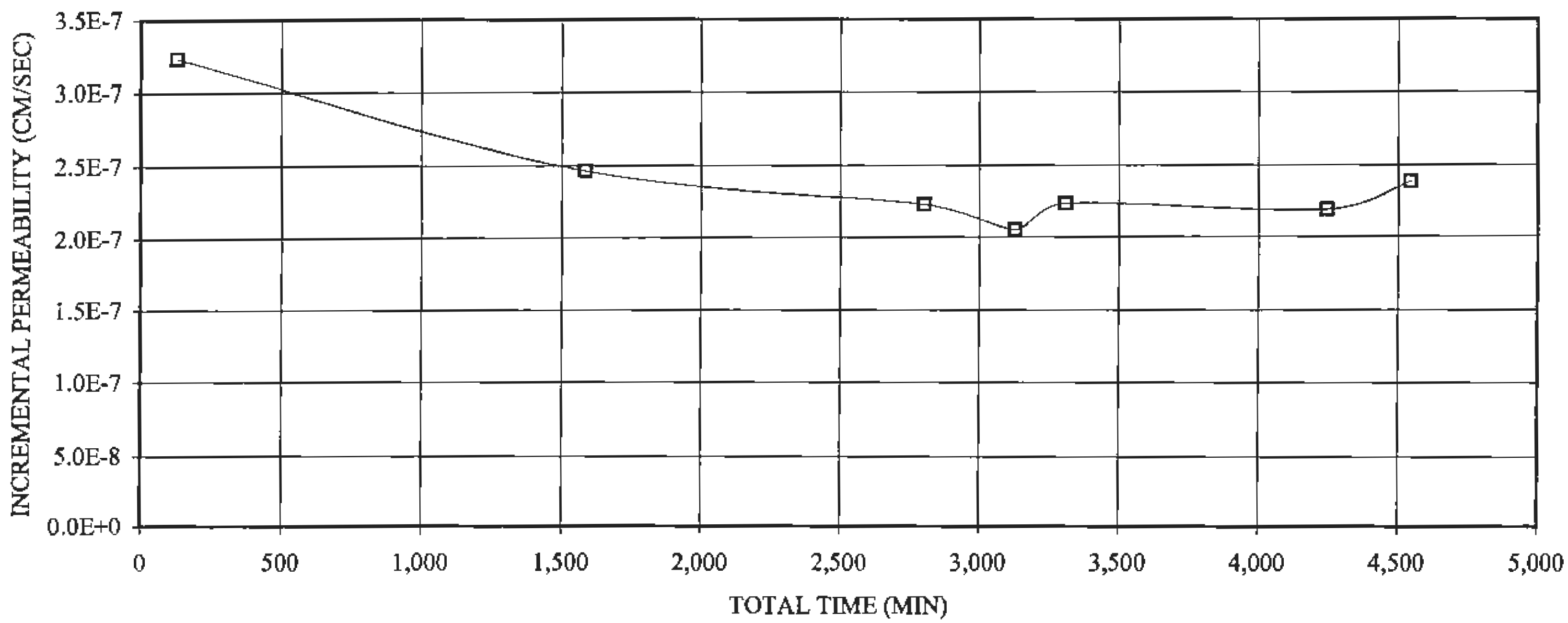
CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/18/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-020-2 Lift 5
		DEPTH (FT):	0.8-1.2

SPECIMEN HEIGHT (IN)	3.548	HEIGHT OF HEAD (PSI)	3.8
DIAMETER (IN)	2.832	PRESSURE HEAD (CM H2O)	267.205968
AREA (SQ IN)	6.299	PANEL NUMBER	5



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Slope)	SAMPLE #:	ST-021-3 Lift 4
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt / so. clay (tr. sm. gravel).	DEPTH (FT):	1.0-1.5

			WATER CONTENT OF TRIMMINGS BEFORE TEST	WATER CONTENT OF TRIMMINGS AFTER TEST
SPECIMEN WEIGHT (G)	760.63			
SPECIMEN HEIGHT (IN)	3.471			
DIAMETER (IN)	2.877	TARE + WET SOIL (G)	131.29	820.24
AREA (SQ IN)	6.501	TARE + DRY SOIL (G)	111.7	691.69
VOLUME (CU IN)	22.564	TARE (G)	3.75	49.98
WET DENSITY (PCF)	128.42	WATER (G)	19.59	128.55
DRY DENSITY (PCF)	108.69	DRY SOIL (G)	107.95	641.71
WT. DRY SOIL (G)	643.80	WATER CONTENT (%)	18.15	20.03
VOLUME DRY SOIL (CU IN)	14.551			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	35.51	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	3.7	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.5	% COMPACTION	N/A
1/4 PORE VOLUME	32.83	PRESSURE HEAD (CM H2O)	260.174232
Initial Degree of Saturation	88.97	PANEL NUMBER	6
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Slope)

TEST DATE: 10/18/2008
BORING #: N/A
SAMPLE #: ST-021-3 Lift 4
DEPTH (FT): 1.0-1.5

SPECIMEN HEIGHT (IN) 3.471
DIAMETER (IN) 2.877
AREA (SQ IN) 6.501

HEIGHT OF HEAD (PSI) 3.7
PRESSURE HEAD (CM H2O) 260.17
PANEL NUMBER 6

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/18/2008	9:33:45	10/19/2008	11:57:00	12.30	12.30	1583.25	1583.25	1.05E-07	1.05E-07
10/19/2008	11:58:00	10/20/2008	8:15:45	9.50	21.80	1217.75	2801.00	1.05E-07	1.05E-07
10/20/2008	8:15:45	10/20/2008	13:41:00	2.30	24.10	325.25	3126.25	9.52E-08	1.00E-07
10/20/2008	13:41:00	10/20/2008	16:44:40	1.30	25.40	183.67	3309.92	9.53E-08	9.53E-08
10/20/2008	16:46:45	10/21/2008	8:21:30	7.20	32.60	934.75	4244.67	1.04E-07	9.95E-08
10/21/2008	8:21:30	10/21/2008	13:02:35	2.00	34.60	281.08	4525.75	9.58E-08	9.98E-08

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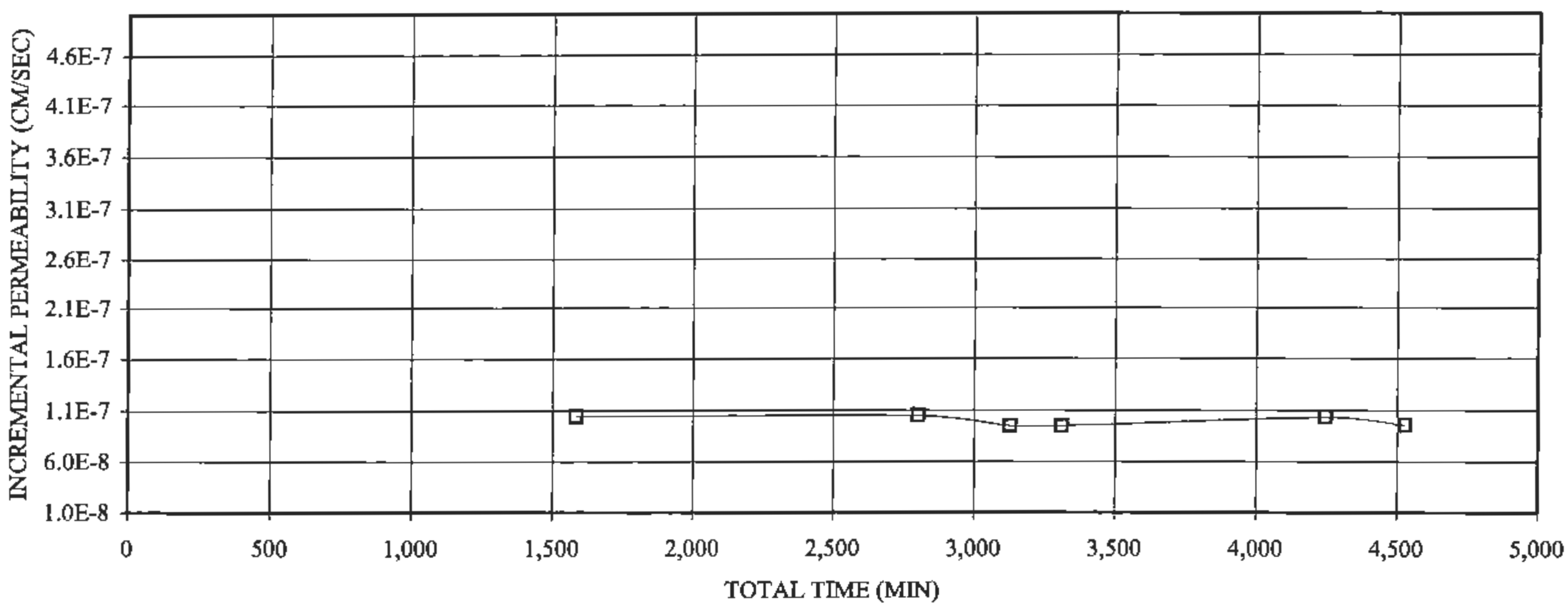
CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/18/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Slope)	SAMPLE #:	ST-021-3 Lift 4
		DEPTH (FT):	1.0-1.5

SPECIMEN HEIGHT (IN)	3.471	HEIGHT OF HEAD (PSI)	3.7
DIAMETER (IN)	2.877	PRESSURE HEAD (CM H2O)	260.17
AREA (SQ IN)	6.501	PANEL NUMBER	6



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-024-2 Lift 5
SAMPLE DESCRIPTION:	Gray vf. sandy silt (tr. clay, c. sand & sm. gravel).	DEPTH (FT):	0.5-1.0

			WATER CONTENT OF TRIMMINGS BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	838.06			
SPECIMEN HEIGHT (IN)	3.756			
DIAMETER (IN)	2.821	TARE + WET SOIL (G)	156.96	889.79
AREA (SQ IN)	6.250	TARE + DRY SOIL (G)	139.91	783.23
VOLUME (CU IN)	23.476	TARE (G)	3.71	49.34
WET DENSITY (PCF)	136.00	WATER (G)	17.05	106.56
DRY DENSITY (PCF)	120.87	DRY SOIL (G)	136.2	733.89
WT. DRY SOIL (G)	744.82	WATER CONTENT (%)	12.52	14.52
VOLUME DRY SOIL (CU IN)	16.834			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	28.292	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	4	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.5	% COMPACTION	N/A
1/4 PORE VOLUME	27.21	PRESSURE HEAD (CM H2O)	281.269
Initial Degree of Saturation	85.67	PANEL NUMBER	8
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

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CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/18/2008
BORING #: N/A
SAMPLE #: ST-024-2 Lift 5
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.756
DIAMETER (IN) 2.821
AREA (SQ IN) 6.250

HEIGHT OF HEAD (PSI) 4
PRESSURE HEAD (CM H2O) 281.26944
PANEL NUMBER 8

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/18/2008	9:42:30	10/18/2008	11:43:45	6.30	6.3000	121.25	121.25	7.28E-07	7.28E-07
10/18/2008	11:45:30	10/19/2008	12:01:30	61.60	67.9000	1456.00	1577.25	5.93E-07	6.61E-07
10/19/2008	12:02:20	10/20/2008	8:18:40	45.20	113.1000	1216.33	2793.58	5.21E-07	6.14E-07
10/20/2008	8:18:40	10/20/2008	13:43:30	10.80	123.9000	324.83	3118.42	4.66E-07	5.27E-07
10/20/2008	13:43:30	10/20/2008	16:53:00	5.60	129.5000	189.50	3307.92	4.14E-07	4.67E-07
10/20/2008	16:57:25	10/21/2008	8:29:30	30.80	160.3000	932.08	4240.00	4.63E-07	4.48E-07
10/21/2008	8:29:30	10/21/2008	13:31:00	9.20	169.5000	301.50	4541.50	4.28E-07	4.35E-07

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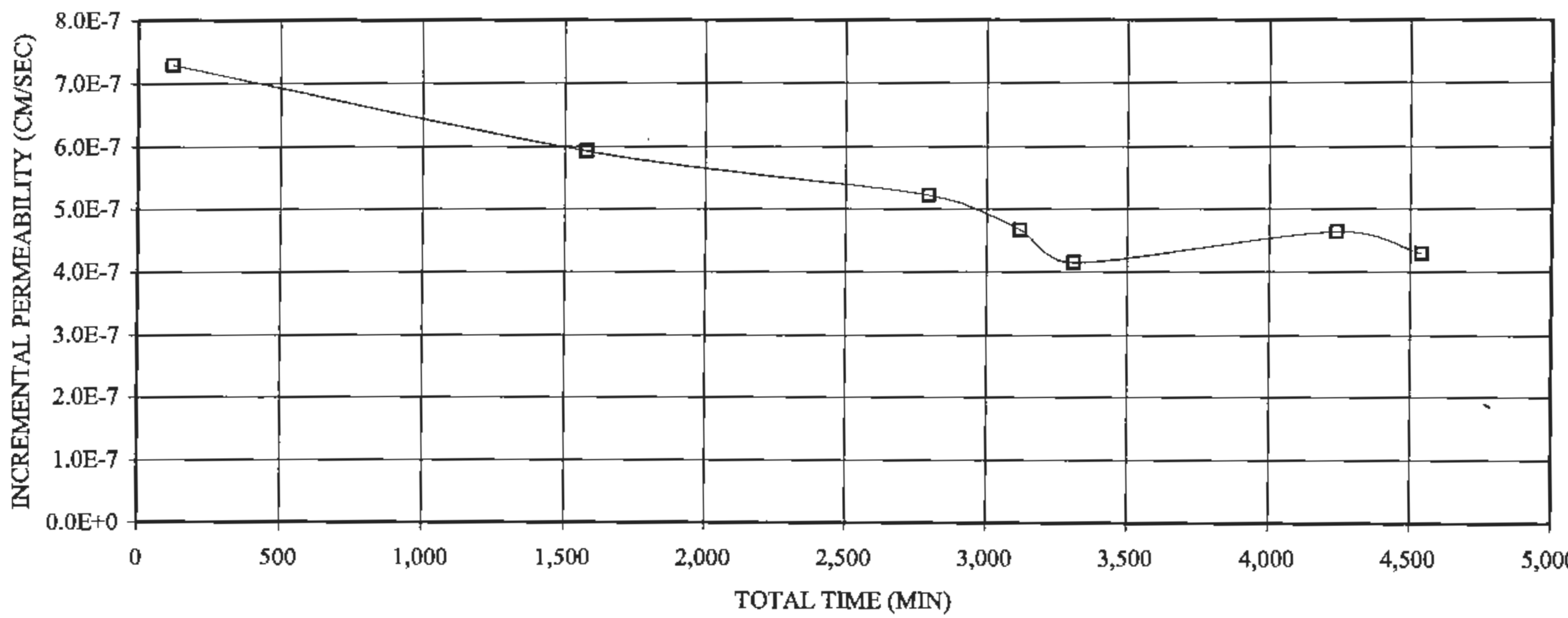
CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/18/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-024-2 Lift 5
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.756	HEIGHT OF HEAD (PSI)	4
DIAMETER (IN)	2.821	PRESSURE HEAD (CM H2O)	281.26944
AREA (SQ IN)	6.250	PANEL NUMBER	8



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/13/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-025-3 Lift 5
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt (tr. clay, c. sand & sm. gravel).	DEPTH (FT):	1.0-1.5

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	851.83			
SPECIMEN HEIGHT (IN)	3.563			
DIAMETER (IN)	2.879	TARE + WET SOIL (G)	218.83	907.69
AREA (SQ IN)	6.510	TARE + DRY SOIL (G)	195.88	815.28
VOLUME (CU IN)	23.195	TARE (G)	3.71	50.04
WET DENSITY (PCF)	139.91	WATER (G)	22.95	92.41
DRY DENSITY (PCF)	124.98	DRY SOIL (G)	192.17	765.24
WT. DRY SOIL (G)	760.95	WATER CONTENT (%)	11.94	12.08
VOLUME DRY SOIL (CU IN)	17.199			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	25.851	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	3.8	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.5	% COMPACTION	N/A	
1/4 PORE VOLUME	24.56	PRESSURE HEAD (CM H2O)	267.21	
Initial Degree of Saturation	92.49	PANEL NUMBER	1	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/18/2008
BORING #: N/A
SAMPLE #: ST-025-3 Lift 5
DEPTH (FT): 1.0-1.5

SPECIMEN HEIGHT (IN) 3.563
DIAMETER (IN) 2.879
AREA (SQ IN) 6.510

HEIGHT OF HEAD (PSI) 3.8
PRESSURE HEAD (CM H2O) 267.205968
PANEL NUMBER 1

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/18/2008	9:44:45	10/18/2008	11:46:30	1.70	1.7000	121.75	121.75	1.88E-07	1.88E-07
10/18/2008	11:48:15	10/19/2008	12:03:00	18.80	20.5000	1454.75	1576.50	1.74E-07	1.81E-07
10/19/2008	12:04:00	10/20/2008	8:20:00	14.80	35.3000	1216.00	2792.50	1.64E-07	1.69E-07
10/20/2008	8:20:00	10/20/2008	13:34:30	3.60	38.9000	314.50	3107.00	1.54E-07	1.59E-07
10/20/2008	13:34:30	10/20/2008	16:58:10	2.40	41.3000	203.67	3310.67	1.58E-07	1.56E-07
10/20/2008	17:00:20	10/21/2008	8:34:15	10.40	51.7000	933.92	4244.58	1.50E-07	1.54E-07
10/21/2008	8:34:15	10/21/2008	13:52:00	3.60	55.3000	317.75	4562.33	1.52E-07	1.51E-07

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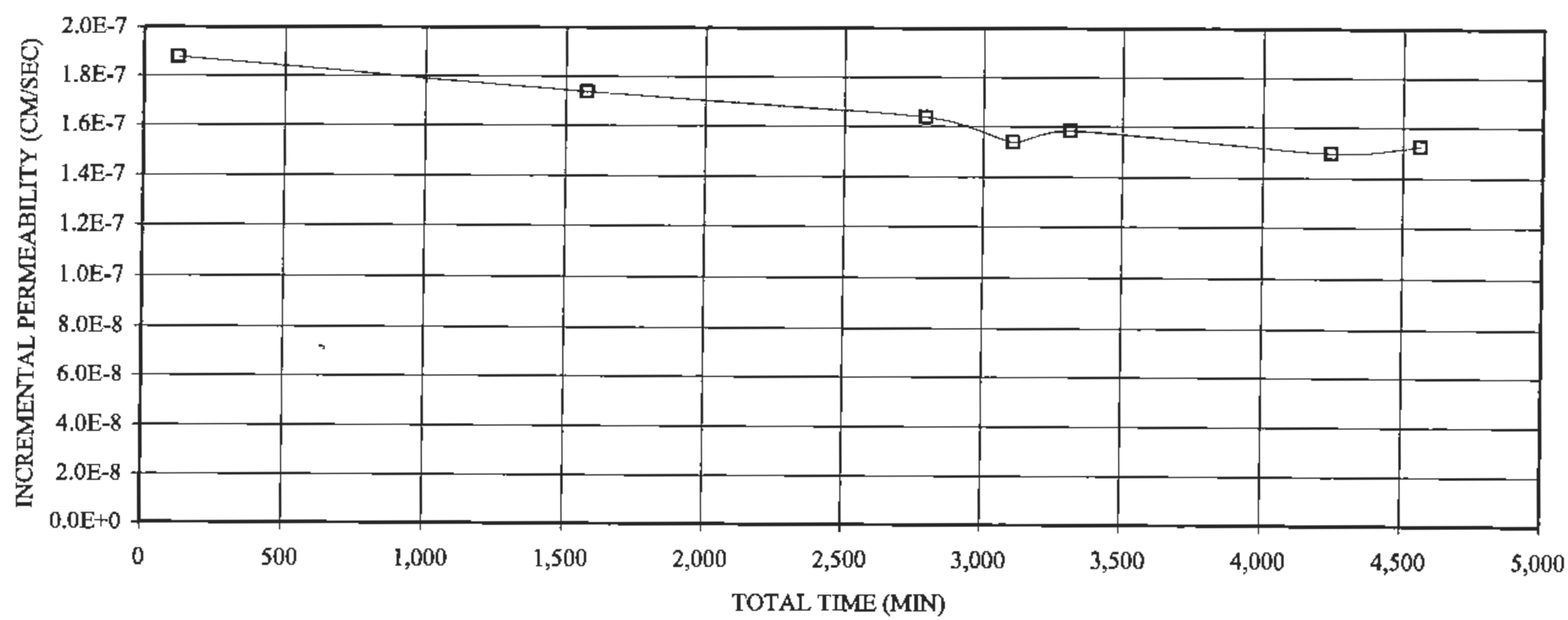
CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 10/18/2008
BORING #: N/A
SAMPLE #: ST-025-3 Lift 5
DEPTH (FT): 1.0-1.5

SPECIMEN HEIGHT (IN) 3.563
DIAMETER (IN) 2.879
AREA (SQ IN) 6.510

HEIGHT OF HEAD (PSI) 3.8
PRESSURE HEAD (CM H2O) 267.205968
PANEL NUMBER 1



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities **Ameren**

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	GYPSOM STACK
Location	FULTON COUNTY, IL
Sampler(s) / Phone	JOHN MANSKER & DIANNE LAMBI (309) 635-0268
Turnaround Time	Standard [ ] Rush [X] Date Required:
P.O. # or Invoice To	AMEREN ENERGY
Contact Person	DAVE BOYCE AMEREN CONST. MGR.

Analysis and/or Method Requested: TEST PER SPECIFICATIONS

Remarks or Observations: CLAY LINER

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	TEST PER SPECIFICATIONS						Remarks or Observations
ST 24	10/5/08	15:20	O	1	X						CLAY LINER
~~ST-022~~	~~10/5/08~~	~~14:00~~	~~O~~	~~1~~							
ST-025	10/5/08	16:00	O	1	X						CLAY LINER
ST-021	9/27/08	14:00	O	1	X						CLAY LINER
ST-020	9/27/08	13:00	O	1	X						CLAY LINER

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
[signature]	10/7/08	14:40	[signature]	10-7-08	14:40	

Special Instructions:

Page ____ of ____ Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/21/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-026-2
SAMPLE DESCRIPTION:	Brn. gray vf. sandy silt (tr. clay, c. sand & sm. gravel).	DEPTH (FT):	0.5-1.0

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	864.61			
SPECIMEN HEIGHT (IN)	3.700			
DIAMETER (IN)	2.860	TARE + WET SOIL (G)	136.05	916.72
AREA (SQ IN)	6.424	TARE + DRY SOIL (G)	121.45	813.46
VOLUME (CU IN)	23.770	TARE (G)	3.75	49.97
WET DENSITY (PCF)	138.57	WATER (G)	14.60	103.26
DRY DENSITY (PCF)	123.28	DRY SOIL (G)	117.70	763.49
WT. DRY SOIL (G)	769.20	WATER CONTENT (%)	12.40	13.52
VOLUME DRY SOIL (CU	17.385			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	26.86	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	4.0	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.9	% COMPACTION	N/A	
1/4 PORE VOLUME	26.16	PRESSURE HEAD (CM H2O)	281.27	
Initial Degree of Saturation	91.19	PANEL NUMBER	5	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Floor)

TEST DATE: 10/23/2008
BORING #: N/A
SAMPLE #: ST-026-2
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.700
DIAMETER (IN) 2.860
AREA (SQ IN) 6.424

HEIGHT OF HEAD (PSI) 4
PRESSURE HEAD (CM H2O) 281.26944
PANEL NUMBER 5

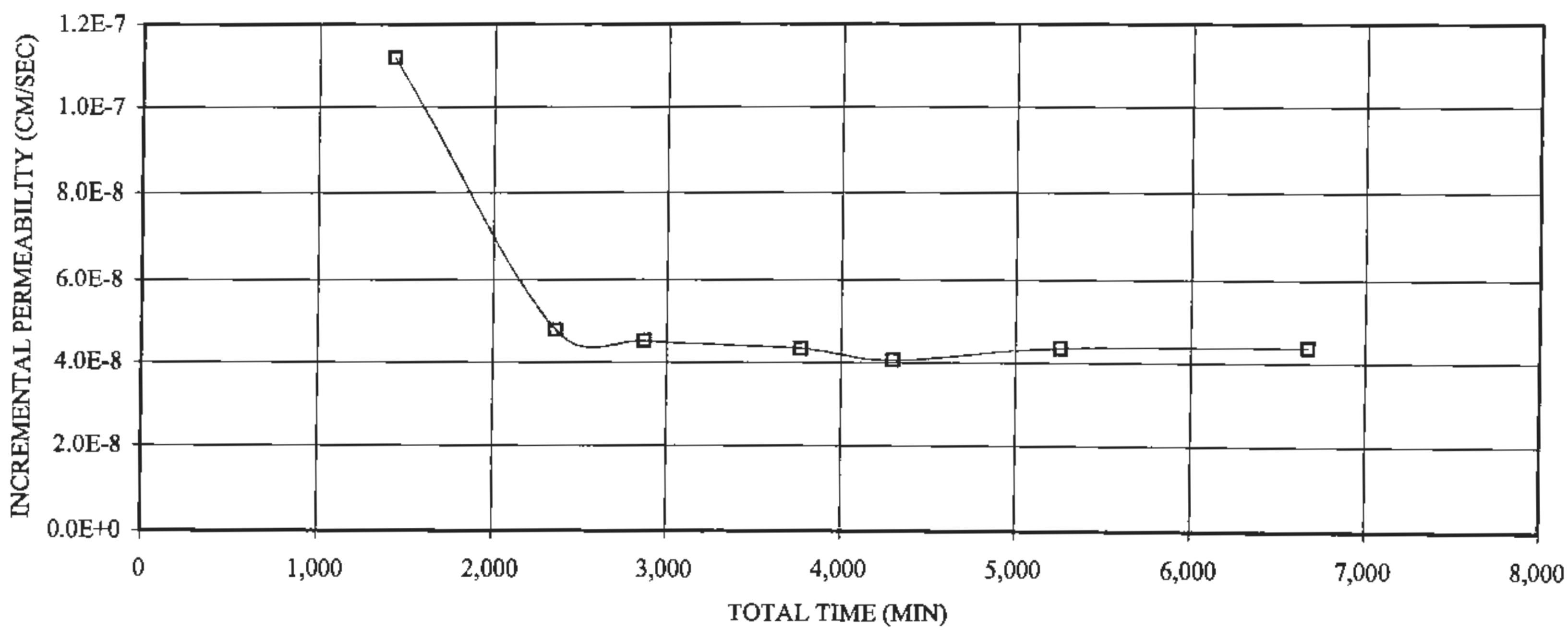
START. DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/23/2008	8:23:00	10/24/2008	8:13:15	11.90	11.9000	1430.25	1430.25	1.12E-07	1.12E-07
10/24/2008	16:27:30	10/25/2008	7:58:00	3.30	15.2000	930.50	2360.75	4.77E-08	7.97E-08
10/25/2008	7:58:00	10/25/2008	16:25:30	1.70	16.9000	507.50	2868.25	4.50E-08	4.63E-08
10/25/2008	16:25:30	10/26/2008	7:25:10	2.90	19.8000	899.67	3767.92	4.33E-08	4.42E-08
10/26/2008	7:25:10	10/26/2008	16:15:00	1.60	21.4000	529.83	4297.75	4.06E-08	4.19E-08
10/26/2008	16:15:00	10/27/2008	8:13:30	3.10	24.5000	958.50	5256.25	4.35E-08	4.20E-08
10/27/2008	8:15:00	10/28/2008	7:50:00	4.60	29.1000	1415.00	6671.25	4.37E-08	4.36E-08

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/23/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-026-2
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.700	HEIGHT OF HEAD (PSI)	4
DIAMETER (IN)	2.860	PRESSURE HEAD (CM H2O)	281.26944
AREA (SQ IN)	6.424	PANEL NUMBER	5



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/21/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-027-1
SAMPLE DESCRIPTION:	Yel. brn. & brn. vf. sandy silt / so. clay (tr. gravel).	DEPTH (FT):	0.0-0.5

			WATER CONTENT OF TRIMMINGS BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	798.21			
SPECIMEN HEIGHT (IN)	3.604			
DIAMETER (IN)	2.887	TARE + WET SOIL (G)	353.7	858.81
AREA (SQ IN)	6.546	TARE + DRY SOIL (G)	304.91	723.83
VOLUME (CU IN)	23.592	TARE (G)	3.71	50.19
WET DENSITY (PCF)	128.89	WATER (G)	48.79	134.98
DRY DENSITY (PCF)	110.92	DRY SOIL (G)	301.2	673.64
WT. DRY SOIL (G)	686.94	WATER CONTENT (%)	16.20	20.04
VOLUME DRY SOIL (CU IN)	15.526			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	34.19	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	3.8	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.2	% COMPACTION	N/A	
1/4 PORE VOLUME	33.05	PRESSURE HEAD (CM H2O)	267.205968	
Initial Degree of Saturation	84.18	PANEL NUMBER	6	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Floor)

TEST DATE: 10/23/2008
BORING #: N/A
SAMPLE #: ST-027-1
DEPTH (FT): 0.0-0.5

SPECIMEN HEIGHT (IN) 3.604
DIAMETER (IN) 2.887
AREA (SQ IN) 6.546

HEIGHT OF HEAD (PSI) 3.8
PRESSURE HEAD (CM H2O) 267.21
PANEL NUMBER 6

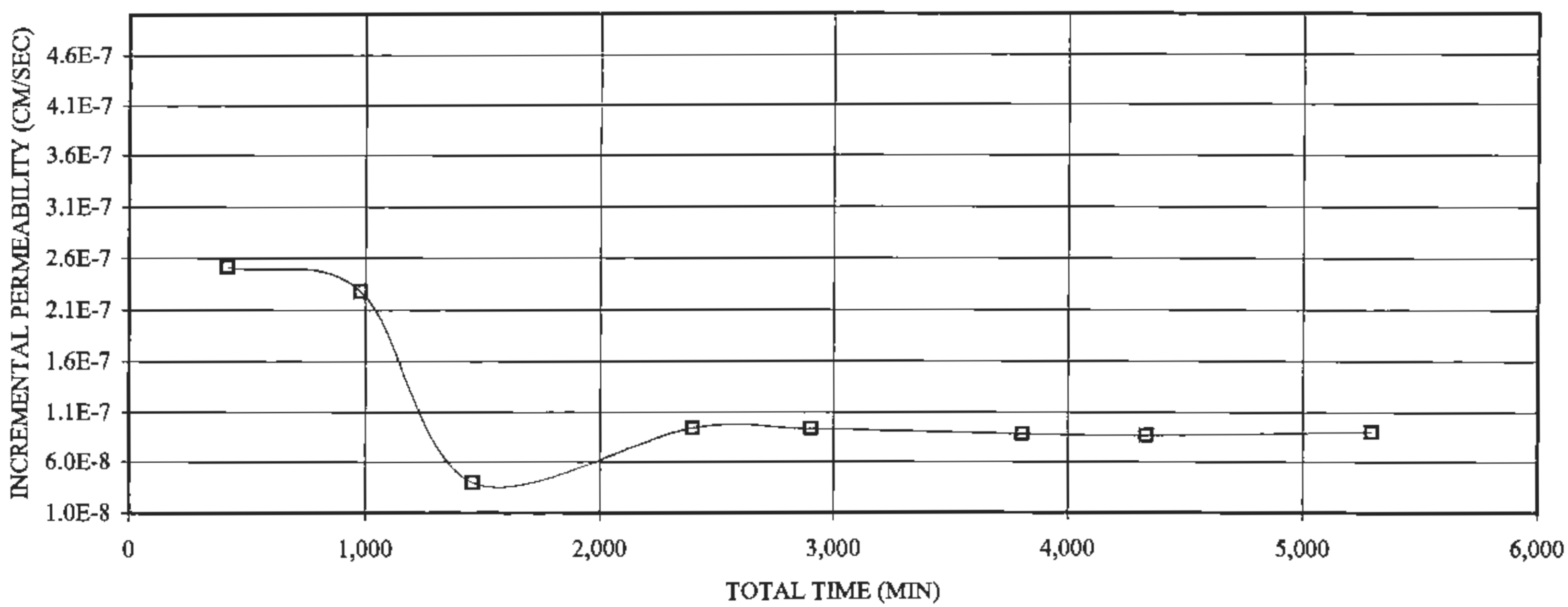
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/23/2008	8:59:45	10/23/2008	15:54:00	7.70	7.70	414.25	414.25	2.51E-07	2.51E-07
10/23/2008	15:56:00	10/24/2008	8:14:30	16.50	24.20	978.50	978.50	2.28E-07	2.28E-07
10/24/2008	8:16:50	10/24/2008	16:17:45	1.40	25.60	480.92	1459.42	3.94E-08	1.34E-07
10/24/2008	16:20:00	10/25/2008	7:54:45	6.50	32.10	934.75	2394.17	9.40E-08	6.67E-08
10/25/2008	7:54:45	10/25/2008	16:21:30	3.50	35.60	506.75	2900.92	9.34E-08	9.37E-08
10/25/2008	16:21:30	10/26/2008	7:23:30	5.90	41.50	902.00	3802.92	8.84E-08	9.09E-08
10/26/2008	7:23:30	10/26/2008	16:12:15	3.40	44.90	528.75	4331.67	8.69E-08	8.77E-08
10/26/2008	16:14:15	10/27/2008	8:15:00	6.40	51.30	960.75	5292.42	9.01E-08	8.85E-08

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/23/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-027-1
		DEPTH (FT):	0.0-0.5

SPECIMEN HEIGHT (IN)	3.604	HEIGHT OF HEAD (PSI)	3.8
DIAMETER (IN)	2.887	PRESSURE HEAD (CM H2O)	267.21
AREA (SQ IN)	6.546	PANEL NUMBER	6



Chain of Custody Record
(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities **Ameren**

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	GYPSUM STACK
Location	FULTON COUNTY, IL
Sampler(s) / Phone	JOHN MANSKER / (309) 635-0268
Turnaround Time	Standard [ ] Rush [X] Date Required:
P.O. # or Invoice To	AMEREN ENERGY
Contact Person	DAVE

Analysis and/or Method Requested: TEST PER CLAY LINER SPECIFICATIONS

Remarks or Observations

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	TEST PER CLAY LINER SPECIFICATIONS						Remarks or Observations
ST-026	10/13/08	08:00	O	1	X						
ST-027	10/13/08	08:30	O	1	X						

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
John M Mansker	10/17/08	14:00	[signature]	10-17-08	2:00	Car.
[signature]	10-17-08	3:52PM		10-17-08	3:52	"

Special Instructions:

Page ____ of ____ Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/28/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-034-2 Lift 5
SAMPLE DESCRIPTION:	Yel. brn. & brn. vf. sandy clayey silt	DEPTH (FT):	0.5-1.0

WATER CONTENT OF TRIMMINGS

			BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	772.66			
SPECIMEN HEIGHT (IN)	3.508			
DIAMETER (IN)	2.882	TARE + WET SOIL (G)	225.04	833.84
AREA (SQ IN)	6.523	TARE + DRY SOIL (G)	188.52	702.67
VOLUME (CU IN)	22.884	TARE (G)	3.70	49.35
WET DENSITY (PCF)	128.62	WATER (G)	36.52	131.17
DRY DENSITY (PCF)	107.40	DRY SOIL (G)	184.82	653.32
WT. DRY SOIL (G)	645.17	WATER CONTENT (%)	19.76	20.08
VOLUME DRY SOIL (CU	14.582			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	36.28	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	3.8	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	30.0	% COMPACTION	N/A
1/4 PORE VOLUME	34.01	PRESSURE HEAD (CM H2O)	267.21
Initial Degree of Saturation	93.70	PANEL NUMBER	5
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Floor)

TEST DATE: 10/30/2008
BORING #: N/A
SAMPLE #: ST-034-2 Lift 5
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.508
DIAMETER (IN) 2.882
AREA (SQ IN) 6.523

HEIGHT OF HEAD (PSI) 3.8
PRESSURE HEAD (CM H2O) 267.205968
PANEL NUMBER 5

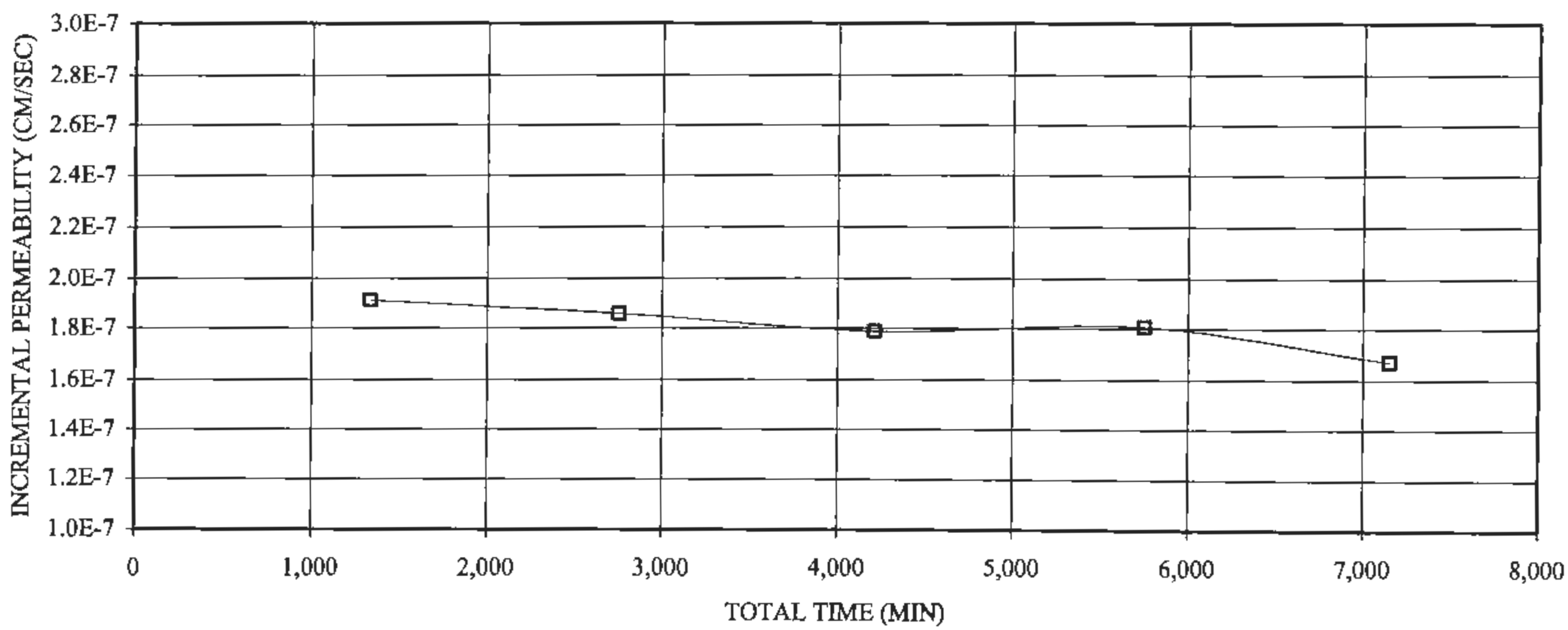
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/30/2008	9:48:30	10/31/2008	8:04:00	19.30	19.3000	1335.50	1335.50	1.91E-07	1.91E-07
10/31/2008	8:06:30	11/1/2008	7:42:00	19.90	39.2000	1415.50	2751.00	1.86E-07	1.88E-07
11/1/2008	7:44:30	11/2/2008	8:06:45	19.80	59.0000	1462.25	4213.25	1.79E-07	1.82E-07
11/2/2008	7:08:15	11/3/2008	8:43:50	21.00	80.0000	1535.58	5748.83	1.81E-07	1.80E-07
11/3/2008	8:45:25	11/4/2008	8:05:00	17.70	97.7000	1399.58	7148.42	1.67E-07	1.74E-07

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/30/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-034-2 Lift 5
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.508	HEIGHT OF HEAD (PSI)	3.8
DIAMETER (IN)	2.882	PRESSURE HEAD (CM H2O)	267.205968
AREA (SQ IN)	6.523	PANEL NUMBER	5



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/28/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-035-1 Lift 5
SAMPLE DESCRIPTION:	Yel. brn. & brn. vf. sandy silt / so. clay.	DEPTH (FT):	0.0-0.5

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	726.97			
SPECIMEN HEIGHT (IN)	3.291			
DIAMETER (IN)	2.867	TARE + WET SOIL (G)	187.05	782.91
AREA (SQ IN)	6.456	TARE + DRY SOIL (G)	157.7	659.31
VOLUME (CU IN)	21.246	TARE (G)	3.71	50.18
WET DENSITY (PCF)	130.35	WATER (G)	29.35	123.6
DRY DENSITY (PCF)	109.48	DRY SOIL (G)	153.99	609.13
WT. DRY SOIL (G)	610.59	WATER CONTENT (%)	19.06	20.29
VOLUME DRY SOIL (CU IN)	13.800			
SP.GR. (ASSUMED)	2.7			
POROSITY (%)	35.04	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	3.5	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.4	% COMPACTION	N/A	
1/4 PORE VOLUME	30.50	PRESSURE HEAD (CM H2O)	246.11076	
Initial Degree of Saturation	95.38	PANEL NUMBER	1	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

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CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (Floor)

TEST DATE: 10/30/2008
BORING #: N/A
SAMPLE #: ST-035-1 Lift 5
DEPTH (FT): 0.0-0.5

SPECIMEN HEIGHT (IN) 3.291
DIAMETER (IN) 2.867
AREA (SQ IN) 6.456

HEIGHT OF HEAD (PSI) 3.5
PRESSURE HEAD (CM H2O) 246.11
PANEL NUMBER 1

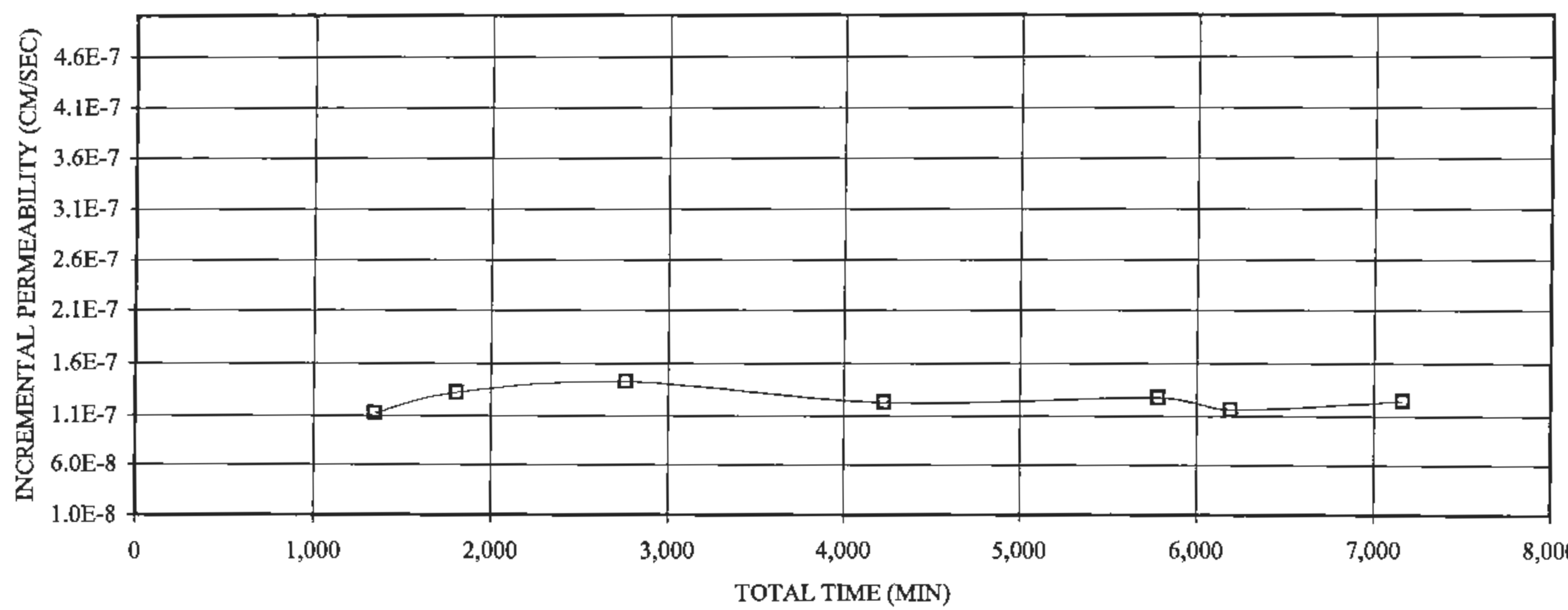
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
10/30/2008	9:55:00	10/31/2008	8:17:30	11.10	11.10	1342.50	1342.50	1.12E-07	1.12E-07
10/31/2008	8:17:30	10/31/2008	16:00:45	4.50	15.60	463.25	1805.75	1.32E-07	1.32E-07
10/31/2008	16:03:00	11/1/2008	7:57:15	10.00	25.60	954.25	2760.00	1.42E-07	1.37E-07
11/1/2008	7:57:15	11/2/2008	8:24:30	13.30	38.90	1467.25	4227.25	1.23E-07	1.33E-07
11/2/2008	7:26:30	11/3/2008	9:19:20	14.60	53.50	1552.83	5780.08	1.28E-07	1.25E-07
11/3/2008	9:19:20	11/3/2008	16:08:20	3.50	57.00	409.00	6189.08	1.16E-07	1.22E-07
11/3/2008	16:09:15	11/4/2008	8:22:30	8.90	65.90	973.25	7162.33	1.24E-07	1.20E-07

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	10/30/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (Floor)	SAMPLE #:	ST-035-1 Lift 5
		DEPTH (FT):	0.0-0.5

SPECIMEN HEIGHT (IN)	3.291	HEIGHT OF HEAD (PSI)	3.5
DIAMETER (IN)	2.867	PRESSURE HEAD (CM H2O)	246.11
AREA (SQ IN)	6.456	PANEL NUMBER	1



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CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	10/31/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner (south slope)	SAMPLE #:	ST-036-2 Lift 4 (S. Slope)
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt (tr. clay, c. sand & Sm. gravel).	DEPTH (FT):	0.5-1.0

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	727.24			
SPECIMEN HEIGHT (IN)	3.209			
DIAMETER (IN)	2.857	TARE + WET SOIL (G)	222.39	783.22
AREA (SQ IN)	6.411	TARE + DRY SOIL (G)	196.7	688.95
VOLUME (CU IN)	20.572	TARE (G)	3.71	49.97
WET DENSITY (PCF)	134.67	WATER (G)	25.69	94.27
DRY DENSITY (PCF)	118.85	DRY SOIL (G)	192.99	638.98
WT. DRY SOIL (G)	641.81	WATER CONTENT (%)	13.31	14.75
VOLUME DRY SOIL (CU IN)	14.506			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	29.488	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	3.4	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.3	% COMPACTION	N/A
1/4 PORE VOLUME	24.85	PRESSURE HEAD (CM H2O)	239.08
Initial Degree of Saturation	85.94	PANEL NUMBER	7
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (south slope)

TEST DATE: 11/3/2008
BORING #: N/A
SAMPLE #: ST-036-2 Lift 4 (S. Slope)
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.209
DIAMETER (IN) 2.857
AREA (SQ IN) 6.411

HEIGHT OF HEAD (PSI) 3.4
PRESSURE HEAD (CM H2O) 239.079024
PANEL NUMBER 7

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
11/3/2008	9:30:40	11/3/2008	13:10:15	20.50	20.5000	219.58	219.58	1.28E-06	1.28E-06
11/3/2008	13:12:00	11/3/2008	16:10:00	15.20	35.7000	178.00	397.58	1.17E-06	1.23E-06
11/3/2008	16:12:00	11/4/2008	8:09:45	69.54	105.2400	957.75	1355.33	9.98E-07	1.09E-06
11/4/2008	8:12:00	11/4/2008	16:27:00	32.30	137.5400	495.00	1850.33	8.96E-07	9.47E-07
11/4/2008	16:28:15	11/5/2008	8:12:15	49.02	186.5600	944.00	2794.33	7.13E-07	8.05E-07
11/5/2008	8:14:30	11/5/2008	14:58:40	19.76	206.3200	404.17	3198.50	6.72E-07	6.93E-07

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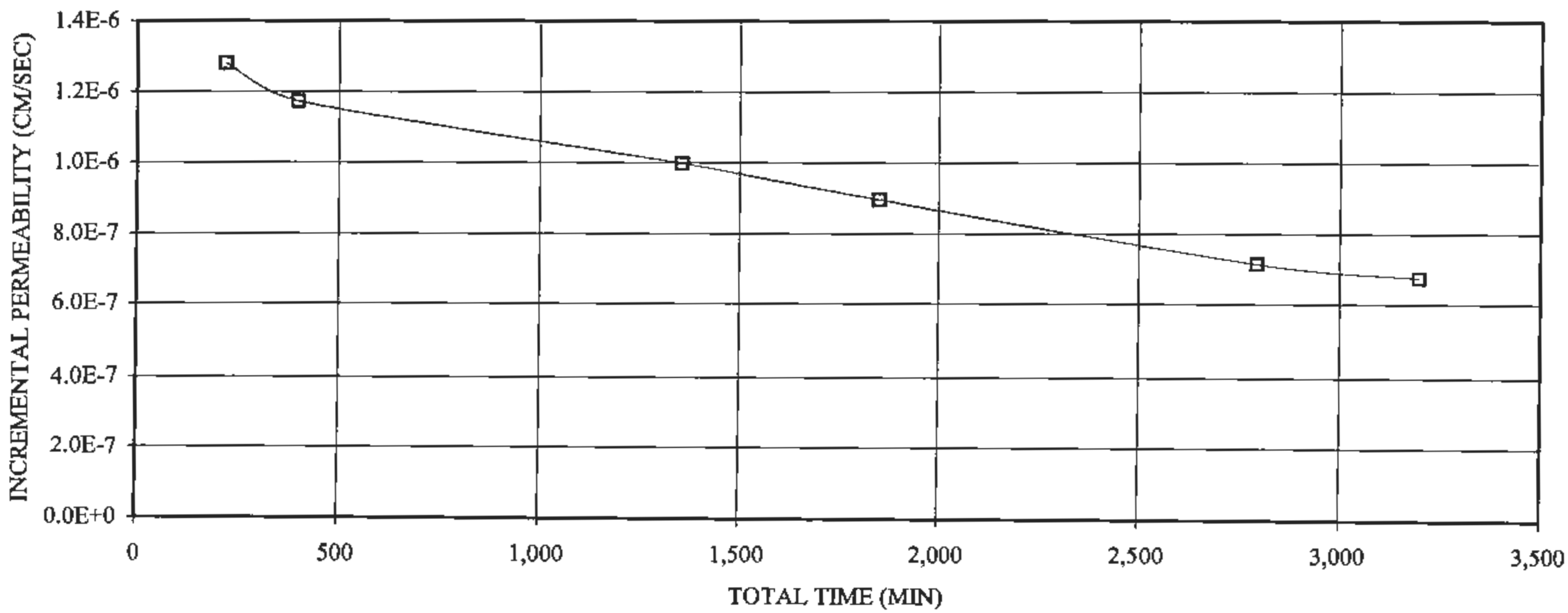
CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner (south slope)

TEST DATE: 11/3/2008
BORING #: N/A
SAMPLE #: ST-036-2 Lift 4 (S. Slope)
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.209
DIAMETER (IN) 2.857
AREA (SQ IN) 6.411

HEIGHT OF HEAD (PSI) 3.4
PRESSURE HEAD (CM H2O) 239.079024
PANEL NUMBER 7



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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	11/4/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-037-2 Lift 4
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy clayey silt.	DEPTH (FT):	0.5-1.0

		WATER CONTENT OF TRIMMINGS	BEFORE TEST	AFTER TEST
SPECIMEN WEIGHT (G)	728.73			
SPECIMEN HEIGHT (IN)	3.442			
DIAMETER (IN)	2.883	TARE + WET SOIL (G)	311.18	781.31
AREA (SQ IN)	6.528	TARE + DRY SOIL (G)	248.48	637.09
VOLUME (CU IN)	22.469	TARE (G)	3.75	50.16
WET DENSITY (PCF)	123.55	WATER (G)	62.7	144.22
DRY DENSITY (PCF)	98.35	DRY SOIL (G)	244.73	586.93
WT. DRY SOIL (G)	580.11	WATER CONTENT (%)	25.62	24.57
VOLUME DRY SOIL (CU IN)	13.111			
SP.GR. (ASSUMED)	2.7			

POROSITY (%)	41.65	STD. MAX. DEN.(LBS/CU.FT.)	N/A
HEIGHT OF HEAD (PSI)	3.7	OPTIMUM MOISTURE (%)	N/A
HYDRAULIC GRADIANT	29.8	% COMPACTION	N/A
1/4 PORE VOLUME	38.34	PRESSURE HEAD (CM H2O)	260.17
Initial Degree of Saturation	96.92	PANEL NUMBER	5
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 11/10/2008
BORING #: N/A
SAMPLE #: ST-037-2 Lift 4
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.442
DIAMETER (IN) 2.883
AREA (SQ IN) 6.528
1/4 PORE VOLUME 38.338

HEIGHT OF HEAD (PSI) 3.7
PRESSURE HEAD (CM H2O) 260.174232
PANEL NUMBER 5

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
11/10/2008	8:27:00	11/10/2008	16:17:10	7.60	7.60	470.17	470.17	2.15E-07	2.15E-07
11/10/2008	16:17:10	11/11/2008	7:47:00	16.10	23.70	929.83	1400.00	2.30E-07	2.23E-07
11/10/2008	7:50:15	11/11/2008	16:24:30	10.80	34.50	1954.25	3354.25	7.35E-08	1.52E-07
11/11/2008	16:25:40	11/12/2008	8:01:20	17.70	52.20	935.67	4289.92	2.52E-07	1.63E-07
11/12/2008	8:01:20	11/12/2008	13:30:00	7.50	59.70	328.67	4618.58	3.03E-07	2.78E-07

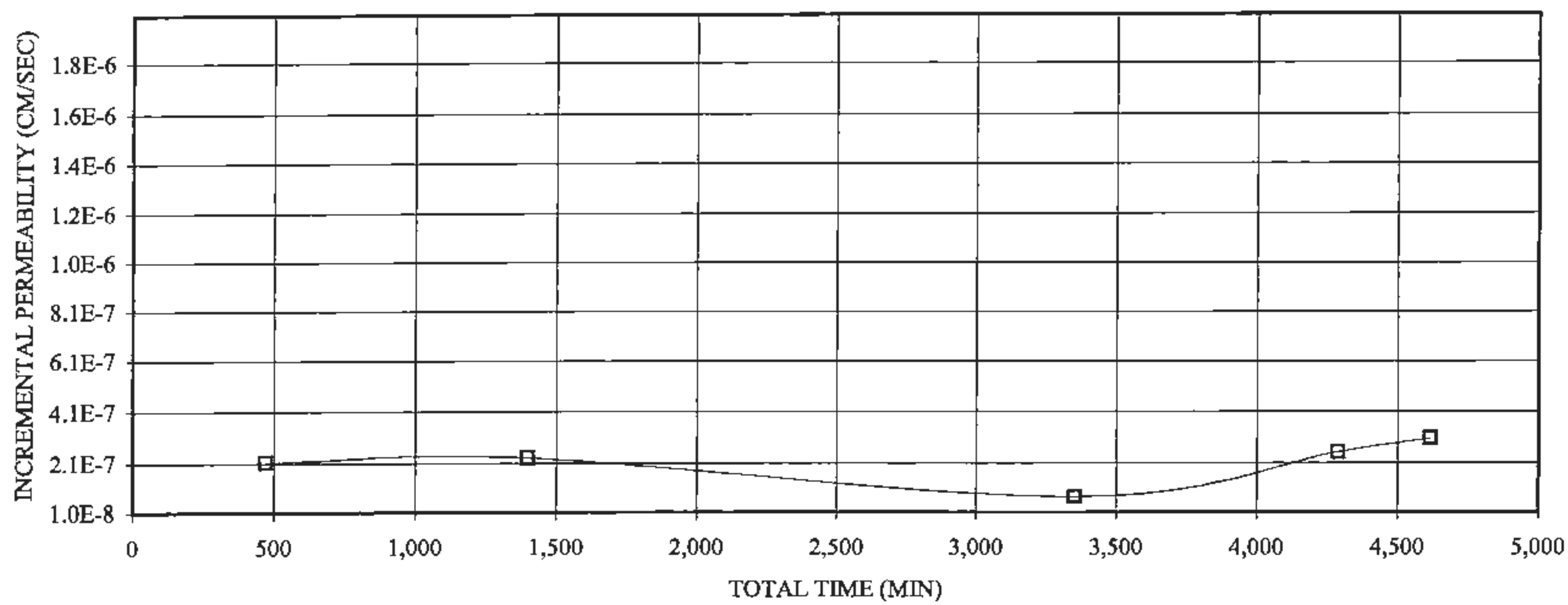
HANSON®

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	11/10/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-037-2 Lift 4
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.442	HEIGHT OF HEAD (PSI)	3.7
DIAMETER (IN)	2.883	PRESSURE HEAD (CM H2O)	260.174232
AREA (SQ IN)	6.528	PANEL NUMBER	5
1/4 PORE VOLUME	38.338		



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities — Ameren

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	GYPSUM STACK
Location	FULTON COUNTY, IL
Sampler(s) / Phone	JOHN MANSKER / 309-635-0268
Turnaround Time	Standard [ ] Rush [X] Date Required:
P.O. # or Invoice To	AMEREN ENERGY
Contact Person	DAVE BOYCE - AMEREN CONSTRUCTION MGR, 815-970-1771

Analysis and/or Method Requested: TEST PER SPECIFICATIONS FOR CLAY LINER

Remarks or Observations

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	TEST PER SPECIFICATIONS FOR CLAY LINER						Remarks or Observations
ST-034	10/22/08	10:00	O	1	X						
ST-035	10/22/08	17:00	O	1	X						
ST-036	10/23/08	09:30	O	1	X						
ST-037	10/23/08	10:00	O	1	X						

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
[signature]	10/23/08	16:45	[signature]	10-23-08	16:45	

Special Instructions:

 Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	11/12/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-038-2 Lift 5
SAMPLE DESCRIPTION:	Brn. & gray vf. sandy silt / so. clay (tr. sm. gravel).	DEPTH (FT):	0.5-1.0

FOR ESTIMATING PORE VOLUME ONLY

				WATER CONTENT TRIMMINGS BEFORE TEST	SAMPLE AFTER TEST
SPECIMEN WEIGHT (G)	733.03				
SPECIMEN HEIGHT (IN)	3.302				
DIAMETER (IN)	2.877		TARE + WET SOIL (G)	200.09	785.11
AREA (SQ IN)	6.501		TARE + DRY SOIL (G)	170.46	665.73
VOLUME (CU IN)	21.466		TARE (G)	3.71	50.13
WET DENSITY (PCF)	130.09		WATER (G)	29.63	119.38
DRY DENSITY (PCF)	110.46	*	DRY SOIL (G)	166.75	615.60
WT. DRY SOIL (G)	622.43	*	WATER CONT.(%)	17.77	19.39
VOLUME DRY SOIL (CU IN	14.068	*			
SP.GR. (ASSUMED)	2.70				
POROSITY (%)	34.46	*	STD. MAX. DEN.(LBS/CU.FT.)	N/A	
HEIGHT OF HEAD (PSI)	3.50		OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.3		% COMPACTION	N/A	
1/4 PORE VOLUME	30.31	*	PRESSURE HEAD (CM H2O)	246.11	
Initial Degree of Saturation	91.23	*	PANEL NUMBER	8	
TEST METHOD USED:	IEPA ASTM D5084		PERMEANT USED:	Tap Water	

* **Estimates Only**

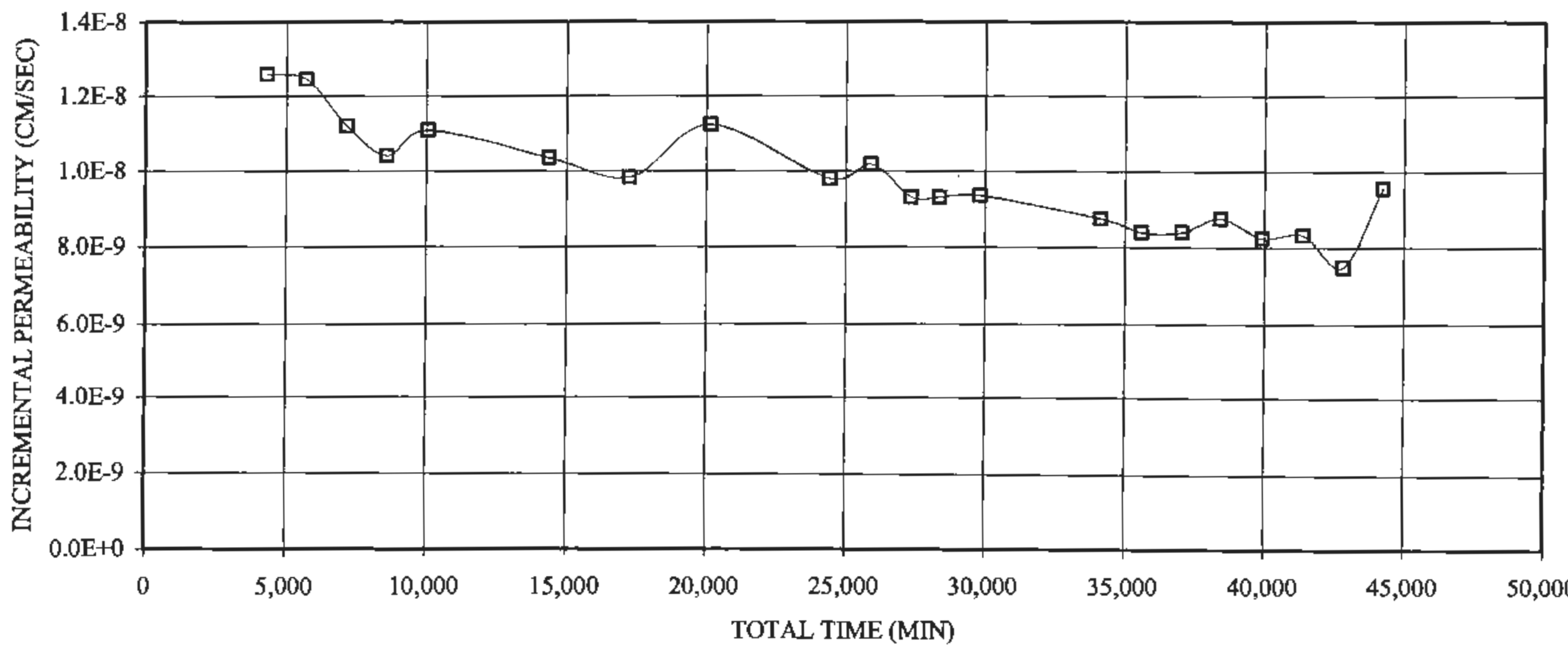
HANSON.

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	11/14/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-038-2 Lift 5
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.302	HEIGHT OF HEAD (PSI)	3.50
DIAMETER (IN)	2.877	PRESSURE HEAD (CM H2O)	246.11
AREA (SQ IN)	6.501	PANEL NUMBER	8
1/4 PORE VOLUME	30.31		



HANSON.

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 11/14/2008
BORING #: N/A
SAMPLE #: ST-038-2 Lift 5
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.302
DIAMETER (IN) 2.877
AREA (SQ IN) 6.501
1/4 PORE VOLUME 30.31

HEIGHT OF HEAD (PSI) 3.50
PRESSURE HEAD (CM H2O) 246.11
PANEL NUMBER 8

START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
11/14/2008	8:23:00	11/17/2008	8:11:15	4.00	4.0000	4308.25	4308.25	1.26E-08	1.26E-08
11/17/2008	8:11:15	11/18/2008	7:45:45	1.30	5.3000	1414.50	5722.75	1.24E-08	1.25E-08
11/18/2008	7:45:45	11/19/2008	7:56:45	1.20	6.5000	1451.00	7173.75	1.12E-08	1.18E-08
11/19/2008	7:56:45	11/20/2008	7:47:00	1.10	7.6000	1430.25	8604.00	1.04E-08	1.08E-08
11/20/2008	7:47:00	11/21/2008	8:11:30	1.20	8.8000	1464.50	10068.50	1.11E-08	1.08E-08
11/21/2008	8:11:30	11/24/2008	8:02:45	3.30	12.1000	4311.25	14379.75	1.04E-08	1.07E-08
11/24/2008	8:02:45	11/26/2008	8:17:00	2.10	14.2000	2894.25	17274.00	9.83E-09	1.01E-08
11/26/2008	8:20:15	11/28/2008	8:33:30	2.40	16.6000	2893.25	20167.25	1.12E-08	1.05E-08
11/28/2008	8:33:30	12/1/2008	8:03:00	3.10	19.7000	4289.50	24456.75	9.79E-09	1.05E-08
12/1/2008	8:03:00	12/2/2008	8:26:15	1.10	20.8000	1463.25	25920.00	1.02E-08	9.98E-09
12/2/2008	8:26:15	12/3/2008	8:40:00	1.00	21.8000	1453.75	27373.75	9.32E-09	9.75E-09
12/3/2008	14:59:00	12/4/2008	7:57:45	0.70	22.5000	1018.75	28392.50	9.31E-09	9.31E-09
12/4/2008	7:57:45	12/5/2008	8:04:30	1.00	23.5000	1446.75	29839.25	9.36E-09	9.33E-09
12/5/2008	8:04:30	12/8/2008	8:13:00	2.80	26.3000	4328.50	34167.75	8.76E-09	9.06E-09
12/8/2008	8:13:00	12/9/2008	8:25:45	0.90	27.2000	1452.75	35620.50	8.39E-09	8.57E-09
12/9/2008	8:25:45	12/10/2008	8:37:00	0.90	28.1000	1451.25	37071.75	8.40E-09	8.39E-09
12/10/2008	8:37:00	12/11/2008	7:50:00	0.90	29.0000	1393.00	38464.75	8.75E-09	8.57E-09
12/11/2008	7:50:00	12/12/2008	8:29:00	0.90	29.9000	1479.00	39943.75	8.24E-09	8.50E-09

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Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE: 11/14/2008
BORING #: N/A
SAMPLE #: ST-038-2 Lift 5
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.302
DIAMETER (IN) 2.877
AREA (SQ IN) 6.501
1/4 PORE VOLUME 30.31

HEIGHT OF HEAD (PSI) 3.50
PRESSURE HEAD (CM H2O) 246.11
PANEL NUMBER 8

12/12/2008	8:29:00	12/13/2008	8:56:00	0.90	30.8000	1467.00	41410.75	8.31E-09	8.27E-09
12/13/2008	8:56:00	12/14/2008	9:02:30	0.80	31.6000	1446.50	42857.25	7.49E-09	7.90E-09
12/14/2008	9:02:30	12/15/2008	8:39:15	1.00	32.6000	1416.75	44274.00	9.56E-09	8.52E-09

HANSON®

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

ASTM D5084

JOB NUMBER:	03S5010	TEST DATE:	11/24/2008
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-039-2
SAMPLE DESCRIPTION:	Brn. & gray vf. Sandy silt /so. Clay (tr. Sm. gravel).	DEPTH (FT):	0.5-1.0

FOR ESTIMATING PORE VOLUME ONLY

			WATER CONTENT TRIMMINGS BEFORE TEST	WATER CONTENT SAMPLE AFTER TEST
SPECIMEN WEIGHT (G)	676.73			
SPECIMEN HEIGHT (IN)	3.103			
DIAMETER (IN)	2.864	TARE + WET SOIL (G)	173.03	729.53
AREA (SQ IN)	6.442	TARE + DRY SOIL (G)	149.27	616.83
VOLUME (CU IN)	19.990	TARE (G)	3.75	50.18
WET DENSITY (PCF)	128.96	WATER (G)	23.76	112.70
DRY DENSITY (PCF)	110.86 *	DRY SOIL (G)	145.52	566.65
WT. DRY SOIL (G)	581.74 *	WATER CONT.(%)	16.33	19.89
VOLUME DRY SOIL (CU IN)	13.148 *			
SP.GR. (ASSUMED)	2.70			
POROSITY (%)	34.23 *	STD. MAX. DEN.(lbs/ft³.)	N/A	
HEIGHT OF HEAD (PSI)	3.30	OPTIMUM MOISTURE (%)	N/A	
HYDRAULIC GRADIANT	29.4	% COMPACTION	N/A	
1/4 PORE VOLUME	28.03 *	PRESSURE HEAD (CM H2O)	232.05	
Initial Degree of Saturation	84.72 *	PANEL NUMBER	6	
TEST METHOD USED:	IEPA ASTM D5084	PERMEANT USED:	Tap Water	

* **Estimates Only**

HANSON

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER: 03S5010
CLIENT: Ameren Duck Creek
JOB DESCRIPTION: Gypsum Stack Clay Liner

TEST DATE:
BORING #: N/A
SAMPLE #: ST-039-2
DEPTH (FT): 0.5-1.0

SPECIMEN HEIGHT (IN) 3.103
DIAMETER (IN) 2.864
AREA (SQ IN) 6.442
1/4 PORE VOLUME 28.03

HEIGHT OF HEAD (PSI) 3.30
PRESSURE HEAD (CM H2O) 232.05
PANEL NUMBER 6

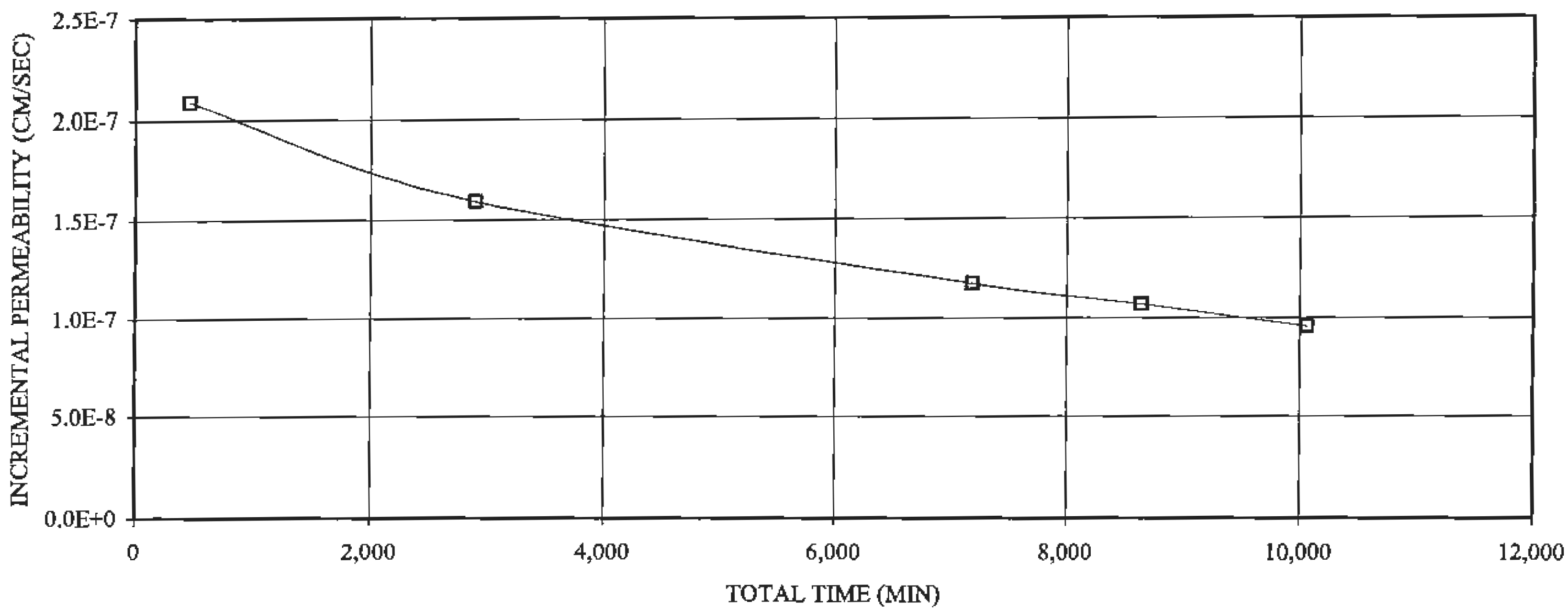
START DATE	START TIME	STOP DATE	STOP TIME	INCREMENT. FLOW (CC)	TOTAL FLOW (CC)	INCREMENT. TIME (MIN)	TOTAL TIME (MIN)	INCREMENTAL PERMEABILITY (CM/SEC)	AVERAGE PERMEABILITY (CM/SEC)
11/26/2008	8:05:45	11/26/2008	15:49:45	7.10	7.1000	464.00	464.00	2.08E-07	2.08E-07
11/26/2008	15:54:15	11/28/2008	8:26:45	28.49	35.5900	2432.50	2896.50	1.60E-07	1.84E-07
11/28/2008	8:26:45	12/1/2008	7:54:40	37.00	72.5900	4287.92	7184.42	1.18E-07	1.62E-07
12/1/2008	8:00:00	12/2/2008	8:23:15	11.47	84.0600	1463.25	8647.67	1.07E-07	1.28E-07
12/2/2008	8:23:15	12/3/2008	8:07:50	9.99	94.0500	1424.58	10072.25	9.55E-08	1.07E-07

Hanson Professional Services Inc.

CONSTANT HEAD PERMEABILITY TEST

JOB NUMBER:	03S5010	TEST DATE:	
CLIENT:	Ameren Duck Creek	BORING #:	N/A
JOB DESCRIPTION:	Gypsum Stack Clay Liner	SAMPLE #:	ST-039-2
		DEPTH (FT):	0.5-1.0

SPECIMEN HEIGHT (IN)	3.103	HEIGHT OF HEAD (PSI)	3.30
DIAMETER (IN)	2.864	PRESSURE HEAD (CM H2O)	232.05
AREA (SQ IN)	6.442	PANEL NUMBER	6
1/4 PORE VOLUME	28.03		



Chain of Custody Record

(Form CQAP 6.1, Revision 0)

Gypsum Management and CCB Landfill Facilities **Ameren**

Client	Ameren Duck Creek Generating Station
Address	17751 North Cilco Road
City, State Zip Code	Canton, IL 61520
Phone / Facsimile No.	(309) 668-2236 / (217) 347-3106
Client Project	Gypsum Stack
Location	Fulton County, IL
Sampler(s) / Phone	John Mansker / (309) 635-0268
Turnaround Time	Standard [ ] Rush [X] Date Required:
P.O. # or Invoice To	Ameren Energy
Contact Person	Dave Boyce Ameren Construction Mgr. (309) 668-3886

Analysis and/or Method Requested: Test per Specifications

Remarks or Observations

Sample Description	Sampling Date	Sampling Time	Sample Type[1]	# of Containers	Test per Specifications						Remarks or Observations
ST-038 Clay Liner GS Floor	11/02/08	10:00	O	1	X						
ST-039 Clay Liner GS Floor	11/02/08	11:00	O	1	X						

(1) Sample Type: S = Soil; GM = Geomembrane; GT = Geotextile; GCL = Geosynthetic Clay Liner; DM = Drainage Media; O = Other

Relinquished By	Date	Time	Received By	Date	Time	Method of Shipment
John M. Mansker	11/04/08	14:30	[signature]	~~11-5~~ 11/4/08	1530	[signature]
[signature]	11/5/08	1500	[signature]	11-5-08	08:00	

Special Instructions:

Page ____ of ____ Copies: White – CQA Officer Yellow – Testing Firm Pink – Sampler

GEOSYNTHETIC CLAY LINER MANUFACTURER PRODUCT CERTIFICATIONS

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Date: 6/6/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940201, 023940202, 023940203, 023940204, 023940205, 023940206, 023940207, 023940208, 023940209, 023940210, 023940211, 023940212, 023940213, 023940214, 023940215, 023940216, 023940217, 023940218, 023940219, 023940220, 023940221, 023940222, 023940223, 023940224, 023940225, 023940226, 023940227, 023940228, 023940229, 023940230, 023940231, 023940232, 023940233, 023940234, 023940235, 023940236, 023940237, 023940238, 023940239, 023940240, 023940241, 023940243, 023940245

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/5/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940201, 023940202, 023940203, 023940204, 023940205, 023940206, 023940207, 023940208, 023940209, 023940210, 023940211, 023940212, 023940213, 023940214, 023940215, 023940216, 023940217, 023940218, 023940219, 023940220, 023940221, 023940222, 023940223, 023940224, 023940225, 023940226, 023940227, 023940228, 023940229, 023940230, 023940231, 023940232, 023940233, 023940234, 023940235, 023940236, 023940237, 023940238, 023940239, 023940240, 023940241, 023940243, 023940245
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Ship Date: 6/5/2008

Order Numbers: 023940201, 023940202, 023940203, 023940204, 023940205, 023940206, 023940207, 02394020 023940209, 023940210, 023940211, 023940212, 023940213, 023940214, 023940215, 023940216, 023940217, 023940218, 023940219, 023940220, 023940221, 023940222, 023940223, 023940224, 023940225, 023940226, 023940227, 023940228, 023940229, 023940230, 023940231, 023940232, 023940233, 023940234, 023940235, 023940236, 023940237, 023940238, 023940239, 023940240, 023940241, 023940243, 023940245

Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940212	LO-BENTOMAT SDN	200820LO	00000001	150	14	2100	2520
023940212	LO-BENTOMAT SDN	200820LO	00000002	150	14	2100	2510
023940212	LO-BENTOMAT SDN	200820LO	00000003	150	14	2100	2500
023940212	LO-BENTOMAT SDN	200820LO	00000004	150	14	2100	2505
023940215	LO-BENTOMAT SDN	200820LO	00000005	150	14	2100	2510
023940207	LO-BENTOMAT SDN	200820LO	00000006	150	14	2100	2500
023940207	LO-BENTOMAT SDN	200820LO	00000007	150	14	2100	2520
023940211	LO-BENTOMAT SDN	200820LO	00000008	150	14	2100	2540
023940203	LO-BENTOMAT SDN	200820LO	00000009	150	14	2100	2535
023940203	LO-BENTOMAT SDN	200820LO	00000010	150	14	2100	2540
023940211	LO-BENTOMAT SDN	200820LO	00000011	150	14	2100	2545
023940211	LO-BENTOMAT SDN	200820LO	00000013	150	14	2100	2575
023940211	LO-BENTOMAT SDN	200820LO	00000014	150	14	2100	2560
023940211	LO-BENTOMAT SDN	200820LO	00000015	150	14	2100	2545
023940205	LO-BENTOMAT SDN	200820LO	00000017	150	13.5	2025	2550
023940207	LO-BENTOMAT SDN	200820LO	00000018	150	13.5	2025	2540
023940203	LO-BENTOMAT SDN	200820LO	00000022	150	13.5	2025	2530
023940205	LO-BENTOMAT SDN	200820LO	00000024	150	13.5	2025	2535
023940203	LO-BENTOMAT SDN	200820LO	00000026	150	13.5	2025	2560
023940203	LO-BENTOMAT SDN	200820LO	00000027	150	13.5	2025	2570
023940205	LO-BENTOMAT SDN	200820LO	00000029	150	13.5	2025	2585
023940223	LO-BENTOMAT SDN	200820LO	00000031	150	13.5	2025	2585
023940223	LO-BENTOMAT SDN	200820LO	00000032	150	13.5	2025	2580
023940223	LO-BENTOMAT SDN	200820LO	00000033	150	13.5	2025	2570
023940203	LO-BENTOMAT SDN	200820LO	00000034	150	13.5	2025	2575
023940217	LO-BENTOMAT SDN	200820LO	00000035	150	13.5	2025	2580
023940211	LO-BENTOMAT SDN	200820LO	00000036	150	13.5	2025	2560

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940223	LO-BENTOMAT SDN	200820LO	00000037	150	13.5	2025	2555
023940223	LO-BENTOMAT SDN	200820LO	00000039	150	13.5	2025	2560
023940223	LO-BENTOMAT SDN	200820LO	00000041	150	13.5	2025	2565
023940219	LO-BENTOMAT SDN	200820LO	00000045	150	13.5	2025	2510
023940201	LO-BENTOMAT SDN	200820LO	00000048	150	13.5	2025	2540
023940216	LO-BENTOMAT SDN	200820LO	00000049	150	13.5	2025	2550
023940206	LO-BENTOMAT SDN	200820LO	00000052	150	13.5	2025	2570
023940217	LO-BENTOMAT SDN	200820LO	00000053	150	13.5	2025	2540
023940219	LO-BENTOMAT SDN	200820LO	00000057	150	13.5	2025	2540
023940219	LO-BENTOMAT SDN	200820LO	00000059	150	13.5	2025	2605
023940221	LO-BENTOMAT SDN	200820LO	00000060	150	13.5	2025	2610
023940221	LO-BENTOMAT SDN	200820LO	00000061	150	13.5	2025	2640
023940206	LO-BENTOMAT SDN	200820LO	00000065	150	13.5	2025	2640
023940206	LO-BENTOMAT SDN	200820LO	00000066	150	13.5	2025	2590
023940203	LO-BENTOMAT SDN	200820LO	00000067	150	13.5	2025	2580
023940203	LO-BENTOMAT SDN	200820LO	00000071	150	13.5	2025	2605
023940205	LO-BENTOMAT SDN	200820LO	00000075	150	13.5	2025	2555
023940241	LO-BENTOMAT SDN	200820LO	00000076	150	13.5	2025	2540
023940241	LO-BENTOMAT SDN	200820LO	00000077	150	13.5	2025	2565
023940223	LO-BENTOMAT SDN	200820LO	00000078	150	13.5	2025	2525
023940221	LO-BENTOMAT SDN	200820LO	00000079	150	13.5	2025	2500
023940221	LO-BENTOMAT SDN	200820LO	00000080	150	13.5	2025	2520
023940204	LO-BENTOMAT SDN	200820LO	00000082	150	13.5	2025	2520
023940223	LO-BENTOMAT SDN	200820LO	00000085	150	13.5	2025	2530
023940203	LO-BENTOMAT SDN	200820LO	00000086	150	13.5	2025	2515
023940241	LO-BENTOMAT SDN	200820LO	00000096	150	13.5	2025	2535
023940241	LO-BENTOMAT SDN	200820LO	00000097	150	13.5	2025	2540
023940221	LO-BENTOMAT SDN	200820LO	00000098	150	13.5	2025	2530
023940221	LO-BENTOMAT SDN	200820LO	00000100	150	13.5	2025	2515
023940217	LO-BENTOMAT SDN	200821LO	00000101	150	13.5	2025	2520
023940204	LO-BENTOMAT SDN	200821LO	00000102	150	13.5	2025	2510
023940204	LO-BENTOMAT SDN	200821LO	00000103	150	13.5	2025	2515

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940206	LO-BENTOMAT SDN	200821LO	00000108	150	13.5	2025	2650
023940241	LO-BENTOMAT SDN	200821LO	00000109	150	13.5	2025	2590
023940206	LO-BENTOMAT SDN	200821LO	00000110	150	13.5	2025	2575
023940204	LO-BENTOMAT SDN	200821LO	00000111	150	13.5	2025	2780
023940222	LO-BENTOMAT SDN	200821LO	00000112	150	13.5	2025	2570
023940206	LO-BENTOMAT SDN	200821LO	00000113	150	13.5	2025	2575
023940241	LO-BENTOMAT SDN	200821LO	00000116	150	13.5	2025	2590
023940219	LO-BENTOMAT SDN	200821LO	00000117	150	13.5	2025	2605
023940221	LO-BENTOMAT SDN	200821LO	00000118	150	13.5	2025	2585
023940203	LO-BENTOMAT SDN	200821LO	00000119	150	13.5	2025	2590
023940221	LO-BENTOMAT SDN	200821LO	00000122	150	13.5	2025	2485
023940223	LO-BENTOMAT SDN	200821LO	00000123	150	13.5	2025	2470
023940221	LO-BENTOMAT SDN	200821LO	00000126	150	13.5	2025	2465
023940223	LO-BENTOMAT SDN	200821LO	00000127	150	13.5	2025	2480
023940241	LO-BENTOMAT SDN	200821LO	00000135	150	13.5	2025	2535
023940222	LO-BENTOMAT SDN	200821LO	00000139	150	13.5	2025	2575
023940221	LO-BENTOMAT SDN	200821LO	00000140	150	13.5	2025	2560
023940241	LO-BENTOMAT SDN	200821LO	00000142	150	13.5	2025	2550
023940223	LO-BENTOMAT SDN	200821LO	00000144	150	13.5	2025	2540
023940202	LO-BENTOMAT SDN	200821LO	00000145	150	13.5	2025	2555
023940201	LO-BENTOMAT SDN	200821LO	00000147	150	13.5	2025	2530
023940210	LO-BENTOMAT SDN	200821LO	00000150	150	13.5	2025	2530
023940214	LO-BENTOMAT SDN	200821LO	00000155	150	13.5	2025	2555
023940214	LO-BENTOMAT SDN	200821LO	00000156	150	13.5	2025	2535
023940214	LO-BENTOMAT SDN	200821LO	00000158	150	13.5	2025	2530
023940241	LO-BENTOMAT SDN	200821LO	00000160	150	13.5	2025	2525
023940214	LO-BENTOMAT SDN	200821LO	00000161	150	13.5	2025	2525
023940241	LO-BENTOMAT SDN	200821LO	00000162	150	13.5	2025	2500
023940214	LO-BENTOMAT SDN	200821LO	00000163	150	13.5	2025	2480
023940241	LO-BENTOMAT SDN	200821LO	00000166	150	13.5	2025	2590
023940211	LO-BENTOMAT SDN	200821LO	00000167	150	13.5	2025	2605
023940241	LO-BENTOMAT SDN	200821LO	00000173	150	13.5	2025	2590

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940222	LO-BENTOMAT SDN	200821LO	00000174	150	13.5	2025	2570
023940222	LO-BENTOMAT SDN	200821LO	00000175	150	13.5	2025	2580
023940211	LO-BENTOMAT SDN	200821LO	00000176	150	13.5	2025	2565
023940207	LO-BENTOMAT SDN	200821LO	00000177	150	13.5	2025	2620
023940209	LO-BENTOMAT SDN	200821LO	00000178	150	13.5	2025	2640
023940214	LO-BENTOMAT SDN	200821LO	00000179	150	13.5	2025	2630
023940213	LO-BENTOMAT SDN	200821LO	00000180	150	13.5	2025	2590
023940214	LO-BENTOMAT SDN	200821LO	00000181	150	13.5	2025	2600
023940219	LO-BENTOMAT SDN	200821LO	00000182	150	13.5	2025	2605
023940241	LO-BENTOMAT SDN	200821LO	00000183	150	13.5	2025	2585
023940211	LO-BENTOMAT SDN	200821LO	00000184	150	13.5	2025	2590
023940241	LO-BENTOMAT SDN	200821LO	00000185	150	13.5	2025	2575
023940207	LO-BENTOMAT SDN	200821LO	00000186	150	13.5	2025	2560
023940211	LO-BENTOMAT SDN	200821LO	00000188	150	13.5	2025	2585
023940207	LO-BENTOMAT SDN	200821LO	00000190	150	13.5	2025	2575
023940222	LO-BENTOMAT SDN	200821LO	00000191	150	13.5	2025	2570
023940207	LO-BENTOMAT SDN	200821LO	00000192	150	13.5	2025	2560
023940220	LO-BENTOMAT SDN	200821LO	00000193	150	13.5	2025	2575
023940222	LO-BENTOMAT SDN	200821LO	00000194	150	13.5	2025	2580
023940207	LO-BENTOMAT SDN	200821LO	00000195	150	13.5	2025	2560
023940220	LO-BENTOMAT SDN	200821LO	00000196	150	13.5	2025	2555
023940222	LO-BENTOMAT SDN	200821LO	00000197	150	13.5	2025	2565
023940221	LO-BENTOMAT SDN	200821LO	00000198	150	13.5	2025	2540
023940221	LO-BENTOMAT SDN	200821LO	00000199	150	13.5	2025	2545
023940221	LO-BENTOMAT SDN	200821LO	00000200	150	13.5	2025	2540
023940221	LO-BENTOMAT SDN	200821LO	00000201	150	13.5	2025	2535
023940222	LO-BENTOMAT SDN	200821LO	00000202	150	13.5	2025	2520
023940222	LO-BENTOMAT SDN	200821LO	00000203	150	13.5	2025	2550
023940207	LO-BENTOMAT SDN	200821LO	00000204	150	13.5	2025	2545
023940211	LO-BENTOMAT SDN	200821LO	00000205	150	13.5	2025	2520
023940221	LO-BENTOMAT SDN	200821LO	00000206	150	13.5	2025	2540
023940217	LO-BENTOMAT SDN	200821LO	00000207	150	13.5	2025	2595

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940221	LO-BENTOMAT SDN	200821LO	00000208	150	13.5	2025	2580
023940211	LO-BENTOMAT SDN	200821LO	00000209	150	13.5	2025	2575
023940207	LO-BENTOMAT SDN	200821LO	00000210	150	13.5	2025	2590
023940221	LO-BENTOMAT SDN	200821LO	00000211	150	13.5	2025	2585
023940223	LO-BENTOMAT SDN	200821LO	00000212	150	13.5	2025	2583
023940222	LO-BENTOMAT SDN	200821LO	00000213	150	13.5	2025	2580
023940223	LO-BENTOMAT SDN	200821LO	00000214	150	13.5	2025	2570
023940220	LO-BENTOMAT SDN	200821LO	00000215	150	13.5	2025	2590
023940219	LO-BENTOMAT SDN	200821LO	00000216	150	13.5	2025	2585
023940219	LO-BENTOMAT SDN	200821LO	00000217	150	13.5	2025	2575
023940202	LO-BENTOMAT SDN	200821LO	00000218	150	13.5	2025	2570
023940220	LO-BENTOMAT SDN	200821LO	00000219	150	13.5	2025	2590
023940220	LO-BENTOMAT SDN	200821LO	00000220	150	13.5	2025	2580
023940204	LO-BENTOMAT SDN	200821LO	00000221	150	13.5	2025	2590
023940204	LO-BENTOMAT SDN	200821LO	00000222	150	13.5	2025	2545
023940207	LO-BENTOMAT SDN	200821LO	00000223	150	13.5	2025	2575
023940217	LO-BENTOMAT SDN	200821LO	00000224	150	13.5	2025	2570
023940211	LO-BENTOMAT SDN	200821LO	00000225	150	13.5	2025	2535
023940202	LO-BENTOMAT SDN	200821LO	00000226	150	13.5	2025	2540
023940241	LO-BENTOMAT SDN	200821LO	00000227	150	13.5	2025	2550
023940202	LO-BENTOMAT SDN	200821LO	00000228	150	13.5	2025	2520
023940201	LO-BENTOMAT SDN	200821LO	00000229	150	13.5	2025	2530
023940201	LO-BENTOMAT SDN	200821LO	00000230	150	13.5	2025	2545
023940212	LO-BENTOMAT SDN	200821LO	00000231	150	13.5	2025	2595
023940223	LO-BENTOMAT SDN	200821LO	00000232	150	13.5	2025	2575
023940201	LO-BENTOMAT SDN	200821LO	00000233	150	13.5	2025	2580
023940204	LO-BENTOMAT SDN	200821LO	00000234	150	13.5	2025	2530
023940211	LO-BENTOMAT SDN	200821LO	00000235	150	13.5	2025	2575
023940201	LO-BENTOMAT SDN	200821LO	00000236	150	13.5	2025	2535
023940211	LO-BENTOMAT SDN	200821LO	00000237	150	13.5	2025	2540
023940201	LO-BENTOMAT SDN	200821LO	00000238	150	13.5	2025	2555
023940219	LO-BENTOMAT SDN	200821LO	00000239	150	13.5	2025	2560

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940207	LO-BENTOMAT SDN	200821LO	00000240	150	13.5	2025	2525
023940217	LO-BENTOMAT SDN	200821LO	00000241	150	13.5	2025	2555
023940219	LO-BENTOMAT SDN	200821LO	00000242	150	13.5	2025	2565
023940220	LO-BENTOMAT SDN	200821LO	00000243	150	13.5	2025	2540
023940204	LO-BENTOMAT SDN	200821LO	00000244	150	13.5	2025	2530
023940207	LO-BENTOMAT SDN	200821LO	00000245	150	13.5	2025	2525
023940211	LO-BENTOMAT SDN	200821LO	00000246	150	13.5	2025	2660
023940207	LO-BENTOMAT SDN	200821LO	00000247	150	13.5	2025	2680
023940202	LO-BENTOMAT SDN	200821LO	00000248	150	13.5	2025	2565
023940201	LO-BENTOMAT SDN	200821LO	00000249	150	13.5	2025	2520
023940223	LO-BENTOMAT SDN	200821LO	00000250	150	13.5	2025	2530
023940220	LO-BENTOMAT SDN	200821LO	00000251	150	13.5	2025	2500
023940201	LO-BENTOMAT SDN	200821LO	00000252	150	13.5	2025	2480
023940204	LO-BENTOMAT SDN	200821LO	00000253	150	13.5	2025	2465
023940206	LO-BENTOMAT SDN	200821LO	00000254	150	13.5	2025	2485
023940202	LO-BENTOMAT SDN	200821LO	00000255	150	13.5	2025	2470
023940219	LO-BENTOMAT SDN	200821LO	00000256	150	13.5	2025	2475
023940216	LO-BENTOMAT SDN	200821LO	00000257	150	13.5	2025	2460
023940219	LO-BENTOMAT SDN	200821LO	00000258	150	13.5	2025	2455
023940204	LO-BENTOMAT SDN	200821LO	00000259	150	13.5	2025	2465
023940204	LO-BENTOMAT SDN	200821LO	00000260	150	13.5	2025	2470
023940202	LO-BENTOMAT SDN	200821LO	00000261	150	13.5	2025	2455
023940204	LO-BENTOMAT SDN	200821LO	00000262	150	13.5	2025	2430
023940204	LO-BENTOMAT SDN	200821LO	00000263	150	13.5	2025	2450
023940220	LO-BENTOMAT SDN	200821LO	00000264	150	13.5	2025	2460
023940202	LO-BENTOMAT SDN	200821LO	00000265	150	13.5	2025	2440
023940220	LO-BENTOMAT SDN	200821LO	00000266	150	13.5	2025	2470
023940201	LO-BENTOMAT SDN	200821LO	00000267	150	13.5	2025	2480
023940207	LO-BENTOMAT SDN	200821LO	00000268	150	13.5	2025	2485
023940206	LO-BENTOMAT SDN	200821LO	00000269	150	13.5	2025	2500
023940206	LO-BENTOMAT SDN	200821LO	00000270	150	13.5	2025	2510
023940215	LO-BENTOMAT SDN	200821LO	00000271	150	13.5	2025	2525

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940206	LO-BENTOMAT SDN	200821LO	00000272	150	13.5	2025	2515
023940215	LO-BENTOMAT SDN	200821LO	00000273	150	13.5	2025	2520
023940216	LO-BENTOMAT SDN	200821LO	00000274	150	14.5	2175	2550
023940206	LO-BENTOMAT SDN	200821LO	00000275	150	14.5	2175	2545
023940204	LO-BENTOMAT SDN	200821LO	00000276	150	14.5	2175	2560
023940207	LO-BENTOMAT SDN	200821LO	00000277	150	14.5	2175	2565
023940204	LO-BENTOMAT SDN	200821LO	00000278	150	14.5	2175	2570
023940204	LO-BENTOMAT SDN	200821LO	00000279	150	14.5	2175	2575
023940214	LO-BENTOMAT SDN	200821LO	00000280	150	14.5	2175	2560
023940201	LO-BENTOMAT SDN	200821LO	00000281	150	14.5	2175	2550
023940206	LO-BENTOMAT SDN	200821LO	00000282	150	14.5	2175	2545
023940206	LO-BENTOMAT SDN	200821LO	00000283	150	14.5	2175	2560
023940206	LO-BENTOMAT SDN	200821LO	00000284	150	14.5	2175	2570
023940206	LO-BENTOMAT SDN	200821LO	00000285	150	14.5	2175	2545
023940219	LO-BENTOMAT SDN	200821LO	00000286	150	14.5	2175	2535
023940202	LO-BENTOMAT SDN	200821LO	00000287	150	14.5	2175	2550
023940206	LO-BENTOMAT SDN	200821LO	00000288	150	14.5	2175	2560
023940206	LO-BENTOMAT SDN	200821LO	00000289	150	14.5	2175	2540
023940201	LO-BENTOMAT SDN	200821LO	00000290	150	14.5	2175	2535
023940202	LO-BENTOMAT SDN	200821LO	00000291	150	14.5	2175	2525
023940202	LO-BENTOMAT SDN	200821LO	00000292	150	14.5	2175	2535
023940202	LO-BENTOMAT SDN	200821LO	00000293	150	14.5	2175	2540
023940207	LO-BENTOMAT SDN	200821LO	00000294	150	14.5	2175	2550
023940204	LO-BENTOMAT SDN	200821LO	00000295	150	14.5	2175	2530
023940202	LO-BENTOMAT SDN	200821LO	00000296	150	14.5	2175	2515
023940220	LO-BENTOMAT SDN	200821LO	00000297	150	14.5	2175	2505
023940217	LO-BENTOMAT SDN	200821LO	00000298	150	14.5	2175	2515
023940223	LO-BENTOMAT SDN	200821LO	00000299	150	14.5	2175	2500
023940219	LO-BENTOMAT SDN	200821LO	00000300	150	14.5	2175	2490
023940217	LO-BENTOMAT SDN	200821LO	00000301	150	14.5	2175	2485
023940212	LO-BENTOMAT SDN	200821LO	00000302	150	14.5	2175	2490
023940212	LO-BENTOMAT SDN	200821LO	00000303	150	14.5	2175	2480

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940212	LO-BENTOMAT SDN	200821LO	00000304	150	14.5	2175	2495
023940212	LO-BENTOMAT SDN	200821LO	00000305	150	14.5	2175	2470
023940212	LO-BENTOMAT SDN	200821LO	00000306	150	14.5	2175	2477
023940220	LO-BENTOMAT SDN	200821LO	00000307	150	14.5	2175	2481
023940219	LO-BENTOMAT SDN	200821LO	00000308	150	14.5	2175	2480
023940217	LO-BENTOMAT SDN	200821LO	00000309	150	14.5	2175	2500
023940217	LO-BENTOMAT SDN	200821LO	00000310	150	14.5	2175	2490
023940217	LO-BENTOMAT SDN	200821LO	00000311	150	14.5	2175	2485
023940215	LO-BENTOMAT SDN	200821LO	00000312	150	14.5	2175	2470
023940215	LO-BENTOMAT SDN	200821LO	00000313	150	14.5	2175	2480
023940215	LO-BENTOMAT SDN	200821LO	00000314	150	14.5	2175	2450
023940205	LO-BENTOMAT SDN	200821LO	00000315	150	14.5	2175	2470
023940205	LO-BENTOMAT SDN	200821LO	00000316	150	14.5	2175	2480
023940215	LO-BENTOMAT SDN	200821LO	00000317	150	14.5	2175	2475
023940202	LO-BENTOMAT SDN	200821LO	00000318	150	14.5	2175	2490
023940202	LO-BENTOMAT SDN	200821LO	00000319	150	14.5	2175	2500
023940220	LO-BENTOMAT SDN	200821LO	00000320	150	14.5	2175	2505
023940205	LO-BENTOMAT SDN	200821LO	00000321	150	14.5	2175	2510
023940205	LO-BENTOMAT SDN	200821LO	00000322	150	14.5	2175	2520
023940212	LO-BENTOMAT SDN	200821LO	00000323	150	14.5	2175	2495
023940212	LO-BENTOMAT SDN	200821LO	00000324	150	14.5	2175	2490
023940202	LO-BENTOMAT SDN	200821LO	00000325	150	14.5	2175	2505
023940202	LO-BENTOMAT SDN	200821LO	00000326	150	14.5	2175	2510
023940212	LO-BENTOMAT SDN	200821LO	00000327	150	14.5	2175	2515
023940215	LO-BENTOMAT SDN	200821LO	00000328	150	14.5	2175	2520
023940219	LO-BENTOMAT SDN	200821LO	00000329	150	14.5	2175	2505
023940220	LO-BENTOMAT SDN	200821LO	00000330	150	14.5	2175	2510
023940215	LO-BENTOMAT SDN	200821LO	00000331	150	14.5	2175	2520
023940215	LO-BENTOMAT SDN	200821LO	00000332	150	14.5	2175	2535
023940219	LO-BENTOMAT SDN	200821LO	00000333	150	14.5	2175	2525
023940216	LO-BENTOMAT SDN	200821LO	00000334	150	14.5	2175	2505
023940217	LO-BENTOMAT SDN	200821LO	00000335	150	14.5	2175	2495

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940212	LO-BENTOMAT SDN	200821LO	00000336	150	14.5	2175	2480
023940217	LO-BENTOMAT SDN	200821LO	00000337	150	14.5	2175	2490
023940203	LO-BENTOMAT SDN	200821LO	00000338	150	14.5	2175	2500
023940203	LO-BENTOMAT SDN	200821LO	00000339	150	14.5	2175	2505
023940203	LO-BENTOMAT SDN	200821LO	00000340	150	14.5	2175	2510
023940205	LO-BENTOMAT SDN	200821LO	00000341	150	14.5	2175	2510
023940217	LO-BENTOMAT SDN	200821LO	00000342	150	14.5	2175	2515
023940205	LO-BENTOMAT SDN	200821LO	00000343	150	14.5	2175	2520
023940215	LO-BENTOMAT SDN	200821LO	00000344	150	14.5	2175	2530
023940214	LO-BENTOMAT SDN	200821LO	00000345	150	14.5	2175	2510
023940214	LO-BENTOMAT SDN	200821LO	00000346	150	14.5	2175	2495
023940214	LO-BENTOMAT SDN	200821LO	00000347	150	14.5	2175	2480
023940220	LO-BENTOMAT SDN	200821LO	00000348	150	14.5	2175	2495
023940216	LO-BENTOMAT SDN	200821LO	00000349	150	14.5	2175	2490
023940223	LO-BENTOMAT SDN	200821LO	00000350	150	14.5	2175	2530
023940216	LO-BENTOMAT SDN	200821LO	00000351	150	14.5	2175	2540
023940217	LO-BENTOMAT SDN	200821LO	00000352	150	14.5	2175	2535
023940203	LO-BENTOMAT SDN	200821LO	00000353	150	14.5	2175	2550
023940203	LO-BENTOMAT SDN	200821LO	00000354	150	14.5	2175	2545
023940205	LO-BENTOMAT SDN	200821LO	00000355	150	14.5	2175	2530
023940203	LO-BENTOMAT SDN	200821LO	00000356	150	14.5	2175	2525
023940203	LO-BENTOMAT SDN	200821LO	00000357	150	14.5	2175	2560
023940205	LO-BENTOMAT SDN	200821LO	00000358	150	14.5	2175	2570
023940220	LO-BENTOMAT SDN	200821LO	00000359	150	14.5	2175	2580
023940220	LO-BENTOMAT SDN	200821LO	00000360	150	14.5	2175	2555
023940222	LO-BENTOMAT SDN	200821LO	00000361	150	14.5	2175	2560
023940222	LO-BENTOMAT SDN	200821LO	00000362	150	14.5	2175	2575
023940211	LO-BENTOMAT SDN	200821LO	00000363	150	14.5	2175	2550
023940222	LO-BENTOMAT SDN	200821LO	00000364	150	14.5	2175	2540
023940222	LO-BENTOMAT SDN	200821LO	00000365	150	14.5	2175	2530
023940222	LO-BENTOMAT SDN	200821LO	00000366	150	14.5	2175	2525
023940222	LO-BENTOMAT SDN	200821LO	00000367	150	14.5	2175	2565

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940222	LO-BENTOMAT SDN	200821LO	00000368	150	14.5	2175	2570
023940220	LO-BENTOMAT SDN	200821LO	00000369	150	14.5	2175	2560
023940216	LO-BENTOMAT SDN	200821LO	00000370	150	14.5	2175	2550
023940216	LO-BENTOMAT SDN	200821LO	00000371	150	14.5	2175	2510
023940216	LO-BENTOMAT SDN	200821LO	00000372	150	14.5	2175	2530
023940216	LO-BENTOMAT SDN	200821LO	00000373	150	14.5	2175	2540
023940217	LO-BENTOMAT SDN	200821LO	00000374	150	14.5	2175	2535
023940216	LO-BENTOMAT SDN	200821LO	00000375	150	14.5	2175	2545
023940216	LO-BENTOMAT SDN	200821LO	00000376	150	14.5	2175	2550
023940216	LO-BENTOMAT SDN	200821LO	00000377	150	14.5	2175	2560
023940216	LO-BENTOMAT SDN	200821LO	00000378	150	14.5	2175	2540
023940216	LO-BENTOMAT SDN	200821LO	00000379	150	14.5	2175	2535
023940216	LO-BENTOMAT SDN	200821LO	00000380	150	14.5	2175	2525
023940216	LO-BENTOMAT SDN	200821LO	00000381	150	14.5	2175	2550
023940217	LO-BENTOMAT SDN	200821LO	00000382	150	14.5	2175	2540
023940210	LO-BENTOMAT SDN	200821LO	00000385	150	14.5	2175	2745
023940210	LO-BENTOMAT SDN	200821LO	00000386	150	14.5	2175	2760
023940212	LO-BENTOMAT SDN	200821LO	00000387	150	14.5	2175	2730
023940212	LO-BENTOMAT SDN	200821LO	00000388	150	14.5	2175	2745
023940215	LO-BENTOMAT SDN	200821LO	00000389	150	14.5	2175	2750
023940208	LO-BENTOMAT SDN	200821LO	00000390	150	14.5	2175	2760
023940208	LO-BENTOMAT SDN	200821LO	00000391	150	14.5	2175	2735
023940209	LO-BENTOMAT SDN	200821LO	00000392	150	14.5	2175	2740
023940209	LO-BENTOMAT SDN	200821LO	00000393	150	14.5	2175	2750
023940208	LO-BENTOMAT SDN	200821LO	00000394	150	14.5	2175	2710
023940208	LO-BENTOMAT SDN	200821LO	00000395	150	14.5	2175	2680
023940214	LO-BENTOMAT SDN	200821LO	00000396	150	14.5	2175	2655
023940210	LO-BENTOMAT SDN	200821LO	00000397	150	14.5	2175	2640
023940214	LO-BENTOMAT SDN	200821LO	00000398	150	14.5	2175	2630
023940210	LO-BENTOMAT SDN	200821LO	00000399	150	14.5	2175	2615
023940210	LO-BENTOMAT SDN	200821LO	00000400	150	14.5	2175	2600
023940213	LO-BENTOMAT SDN	200821LO	00000401	150	14.5	2175	2605

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940209	LO-BENTOMAT SDN	200821LO	00000402	150	14.5	2175	2610
023940213	LO-BENTOMAT SDN	200821LO	00000403	150	14.5	2175	2600
023940213	LO-BENTOMAT SDN	200821LO	00000404	150	14.5	2175	2605
023940213	LO-BENTOMAT SDN	200821LO	00000405	150	14.5	2175	2620
023940210	LO-BENTOMAT SDN	200821LO	00000406	150	14.5	2175	2628
023940210	LO-BENTOMAT SDN	200821LO	00000407	150	14.5	2175	2631
023940208	LO-BENTOMAT SDN	200821LO	00000408	150	14.5	2175	2624
023940215	LO-BENTOMAT SDN	200821LO	00000409	150	14.5	2175	2630
023940213	LO-BENTOMAT SDN	200821LO	00000410	150	14.5	2175	2622
023940215	LO-BENTOMAT SDN	200821LO	00000411	150	14.5	2175	2634
023940208	LO-BENTOMAT SDN	200821LO	00000412	150	14.5	2175	2629
023940209	LO-BENTOMAT SDN	200821LO	00000413	150	14.5	2175	2625
023940208	LO-BENTOMAT SDN	200821LO	00000414	150	14.5	2175	2634
023940219	LO-BENTOMAT SDN	200821LO	00000415	150	14.5	2175	2623
023940208	LO-BENTOMAT SDN	200821LO	00000416	150	14.5	2175	2630
023940209	LO-BENTOMAT SDN	200821LO	00000417	150	14.5	2175	2630
023940209	LO-BENTOMAT SDN	200821LO	00000418	150	14.5	2175	2637
023940209	LO-BENTOMAT SDN	200821LO	00000419	150	14.5	2175	2640
023940208	LO-BENTOMAT SDN	200821LO	00000420	150	14.5	2175	2643
023940208	LO-BENTOMAT SDN	200821LO	00000421	150	14.5	2175	2639
023940209	LO-BENTOMAT SDN	200821LO	00000422	150	14.5	2175	2635
023940208	LO-BENTOMAT SDN	200821LO	00000423	150	14.5	2175	2639
023940209	LO-BENTOMAT SDN	200821LO	00000424	150	14.5	2175	2641
023940208	LO-BENTOMAT SDN	200821LO	00000425	150	14.5	2175	2640
023940209	LO-BENTOMAT SDN	200821LO	00000426	150	14.5	2175	2620
023940209	LO-BENTOMAT SDN	200821LO	00000427	150	14.5	2175	2610
023940213	LO-BENTOMAT SDN	200821LO	00000428	150	14.5	2175	2620
023940209	LO-BENTOMAT SDN	200821LO	00000429	150	14.5	2175	2615
023940209	LO-BENTOMAT SDN	200821LO	00000430	150	14.5	2175	2590
023940209	LO-BENTOMAT SDN	200821LO	00000431	150	14.5	2175	2565
023940209	LO-BENTOMAT SDN	200821LO	00000432	150	14.5	2175	2530
023940209	LO-BENTOMAT SDN	200821LO	00000433	150	14.5	2175	2545

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940213	LO-BENTOMAT SDN	200821LO	00000434	150	14.5	2175	2550
023940213	LO-BENTOMAT SDN	200821LO	00000435	150	14.5	2175	2540
023940213	LO-BENTOMAT SDN	200821LO	00000436	150	14.5	2175	2535
023940213	LO-BENTOMAT SDN	200821LO	00000437	150	14.5	2175	2545
023940210	LO-BENTOMAT SDN	200821LO	00000438	150	14.5	2175	2555
023940213	LO-BENTOMAT SDN	200821LO	00000439	150	14.5	2175	2560
023940210	LO-BENTOMAT SDN	200821LO	00000440	150	14.5	2175	2545
023940210	LO-BENTOMAT SDN	200821LO	00000441	150	14.5	2175	2580
023940210	LO-BENTOMAT SDN	200821LO	00000442	150	14.5	2175	2575
023940210	LO-BENTOMAT SDN	200821LO	00000443	150	14.5	2175	2560
023940214	LO-BENTOMAT SDN	200821LO	00000444	150	14.5	2175	2580
023940208	LO-BENTOMAT SDN	200821LO	00000445	150	14.5	2175	2570
023940210	LO-BENTOMAT SDN	200821LO	00000446	150	14.5	2175	2575
023940213	LO-BENTOMAT SDN	200821LO	00000447	150	14.5	2175	2560
023940215	LO-BENTOMAT SDN	200821LO	00000448	150	14.5	2175	2585
023940214	LO-BENTOMAT SDN	200821LO	00000449	150	14.5	2175	2575
023940214	LO-BENTOMAT SDN	200821LO	00000450	150	14.5	2175	2568
023940215	LO-BENTOMAT SDN	200821LO	00000451	150	14.5	2175	2565
023940214	LO-BENTOMAT SDN	200821LO	00000452	150	14.5	2175	2570
023940213	LO-BENTOMAT SDN	200821LO	00000453	150	14.5	2175	2575
023940213	LO-BENTOMAT SDN	200821LO	00000454	150	14.5	2175	2590
023940210	LO-BENTOMAT SDN	200821LO	00000455	150	14.5	2175	2575
023940210	LO-BENTOMAT SDN	200821LO	00000456	150	14.5	2175	2580
023940213	LO-BENTOMAT SDN	200821LO	00000457	150	14.5	2175	2565
023940208	LO-BENTOMAT SDN	200821LO	00000458	150	14.5	2175	2570
023940213	LO-BENTOMAT SDN	200821LO	00000459	150	14.5	2175	2560
023940208	LO-BENTOMAT SDN	200821LO	00000460	150	14.5	2175	2550
023940208	LO-BENTOMAT SDN	200821LO	00000461	150	14.5	2175	2575
023940208	LO-BENTOMAT SDN	200821LO	00000462	150	14.5	2175	2580
023940212	LO-BENTOMAT SDN	200821LO	00000463	150	14.5	2175	2585
023940215	LO-BENTOMAT SDN	200821LO	00000464	150	14.5	2175	2570
023940210	LO-BENTOMAT SDN	200821LO	00000465	150	14.5	2175	2560

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940218	LO-BENTOMAT SDN	200822LO	00000467	150	14.5	2175	2505
023940232	LO-BENTOMAT SDN	200822LO	00000468	150	14.5	2175	2445
023940239	LO-BENTOMAT SDN	200822LO	00000470	150	14.5	2175	2540
023940235	LO-BENTOMAT SDN	200822LO	00000471	150	14.5	2175	2565
023940235	LO-BENTOMAT SDN	200822LO	00000472	150	14.5	2175	2505
023940241	LO-BENTOMAT SDN	200822LO	00000473	150	14.5	2175	2570
023940241	LO-BENTOMAT SDN	200822LO	00000474	150	14.5	2175	2525
023940233	LO-BENTOMAT SDN	200822LO	00000481	150	14.5	2175	2440
023940233	LO-BENTOMAT SDN	200822LO	00000484	150	14.5	2175	2430
023940233	LO-BENTOMAT SDN	200822LO	00000485	150	14.5	2175	2440
023940231	LO-BENTOMAT SDN	200822LO	00000487	150	14.5	2175	2430
023940243	LO-BENTOMAT SDN	200822LO	00000489	150	14.5	2175	2431
023940243	LO-BENTOMAT SDN	200822LO	00000494	150	14.5	2175	2475
023940226	LO-BENTOMAT SDN	200822LO	00000496	150	14.5	2175	2415
023940239	LO-BENTOMAT SDN	200822LO	00000497	150	14.5	2175	2425
023940233	LO-BENTOMAT SDN	200822LO	00000498	150	14.5	2175	2370
023940235	LO-BENTOMAT SDN	200822LO	00000500	150	14.5	2175	2375
023940226	LO-BENTOMAT SDN	200822LO	00000502	150	14.5	2175	2345
023940235	LO-BENTOMAT SDN	200822LO	00000503	150	14.5	2175	2465
023940226	LO-BENTOMAT SDN	200822LO	00000504	150	14.5	2175	2410
023940243	LO-BENTOMAT SDN	200822LO	00000505	150	14.5	2175	2460
023940243	LO-BENTOMAT SDN	200822LO	00000506	150	14.5	2175	2385
023940243	LO-BENTOMAT SDN	200822LO	00000507	150	14.5	2175	2950
023940218	LO-BENTOMAT SDN	200822LO	00000508	150	14.5	2175	2400
023940226	LO-BENTOMAT SDN	200822LO	00000509	150	14.5	2175	2405
023940226	LO-BENTOMAT SDN	200822LO	00000510	150	14.5	2175	2420
023940232	LO-BENTOMAT SDN	200822LO	00000511	150	14.5	2175	2395
023940229	LO-BENTOMAT SDN	200822LO	00000512	150	14.5	2175	2390
023940226	LO-BENTOMAT SDN	200822LO	00000513	150	14.5	2175	2415
023940226	LO-BENTOMAT SDN	200822LO	00000514	150	14.5	2175	2415
023940239	LO-BENTOMAT SDN	200822LO	00000515	150	14.5	2175	2405
023940226	LO-BENTOMAT SDN	200822LO	00000516	150	14.5	2175	2410

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940243	LO-BENTOMAT SDN	200822LO	00000517	150	14.5	2175	2400
023940243	LO-BENTOMAT SDN	200822LO	00000518	150	14.5	2175	2425
023940231	LO-BENTOMAT SDN	200822LO	00000520	150	14.5	2175	2445
023940224	LO-BENTOMAT SDN	200822LO	00000522	150	14.5	2175	2400
023940229	LO-BENTOMAT SDN	200822LO	00000523	150	14.5	2175	2400
023940224	LO-BENTOMAT SDN	200822LO	00000524	150	14.5	2175	2445
023940224	LO-BENTOMAT SDN	200822LO	00000525	150	14.5	2175	2450
023940232	LO-BENTOMAT SDN	200822LO	00000526	150	14.5	2175	2300
023940232	LO-BENTOMAT SDN	200822LO	00000527	150	14.5	2175	2460
023940218	LO-BENTOMAT SDN	200822LO	00000528	150	14.5	2175	2455
023940226	LO-BENTOMAT SDN	200822LO	00000529	150	14.5	2175	2440
023940226	LO-BENTOMAT SDN	200822LO	00000530	150	14.5	2175	2500
023940226	LO-BENTOMAT SDN	200822LO	00000531	150	14.5	2175	2035
023940226	LO-BENTOMAT SDN	200822LO	00000532	150	14.5	2175	2450
023940226	LO-BENTOMAT SDN	200822LO	00000533	150	14.5	2175	2420
023940235	LO-BENTOMAT SDN	200822LO	00000534	150	14.5	2175	2555
023940231	LO-BENTOMAT SDN	200822LO	00000535	150	14.5	2175	2590
023940231	LO-BENTOMAT SDN	200822LO	00000536	150	14.5	2175	2550
023940232	LO-BENTOMAT SDN	200822LO	00000537	150	14.5	2175	2425
023940243	LO-BENTOMAT SDN	200822LO	00000538	150	14.5	2175	2450
023940240	LO-BENTOMAT SDN	200822LO	00000539	150	14.5	2175	2430
023940224	LO-BENTOMAT SDN	200822LO	00000540	150	14.5	2175	4400
023940224	LO-BENTOMAT SDN	200822LO	00000541	150	14.5	2175	2433
023940239	LO-BENTOMAT SDN	200822LO	00000542	150	14.5	2175	2425
023940225	LO-BENTOMAT SDN	200822LO	00000543	150	14.5	2175	2430
023940225	LO-BENTOMAT SDN	200822LO	00000544	150	14.5	2175	2200
023940224	LO-BENTOMAT SDN	200822LO	00000545	150	14.5	2175	2490
023940224	LO-BENTOMAT SDN	200822LO	00000546	150	14.5	2175	2485
023940224	LO-BENTOMAT SDN	200822LO	00000547	150	14.5	2175	2480
023940231	LO-BENTOMAT SDN	200822LO	00000548	150	14.5	2175	2475
023940239	LO-BENTOMAT SDN	200822LO	00000549	150	14.5	2175	2472
023940231	LO-BENTOMAT SDN	200822LO	00000550	150	14.5	2175	2465

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940239	LO-BENTOMAT SDN	200822LO	00000551	150	14.5	2175	2469
023940218	LO-BENTOMAT SDN	200822LO	00000552	150	14.5	2175	2473
023940218	LO-BENTOMAT SDN	200822LO	00000553	150	14.5	2175	2470
023940239	LO-BENTOMAT SDN	200822LO	00000554	150	14.5	2175	2480
023940224	LO-BENTOMAT SDN	200822LO	00000555	150	14.5	2175	2475
023940239	LO-BENTOMAT SDN	200822LO	00000556	150	14.5	2175	2473
023940226	LO-BENTOMAT SDN	200822LO	00000557	150	14.5	2175	2468
023940226	LO-BENTOMAT SDN	200822LO	00000558	150	14.5	2175	2470
023940232	LO-BENTOMAT SDN	200822LO	00000559	150	14.5	2175	2475
023940226	LO-BENTOMAT SDN	200822LO	00000560	150	14.5	2175	2476
023940226	LO-BENTOMAT SDN	200822LO	00000561	150	14.5	2175	2480
023940218	LO-BENTOMAT SDN	200822LO	00000562	150	14.5	2175	2472
023940218	LO-BENTOMAT SDN	200822LO	00000563	150	14.5	2175	2468
023940218	LO-BENTOMAT SDN	200822LO	00000564	150	14.5	2175	2475
023940218	LO-BENTOMAT SDN	200822LO	00000565	150	14.5	2175	2470
023940232	LO-BENTOMAT SDN	200822LO	00000566	150	14.5	2175	2467
023940218	LO-BENTOMAT SDN	200822LO	00000567	150	14.5	2175	2480
023940224	LO-BENTOMAT SDN	200822LO	00000568	150	14.5	2175	2483
023940224	LO-BENTOMAT SDN	200822LO	00000569	150	14.5	2175	2480
023940224	LO-BENTOMAT SDN	200822LO	00000570	150	14.5	2175	2477
023940235	LO-BENTOMAT SDN	200822LO	00000571	150	14.5	2175	2430
023940231	LO-BENTOMAT SDN	200822LO	00000572	150	14.5	2175	2465
023940231	LO-BENTOMAT SDN	200822LO	00000573	150	14.5	2175	2480
023940232	LO-BENTOMAT SDN	200822LO	00000575	150	14.5	2175	2465
023940243	LO-BENTOMAT SDN	200822LO	00000576	150	14.5	2175	2480
023940224	LO-BENTOMAT SDN	200822LO	00000577	150	14.5	2175	2450
023940235	LO-BENTOMAT SDN	200822LO	00000578	150	14.5	2175	2475
023940224	LO-BENTOMAT SDN	200822LO	00000579	150	14.5	2175	2435
023940231	LO-BENTOMAT SDN	200822LO	00000580	150	14.5	2175	2470
023940218	LO-BENTOMAT SDN	200822LO	00000581	150	14.5	2175	2455
023940231	LO-BENTOMAT SDN	200822LO	00000582	150	14.5	2175	2485
023940243	LO-BENTOMAT SDN	200822LO	00000583	150	14.5	2175	2490

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940232	LO-BENTOMAT SDN	200822LO	00000584	150	14.5	2175	2500
023940218	LO-BENTOMAT SDN	200822LO	00000585	150	14.5	2175	2445
023940232	LO-BENTOMAT SDN	200822LO	00000586	150	14.5	2175	2510
023940232	LO-BENTOMAT SDN	200822LO	00000587	150	14.5	2175	2515
023940232	LO-BENTOMAT SDN	200822LO	00000588	150	14.5	2175	2505
023940235	LO-BENTOMAT SDN	200822LO	00000589	150	14.5	2175	2520
023940240	LO-BENTOMAT SDN	200822LO	00000591	150	14.5	2175	2524
023940232	LO-BENTOMAT SDN	200822LO	00000592	150	14.5	2175	2520
023940218	LO-BENTOMAT SDN	200822LO	00000593	150	14.5	2175	2515
023940231	LO-BENTOMAT SDN	200822LO	00000594	150	14.5	2175	2620
023940225	LO-BENTOMAT SDN	200822LO	00000595	150	14.5	2175	2560
023940224	LO-BENTOMAT SDN	200822LO	00000596	150	14.5	2175	2600
023940232	LO-BENTOMAT SDN	200822LO	00000597	150	14.5	2175	2610
023940231	LO-BENTOMAT SDN	200822LO	00000598	150	14.5	2175	2605
023940224	LO-BENTOMAT SDN	200822LO	00000599	150	14.5	2175	2615
023940245	LO-BENTOMAT SDN	200822LO	00000600	150	14.5	2175	2620
023940232	LO-BENTOMAT SDN	200822LO	00000601	150	14.5	2175	2625
023940231	LO-BENTOMAT SDN	200822LO	00000602	150	14.5	2175	2615
023940231	LO-BENTOMAT SDN	200822LO	00000603	150	14.5	2175	2620
023940224	LO-BENTOMAT SDN	200822LO	00000604	150	14.5	2175	2610
023940227	LO-BENTOMAT SDN	200822LO	00000605	150	14.5	2175	2615
023940233	LO-BENTOMAT SDN	200822LO	00000606	150	14.5	2175	2610
023940225	LO-BENTOMAT SDN	200822LO	00000607	150	14.5	2175	2625
023940218	LO-BENTOMAT SDN	200822LO	00000608	150	14.5	2175	2605
023940218	LO-BENTOMAT SDN	200822LO	00000609	150	14.5	2175	2620
023940232	LO-BENTOMAT SDN	200822LO	00000610	150	14.5	2175	2615
023940232	LO-BENTOMAT SDN	200822LO	00000611	150	14.5	2175	2610
023940228	LO-BENTOMAT SDN	200822LO	00000612	150	14.5	2175	2620
023940245	LO-BENTOMAT SDN	200822LO	00000613	150	14.5	2175	2615
023940218	LO-BENTOMAT SDN	200822LO	00000614	150	14.5	2175	2625
023940239	LO-BENTOMAT SDN	200822LO	00000615	150	14.5	2175	2620
023940218	LO-BENTOMAT SDN	200822LO	00000616	150	14.5	2175	2630

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940227	LO-BENTOMAT SDN	200822LO	00000617	150	14.5	2175	2615
023940227	LO-BENTOMAT SDN	200822LO	00000618	150	14.5	2175	2600
023940228	LO-BENTOMAT SDN	200822LO	00000619	150	14.5	2175	2605
023940227	LO-BENTOMAT SDN	200822LO	00000620	150	14.5	2175	2615
023940237	LO-BENTOMAT SDN	200822LO	00000621	150	14.5	2175	2600
023940225	LO-BENTOMAT SDN	200822LO	00000622	150	14.5	2175	2620
023940228	LO-BENTOMAT SDN	200822LO	00000623	150	14.5	2175	2615
023940228	LO-BENTOMAT SDN	200822LO	00000624	150	14.5	2175	2620
023940228	LO-BENTOMAT SDN	200822LO	00000625	150	14.5	2175	2625
023940225	LO-BENTOMAT SDN	200822LO	00000626	150	14.5	2175	2630
023940228	LO-BENTOMAT SDN	200822LO	00000627	150	14.5	2175	2620
023940230	LO-BENTOMAT SDN	200822LO	00000628	150	14.5	2175	2615
023940227	LO-BENTOMAT SDN	200822LO	00000629	150	14.5	2175	2620
023940225	LO-BENTOMAT SDN	200822LO	00000630	150	14.5	2175	2625
023940228	LO-BENTOMAT SDN	200822LO	00000631	150	14.5	2175	2630
023940228	LO-BENTOMAT SDN	200822LO	00000632	150	14.5	2175	2610
023940227	LO-BENTOMAT SDN	200822LO	00000633	150	14.5	2175	2610
023940225	LO-BENTOMAT SDN	200822LO	00000634	150	14.5	2175	2615
023940225	LO-BENTOMAT SDN	200822LO	00000635	150	14.5	2175	2610
023940225	LO-BENTOMAT SDN	200822LO	00000636	150	14.5	2175	2620
023940228	LO-BENTOMAT SDN	200822LO	00000637	150	14.5	2175	2630
023940225	LO-BENTOMAT SDN	200822LO	00000638	150	14.5	2175	2635
023940228	LO-BENTOMAT SDN	200822LO	00000639	150	14.5	2175	2620
023940225	LO-BENTOMAT SDN	200822LO	00000640	150	14.5	2175	2590
023940225	LO-BENTOMAT SDN	200822LO	00000641	150	14.5	2175	2600
023940228	LO-BENTOMAT SDN	200822LO	00000642	150	14.5	2175	2610
023940228	LO-BENTOMAT SDN	200822LO	00000643	150	14.5	2175	2615
023940225	LO-BENTOMAT SDN	200822LO	00000644	150	14.5	2175	2610
023940228	LO-BENTOMAT SDN	200822LO	00000645	150	14.5	2175	2620
023940228	LO-BENTOMAT SDN	200822LO	00000646	150	14.5	2175	2600
023940228	LO-BENTOMAT SDN	200822LO	00000647	150	14.5	2175	2615
023940228	LO-BENTOMAT SDN	200822LO	00000648	150	14.5	2175	2620

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940228	LO-BENTOMAT SDN	200822LO	00000649	150	14.5	2175	2630
023940227	LO-BENTOMAT SDN	200822LO	00000650	150	14.5	2175	2610
023940227	LO-BENTOMAT SDN	200822LO	00000651	150	14.5	2175	2615
023940227	LO-BENTOMAT SDN	200822LO	00000652	150	14.5	2175	2610
023940227	LO-BENTOMAT SDN	200822LO	00000653	150	14.5	2175	2620
023940240	LO-BENTOMAT SDN	200822LO	00000654	150	14.5	2175	2630
023940239	LO-BENTOMAT SDN	200822LO	00000655	150	14.5	2175	2625
023940233	LO-BENTOMAT SDN	200822LO	00000656	150	14.5	2175	2600
023940227	LO-BENTOMAT SDN	200822LO	00000657	150	14.5	2175	2620
023940227	LO-BENTOMAT SDN	200822LO	00000658	150	14.5	2175	2630
023940227	LO-BENTOMAT SDN	200822LO	00000659	150	14.5	2175	2625
023940227	LO-BENTOMAT SDN	200822LO	00000660	150	14.5	2175	2620
023940227	LO-BENTOMAT SDN	200822LO	00000661	150	14.5	2175	2630
023940227	LO-BENTOMAT SDN	200822LO	00000662	150	14.5	2175	2430
023940227	LO-BENTOMAT SDN	200822LO	00000663	150	14.5	2175	2445
023940225	LO-BENTOMAT SDN	200822LO	00000664	150	14.5	2175	2500
023940225	LO-BENTOMAT SDN	200822LO	00000665	150	14.5	2175	2450
023940229	LO-BENTOMAT SDN	200822LO	00000666	150	14.5	2175	2200
023940229	LO-BENTOMAT SDN	200822LO	00000667	150	14.5	2175	2350
023940234	LO-BENTOMAT SDN	200822LO	00000669	150	14.5	2175	2315
023940225	LO-BENTOMAT SDN	200822LO	00000670	150	14.5	2175	2465
023940230	LO-BENTOMAT SDN	200822LO	00000671	150	14.5	2175	2530
023940240	LO-BENTOMAT SDN	200822LO	00000672	150	14.5	2175	2510
023940231	LO-BENTOMAT SDN	200822LO	00000673	150	14.5	2175	2470
023940243	LO-BENTOMAT SDN	200822LO	00000674	150	14.5	2175	2455
023940237	LO-BENTOMAT SDN	200822LO	00000675	150	14.5	2175	2580
023940239	LO-BENTOMAT SDN	200822LO	00000676	150	14.5	2175	2730
023940243	LO-BENTOMAT SDN	200822LO	00000677	150	14.5	2175	2520
023940237	LO-BENTOMAT SDN	200822LO	00000678	150	14.5	2175	2520
023940237	LO-BENTOMAT SDN	200822LO	00000679	150	14.5	2175	2440
023940245	LO-BENTOMAT SDN	200822LO	00000680	150	14.5	2175	2490
023940237	LO-BENTOMAT SDN	200822LO	00000681	150	14.5	2175	2500

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940239	LO-BENTOMAT SDN	200822LO	00000682	150	14.5	2175	2590
023940245	LO-BENTOMAT SDN	200822LO	00000683	150	14.5	2175	2590
023940236	LO-BENTOMAT SDN	200822LO	00000684	150	14.5	2175	2600
023940237	LO-BENTOMAT SDN	200822LO	00000685	150	14.5	2175	2620
023940237	LO-BENTOMAT SDN	200822LO	00000686	150	14.5	2175	2630
023940237	LO-BENTOMAT SDN	200822LO	00000687	150	14.5	2175	2615
023940237	LO-BENTOMAT SDN	200822LO	00000688	150	14.5	2175	2625
023940237	LO-BENTOMAT SDN	200822LO	00000689	150	14.5	2175	2550
023940231	LO-BENTOMAT SDN	200822LO	00000690	150	14.5	2175	2630
023940234	LO-BENTOMAT SDN	200822LO	00000691	150	14.5	2175	2620
023940230	LO-BENTOMAT SDN	200822LO	00000692	150	14.5	2175	2650
023940240	LO-BENTOMAT SDN	200822LO	00000693	150	14.5	2175	2650
023940240	LO-BENTOMAT SDN	200822LO	00000694	150	14.5	2175	2610
023940245	LO-BENTOMAT SDN	200822LO	00000695	150	14.5	2175	2650
023940245	LO-BENTOMAT SDN	200822LO	00000696	150	14.5	2175	2670
023940237	LO-BENTOMAT SDN	200822LO	00000697	150	14.5	2175	2645
023940245	LO-BENTOMAT SDN	200822LO	00000698	150	14.5	2175	2660
023940237	LO-BENTOMAT SDN	200822LO	00000699	150	14.5	2175	2635
023940240	LO-BENTOMAT SDN	200822LO	00000700	150	14.5	2175	2350
023940240	LO-BENTOMAT SDN	200822LO	00000701	150	14.5	2175	2675
023940237	LO-BENTOMAT SDN	200822LO	00000702	150	14.5	2175	2680
023940240	LO-BENTOMAT SDN	200822LO	00000703	150	14.5	2175	2680
023940237	LO-BENTOMAT SDN	200822LO	00000704	150	14.5	2175	2640
023940231	LO-BENTOMAT SDN	200822LO	00000705	150	14.5	2175	2655
023940237	LO-BENTOMAT SDN	200822LO	00000706	150	14.5	2175	2670
023940243	LO-BENTOMAT SDN	200822LO	00000707	150	14.5	2175	2655
023940236	LO-BENTOMAT SDN	200822LO	00000708	150	14.5	2175	2680
023940240	LO-BENTOMAT SDN	200822LO	00000709	150	14.5	2175	2640
023940240	LO-BENTOMAT SDN	200822LO	00000710	150	14.5	2175	2655
023940237	LO-BENTOMAT SDN	200822LO	00000711	150	14.5	2175	2670
023940240	LO-BENTOMAT SDN	200822LO	00000712	150	14.5	2175	2625
023940236	LO-BENTOMAT SDN	200822LO	00000713	150	14.5	2175	2635

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940237	LO-BENTOMAT SDN	200822LO	00000714	150	14.5	2175	2675
023940240	LO-BENTOMAT SDN	200822LO	00000715	150	14.5	2175	2640
023940229	LO-BENTOMAT SDN	200822LO	00000716	150	14.5	2175	2670
023940236	LO-BENTOMAT SDN	200822LO	00000717	150	14.5	2175	2690
023940229	LO-BENTOMAT SDN	200822LO	00000718	150	14.5	2175	2670
023940240	LO-BENTOMAT SDN	200822LO	00000719	150	14.5	2175	2670
023940229	LO-BENTOMAT SDN	200822LO	00000720	150	14.5	2175	2655
023940229	LO-BENTOMAT SDN	200822LO	00000721	150	14.5	2175	2640
023940233	LO-BENTOMAT SDN	200822LO	00000722	150	14.5	2175	2635
023940229	LO-BENTOMAT SDN	200822LO	00000723	150	14.5	2175	2675
023940229	LO-BENTOMAT SDN	200822LO	00000724	150	14.5	2175	2695
023940229	LO-BENTOMAT SDN	200822LO	00000725	150	14.5	2175	2630
023940229	LO-BENTOMAT SDN	200822LO	00000726	150	14.5	2175	2645
023940229	LO-BENTOMAT SDN	200822LO	00000727	150	14.5	2175	2655
023940245	LO-BENTOMAT SDN	200822LO	00000729	150	14.5	2175	2620
023940233	LO-BENTOMAT SDN	200822LO	00000730	150	14.5	2175	2655
023940243	LO-BENTOMAT SDN	200822LO	00000731	150	14.5	2175	2670
023940245	LO-BENTOMAT SDN	200822LO	00000733	150	14.5	2175	2620
023940240	LO-BENTOMAT SDN	200822LO	00000734	150	14.5	2175	2670
023940233	LO-BENTOMAT SDN	200822LO	00000735	150	14.5	2175	2645
023940239	LO-BENTOMAT SDN	200822LO	00000736	150	14.5	2175	2650
023940239	LO-BENTOMAT SDN	200822LO	00000737	150	14.5	2175	2660
023940245	LO-BENTOMAT SDN	200822LO	00000738	150	14.5	2175	2645
023940245	LO-BENTOMAT SDN	200822LO	00000739	150	14.5	2175	2630
023940229	LO-BENTOMAT SDN	200822LO	00000740	150	14.5	2175	2665
023940235	LO-BENTOMAT SDN	200822LO	00000743	150	14.5	2175	2615
023940235	LO-BENTOMAT SDN	200822LO	00000744	150	14.5	2175	2620
023940235	LO-BENTOMAT SDN	200822LO	00000745	150	14.5	2175	2625
023940235	LO-BENTOMAT SDN	200822LO	00000746	150	14.5	2175	2615
023940235	LO-BENTOMAT SDN	200822LO	00000747	150	14.5	2175	2610
023940229	LO-BENTOMAT SDN	200822LO	00000748	150	14.5	2175	2615
023940238	LO-BENTOMAT SDN	200822LO	00000749	150	14.5	2175	2620

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940229	LO-BENTOMAT SDN	200822LO	00000750	150	14.5	2175	2610
023940229	LO-BENTOMAT SDN	200822LO	00000751	150	14.5	2175	2615
023940235	LO-BENTOMAT SDN	200822LO	00000752	150	14.5	2175	2620
023940230	LO-BENTOMAT SDN	200822LO	00000753	150	14.5	2175	2630
023940234	LO-BENTOMAT SDN	200822LO	00000754	150	14.5	2175	2610
023940234	LO-BENTOMAT SDN	200822LO	00000755	150	14.5	2175	2625
023940238	LO-BENTOMAT SDN	200822LO	00000756	150	14.5	2175	2615
023940236	LO-BENTOMAT SDN	200822LO	00000757	150	14.5	2175	2610
023940230	LO-BENTOMAT SDN	200822LO	00000758	150	14.5	2175	2615
023940238	LO-BENTOMAT SDN	200822LO	00000759	150	14.5	2175	2620
023940236	LO-BENTOMAT SDN	200822LO	00000760	150	14.5	2175	2620
023940233	LO-BENTOMAT SDN	200822LO	00000761	150	14.5	2175	2625
023940243	LO-BENTOMAT SDN	200822LO	00000762	150	14.5	2175	2615
023940243	LO-BENTOMAT SDN	200822LO	00000763	150	14.5	2175	2620
023940235	LO-BENTOMAT SDN	200822LO	00000764	150	14.5	2175	2625
023940233	LO-BENTOMAT SDN	200822LO	00000765	150	14.5	2175	2630
023940233	LO-BENTOMAT SDN	200822LO	00000766	150	14.5	2175	2615
023940243	LO-BENTOMAT SDN	200822LO	00000767	150	14.5	2175	2610
023940233	LO-BENTOMAT SDN	200822LO	00000768	150	14.5	2175	2615
023940235	LO-BENTOMAT SDN	200822LO	00000769	150	14.5	2175	2600
023940230	LO-BENTOMAT SDN	200822LO	00000770	150	14.5	2175	2605
023940233	LO-BENTOMAT SDN	200822LO	00000771	150	14.5	2175	2615
023940230	LO-BENTOMAT SDN	200822LO	00000772	150	14.5	2175	2610
023940233	LO-BENTOMAT SDN	200822LO	00000773	150	14.5	2175	2605
023940245	LO-BENTOMAT SDN	200822LO	00000774	150	14.5	2175	2610
023940233	LO-BENTOMAT SDN	200822LO	00000775	150	14.5	2175	2615
023940245	LO-BENTOMAT SDN	200822LO	00000776	150	14.5	2175	2600
023940235	LO-BENTOMAT SDN	200822LO	00000777	150	14.5	2175	2620
023940239	LO-BENTOMAT SDN	200822LO	00000778	150	14.5	2175	2615
023940233	LO-BENTOMAT SDN	200822LO	00000780	150	14.5	2175	2610
023940236	LO-BENTOMAT SDN	200822LO	00000781	150	14.5	2175	2615
023940238	LO-BENTOMAT SDN	200822LO	00000782	150	14.5	2175	2600

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940234	LO-BENTOMAT SDN	200822LO	00000783	150	14.5	2175	2590
023940230	LO-BENTOMAT SDN	200822LO	00000784	150	14.5	2175	2620
023940230	LO-BENTOMAT SDN	200822LO	00000785	150	14.5	2175	2610
023940238	LO-BENTOMAT SDN	200822LO	00000786	150	14.5	2175	2615
023940238	LO-BENTOMAT SDN	200822LO	00000787	150	14.5	2175	2620
023940236	LO-BENTOMAT SDN	200822LO	00000788	150	14.5	2175	2610
023940238	LO-BENTOMAT SDN	200822LO	00000789	150	14.5	2175	2615
023940239	LO-BENTOMAT SDN	200822LO	00000790	150	14.5	2175	2600
023940236	LO-BENTOMAT SDN	200822LO	00000791	150	14.5	2175	2620
023940236	LO-BENTOMAT SDN	200822LO	00000792	150	14.5	2175	2625
023940245	LO-BENTOMAT SDN	200822LO	00000793	150	14.5	2175	2630
023940234	LO-BENTOMAT SDN	200822LO	00000794	150	14.5	2175	2635
023940234	LO-BENTOMAT SDN	200822LO	00000795	150	14.5	2175	2630
023940230	LO-BENTOMAT SDN	200822LO	00000796	150	14.5	2175	2620
023940240	LO-BENTOMAT SDN	200822LO	00000797	150	14.5	2175	2625
023940238	LO-BENTOMAT SDN	200822LO	00000799	150	14.5	2175	2620
023940236	LO-BENTOMAT SDN	200822LO	00000800	150	14.5	2175	2610
023940236	LO-BENTOMAT SDN	200822LO	00000802	150	14.5	2175	2630
023940230	LO-BENTOMAT SDN	200822LO	00000803	150	14.5	2175	2675
023940238	LO-BENTOMAT SDN	200822LO	00000804	150	14.5	2175	2640
023940238	LO-BENTOMAT SDN	200822LO	00000805	150	14.5	2175	2655
023940238	LO-BENTOMAT SDN	200822LO	00000806	150	14.5	2175	2640
023940234	LO-BENTOMAT SDN	200822LO	00000807	150	14.5	2175	2675
023940234	LO-BENTOMAT SDN	200822LO	00000808	150	14.5	2175	2640
023940245	LO-BENTOMAT SDN	200822LO	00000809	150	14.5	2175	2655
023940236	LO-BENTOMAT SDN	200822LO	00000810	150	14.5	2175	2690
023940230	LO-BENTOMAT SDN	200822LO	00000811	150	14.5	2175	2630
023940236	LO-BENTOMAT SDN	200822LO	00000812	150	14.5	2175	2660
023940238	LO-BENTOMAT SDN	200822LO	00000813	150	14.5	2175	2670
023940236	LO-BENTOMAT SDN	200822LO	00000814	150	14.5	2175	2670
023940234	LO-BENTOMAT SDN	200822LO	00000815	150	14.5	2175	2645
023940238	LO-BENTOMAT SDN	200822LO	00000816	150	14.5	2175	2635

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940234	LO-BENTOMAT SDN	200822LO	00000817	150	14.5	2175	2640
023940234	LO-BENTOMAT SDN	200822LO	00000818	150	14.5	2175	2670
023940239	LO-BENTOMAT SDN	200822LO	00000819	150	14.5	2175	2655
023940234	LO-BENTOMAT SDN	200822LO	00000820	150	14.5	2175	2680
023940234	LO-BENTOMAT SDN	200822LO	00000821	150	14.5	2175	2645
023940234	LO-BENTOMAT SDN	200822LO	00000822	150	14.5	2175	2680
023940234	LO-BENTOMAT SDN	200822LO	00000823	150	14.5	2175	2645
023940234	LO-BENTOMAT SDN	200822LO	00000824	150	14.5	2175	2670
023940238	LO-BENTOMAT SDN	200822LO	00000825	150	14.5	2175	2645
023940238	LO-BENTOMAT SDN	200822LO	00000826	150	14.5	2175	2670
023940236	LO-BENTOMAT SDN	200822LO	00000827	150	14.5	2175	2645
023940240	LO-BENTOMAT SDN	200822LO	00000828	150	14.5	2175	2695
023940236	LO-BENTOMAT SDN	200822LO	00000829	150	14.5	2175	2680
023940238	LO-BENTOMAT SDN	200822LO	00000830	150	14.5	2175	2620
023940245	LO-BENTOMAT SDN	200822LO	00000831	150	14.5	2175	2650
023940238	LO-BENTOMAT SDN	200822LO	00000832	150	14.5	2175	2670
			Totals:	**107250**	**10185.5**	**1527825**	**1832519**
Total Number of Rolls Certified: 715							

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200820LO	00000001	00000001	2009462583			2009032535	042608C
200820LO	00000002	00000001	2009462583			2009032535	042608C
200820LO	00000003	00000001	2009462583			2009032535	042608C
200820LO	00000004	00000001	2009462583			2009032535	042608C
200820LO	00000005	00000001	2009462583			2009032535	042608C
200820LO	00000006	00000001	2009462583			2009032535	042608C
200820LO	00000007	00000001	2009462583			2009032535	042608C
200820LO	00000008	00000001	2009462583			2009032535	042608C
200820LO	00000009	00000001	2010015538			2009032535	042608C
200820LO	00000010	00000001	2010015538			2009032535	042608C
200820LO	00000011	00000001	2010015538			2009032535	042608C
200820LO	00000013	00000001	2010015538			2009032535	042608C
200820LO	00000014	00000001	2010015538			2009032535	042608C
200820LO	00000015	00000001	2010015538			2009032535	042608C
200820LO	00000017	00000001	2010015538			2009032537	042608C
200820LO	00000018	00000001	2010015538			2009032537	042608C
200820LO	00000022	00000019	2010015429			2009032537	042608C
200820LO	00000024	00000019	2010015429			2009032537	042608C
200820LO	00000026	00000019	2010015429			2009032537	042608C
200820LO	00000027	00000019	2010082556			2009032537	042608C
200820LO	00000029	00000019	2010082556			2009032537	042608C
200820LO	00000031	00000019	2010082556			2009032537	042608D
200820LO	00000032	00000019	2010082556			2009032537	042608D
200820LO	00000033	00000019	2010082556			2009032537	042608D
200820LO	00000034	00000019	2010082556			2009032537	042608D
200820LO	00000035	00000019	2010082556			2009032530	042608D
200820LO	00000036	00000019	2010082556			2009032530	042608D
200820LO	00000037	00000037	2008676316			2009032530	042608D
200820LO	00000039	00000037	2008676316			2009032530	042608D

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200820LO	00000041	00000037	2008676316			2009032530	042608D
200820LO	00000045	00000037	2008676316			2009032530	042608D
200820LO	00000048	00000037	2010015534			2009032530	042608D
200820LO	00000049	00000037	2010015534			2009032530	042608D
200820LO	00000052	00000037	2010015534			2009032528	042608D
200820LO	00000053	00000037	2010015534			2009032528	042608D
200820LO	00000057	00000055	2010015534			2009032528	042608D
200820LO	00000059	00000055	2009476399			2009032528	042608D
200820LO	00000060	00000055	2009476399			2009032528	042608D
200820LO	00000061	00000055	2009476399			2009032528	042608D
200820LO	00000065	00000055	2009476399			2009032528	042608D
200820LO	00000066	00000055	2010082554			2009032528	042608D
200820LO	00000067	00000055	2010082554			2009032528	042608D
200820LO	00000071	00000055	2010082554			2009032529	042608D
200820LO	00000075	00000073	2010082554			2009032529	042608E
200820LO	00000076	00000073	2010082554			2009032529	042608E
200820LO	00000077	00000073	2008673884			2009032529	042608E
200820LO	00000078	00000073	2008673884			2009032529	042608E
200820LO	00000079	00000073	2008673884			2009032529	042608E
200820LO	00000080	00000073	2008673884			2009032529	042608E
200820LO	00000082	00000073	2008673884			2009032529	042608E
200820LO	00000085	00000073	2008673884			2009032529	042608E
200820LO	00000086	00000073	2008673884			2009032527	042608E
200820LO	00000096	00000091	2010257164			2009032527	042608E
200820LO	00000097	00000091	2010257164			2009032527	042608E
200820LO	00000098	00000091	2009476416			2009032527	042608E
200820LO	00000100	00000091	2009476416			2009032527	042608E
200821LO	00000101	00000101	2009476416			2009032527	042608E
200821LO	00000102	00000101	2009476416			2009032527	042608E
200821LO	00000103	00000101	2009476416			2009032533	042608E
200821LO	00000108	00000101	2007381516			2009032533	042608E
200821LO	00000109	00000101	2007381516			2009032533	042608E
200821LO	00000110	00000101	2007381516			2009032533	042608E
200821LO	00000111	00000101	2007381516			2009032533	042608E
200821LO	00000112	00000101	2007381516			2009032533	042608E

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000113	00000101	2007381516			2009032533	042608E
200821LO	00000116	00000101	2007381516			2009032533	042708A
200821LO	00000117	00000101	2009462584			2009032533	042708A
200821LO	00000118	00000101	2009462584			2009032533	042708A
200821LO	00000119	00000119	2009462584			2009032532	042708A
200821LO	00000122	00000119	2009462584			2009032532	042708A
200821LO	00000123	00000119	2009462584			2009032532	042708A
200821LO	00000126	00000119	2009462584			2009032532	042708A
200821LO	00000127	00000119	2009476392			2009032532	042708A
200821LO	00000135	00000119	2009476392			2009032532	042708A
200821LO	00000139	00000137	2008673922			2009032520	042708A
200821LO	00000140	00000137	2008673922			2009032520	042708A
200821LO	00000142	00000137	2008673922			2009032520	042708A
200821LO	00000144	00000137	2008673922			2009032520	042708A
200821LO	00000145	00000137	2008673922			2009032520	042708A
200821LO	00000147	00000137	2008673888			2009032520	042708A
200821LO	00000150	00000137	2008673888			2009032520	042708A
200821LO	00000155	00000155	2008673888			2009032525	042708A
200821LO	00000156	00000155	2008673888			2009032525	042708A
200821LO	00000158	00000155	2010082557			2009032525	042708A
200821LO	00000160	00000155	2010082557			2009032525	042708A
200821LO	00000161	00000155	2010082557			2009032525	042908A
200821LO	00000162	00000155	2010082557			2009032525	042908A
200821LO	00000163	00000155	2010082557			2009032525	042908A
200821LO	00000166	00000155	2010082557			2009032525	042908A
200821LO	00000167	00000155	2010082557			2009032525	042908A
200821LO	00000173	00000173	2009476414			2009032536	042908A
200821LO	00000174	00000173	2009476414			2009032536	042908A
200821LO	00000175	00000173	2009476414			2009032536	042908A
200821LO	00000176	00000173	2009476414			2009032536	042908A
200821LO	00000177	00000173	2009462601			2009032536	042908A
200821LO	00000178	00000173	2009462601			2009032536	042908A
200821LO	00000179	00000173	2009462601			2009032536	042908A
200821LO	00000180	00000173	2009462601			2009032536	042908A
200821LO	00000181	00000173	2009462601			2009032536	042908A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000182	00000173	2009462601			2009032536	042908A
200821LO	00000183	00000173	2009462601			2009032536	042908A
200821LO	00000184	00000173	2009462601			2009032536	042908A
200821LO	00000185	00000173	2009462601			2009032536	042908A
200821LO	00000186	00000173	2009476388			2009032536	042908A
200821LO	00000188	00000173	2009476388			2009032536	042908A
200821LO	00000190	00000173	2009476388			2009032521	042908A
200821LO	00000191	00000191	2009476388			2009032521	042908A
200821LO	00000192	00000191	2009476388			2009032521	042908A
200821LO	00000193	00000191	2009476388			2009032521	042908A
200821LO	00000194	00000191	2009476388			2009032521	042908A
200821LO	00000195	00000191	2009476388			2009032521	042908A
200821LO	00000196	00000191	2009476388			2009032521	042908A
200821LO	00000197	00000191	2008673734			2009032521	042908A
200821LO	00000198	00000191	2008673734			2009032521	042908A
200821LO	00000199	00000191	2008673734			2009032521	042908A
200821LO	00000200	00000191	2008673734			2009032521	042908A
200821LO	00000201	00000191	2008673734			2009032521	042908A
200821LO	00000202	00000191	2008673734			2009032521	042908A
200821LO	00000203	00000191	2008673734			2009032521	042908A
200821LO	00000204	00000191	2008673734			2009032521	042908A
200821LO	00000205	00000191	2008673734			2009032521	042908A
200821LO	00000206	00000191	2008673332			2009028215	043008A
200821LO	00000207	00000191	2008673332			2009028215	043008A
200821LO	00000208	00000191	2008673332			2009028215	043008A
200821LO	00000209	00000209	2008673332			2009028215	043008A
200821LO	00000210	00000209	2008673332			2009028215	043008A
200821LO	00000211	00000209	2008673332			2009028215	043008A
200821LO	00000212	00000209	2008673332			2009028215	043008A
200821LO	00000213	00000209	2008673332			2009028215	043008A
200821LO	00000214	00000209	2008673332			2009028215	043008A
200821LO	00000215	00000209	2007381469			2009028215	043008A
200821LO	00000216	00000209	2007381469			2009028215	043008A
200821LO	00000217	00000209	2007381469			2009028215	043008A
200821LO	00000218	00000209	2007381469			2009028215	043008A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000219	00000209	2007381469			2009028215	043008A
200821LO	00000220	00000209	2007381469			2009028215	043008A
200821LO	00000221	00000209	2007381469			2009028215	043008A
200821LO	00000222	00000209	2007381469			2009028215	043008A
200821LO	00000223	00000209	2007381469			2009032524	043008A
200821LO	00000224	00000209	2007381469			2009032524	043008A
200821LO	00000225	00000209	2007381469			2009032524	043008A
200821LO	00000226	00000209	2009476391			2009032524	043008A
200821LO	00000227	00000227	2009476391			2009032524	043008A
200821LO	00000228	00000227	2009476391			2009032524	043008A
200821LO	00000229	00000227	2009476391			2009032524	043008A
200821LO	00000230	00000227	2009476391			2009032524	043008A
200821LO	00000231	00000227	2009476391			2009032524	043008A
200821LO	00000232	00000227	2009476391			2009032524	043008A
200821LO	00000233	00000227	2009476391			2009032524	043008A
200821LO	00000234	00000227	2009476391			2009032524	043008A
200821LO	00000235	00000227	2009476165			2009032524	043008A
200821LO	00000236	00000227	2009476165			2009032524	043008A
200821LO	00000237	00000227	2009476165			2009032524	043008A
200821LO	00000238	00000227	2009476165			2009032524	043008A
200821LO	00000239	00000227	2009476165			2009032524	043008A
200821LO	00000240	00000227	2009476165			2009032531	043008A
200821LO	00000241	00000227	2009476165			2009032531	043008A
200821LO	00000242	00000227	2009476165			2009032531	043008A
200821LO	00000243	00000227	2009476165			2009032531	043008A
200821LO	00000244	00000227	2009476165			2009032531	043008A
200821LO	00000245	00000245	2009476165			2009032531	043008A
200821LO	00000246	00000245	2008411170			2009032531	043008A
200821LO	00000247	00000245	2008411170			2009032531	043008A
200821LO	00000248	00000245	2008411170			2009032531	043008A
200821LO	00000249	00000245	2008411170			2009032531	043008A
200821LO	00000250	00000245	2008411170			2009032531	043008A
200821LO	00000251	00000251	2008411170			2009032531	043008B
200821LO	00000252	00000251	2008411170			2009032531	043008B
200821LO	00000253	00000251	2008411170			2009032531	043008B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000254	00000251	2008673731			2009032531	043008B
200821LO	00000255	00000251	2008673731			2009032523	043008B
200821LO	00000256	00000251	2008673731			2009032523	043008B
200821LO	00000257	00000251	2008673731			2009032523	043008B
200821LO	00000258	00000251	2008673731			2009032523	043008B
200821LO	00000259	00000251	2008673731			2009032523	043008B
200821LO	00000260	00000251	2008673731			2009032523	043008B
200821LO	00000261	00000251	2008673731			2009032523	043008B
200821LO	00000262	00000251	2008673731			2009032523	043008B
200821LO	00000263	00000251	2008673331			2009032523	043008B
200821LO	00000264	00000251	2008673331			2009032523	043008B
200821LO	00000265	00000251	2008673331			2009032523	043008B
200821LO	00000266	00000251	2008673331			2009032523	043008B
200821LO	00000267	00000251	2008673331			2009032523	043008B
200821LO	00000268	00000251	2008673331			2009032523	043008B
200821LO	00000269	00000269	2008673331			2009032523	043008B
200821LO	00000270	00000269	2008673331			2009032523	043008B
200821LO	00000271	00000269	2008673331			2009032523	043008B
200821LO	00000272	00000269	2008673331			2009032523	043008B
200821LO	00000273	00000269	2008673331			2010342838	043008B
200821LO	00000274	00000269	2009476401			2010342838	043008B
200821LO	00000275	00000269	2009476401			2010342838	043008B
200821LO	00000276	00000269	2009476401			2010342838	043008B
200821LO	00000277	00000269	2009476401			2010342838	043008B
200821LO	00000278	00000269	2009476401			2010342838	043008B
200821LO	00000279	00000269	2009476401			2010342838	043008B
200821LO	00000280	00000269	2009476401			2010342838	043008B
200821LO	00000281	00000269	2009476401			2010342838	043008B
200821LO	00000282	00000269	2009476401			2010342838	043008B
200821LO	00000283	00000269	2008673925			2010342838	043008B
200821LO	00000284	00000269	2008673925			2010342838	043008B
200821LO	00000285	00000269	2008673925			2010342838	043008B
200821LO	00000286	00000269	2008673925			2010342838	043008B
200821LO	00000287	00000287	2008673925			2010342884	043008B
200821LO	00000288	00000287	2008673925			2010342884	043008B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000289	00000287	2008673925			2010342884	043008B
200821LO	00000290	00000287	2008673925			2010342884	043008B
200821LO	00000291	00000287	2008673925			2010342884	043008B
200821LO	00000292	00000287	2008673925			2010342884	043008B
200821LO	00000293	00000287	2008673925			2010342884	043008B
200821LO	00000294	00000287	2009476406			2010342884	043008B
200821LO	00000295	00000287	2009476406			2010342884	043008B
200821LO	00000296	00000287	2009476406			2010342884	043008B
200821LO	00000297	00000287	2009476406			2010342884	043008C
200821LO	00000298	00000287	2009476406			2010342884	043008C
200821LO	00000299	00000287	2009476406			2010342884	043008C
200821LO	00000300	00000287	2009476406			2010342884	043008C
200821LO	00000301	00000287	2009476406			2010342884	043008C
200821LO	00000302	00000287	2009476406			2010342884	043008C
200821LO	00000303	00000287	2007381475			2010342880	043008C
200821LO	00000304	00000287	2007381475			2010342880	043008C
200821LO	00000305	00000305	2007381475			2010342880	043008C
200821LO	00000306	00000305	2007381475			2010342880	043008C
200821LO	00000307	00000305	2007381475			2010342880	043008C
200821LO	00000308	00000305	2007381475			2010342880	043008C
200821LO	00000309	00000305	2007381475			2010342880	043008C
200821LO	00000310	00000305	2007381475			2010342880	043008C
200821LO	00000311	00000305	2008673913			2010342880	043008C
200821LO	00000312	00000305	2008673913			2010342880	043008C
200821LO	00000313	00000305	2008673913			2010342880	043008C
200821LO	00000314	00000305	2008673913			2010342880	043008C
200821LO	00000315	00000305	2008673913			2010342880	043008C
200821LO	00000316	00000305	2008673913			2010342880	043008C
200821LO	00000317	00000305	2008673913			2010342880	043008C
200821LO	00000318	00000305	2008673913			2010342880	043008C
200821LO	00000319	00000305	2008673913			2010342832	043008C
200821LO	00000320	00000305	2008673913			2010342832	043008C
200821LO	00000321	00000305	2008544951			2010342832	043008C
200821LO	00000322	00000305	2008544951			2010342832	043008C
200821LO	00000323	00000323	2008544951			2010342832	043008C

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000324	00000323	2008544951			2010342832	043008C
200821LO	00000325	00000323	2008544951			2010342832	043008C
200821LO	00000326	00000323	2008544951			2010342832	043008C
200821LO	00000327	00000323	2008544951			2010342832	043008C
200821LO	00000328	00000323	2008544951			2010342832	043008C
200821LO	00000329	00000323	2008544951			2010342832	043008C
200821LO	00000330	00000323	2008544951			2010342832	043008C
200821LO	00000331	00000323	2008544951			2010342832	043008C
200821LO	00000332	00000323	2008673915			2010342830	043008C
200821LO	00000333	00000323	2008673915			2010342830	043008C
200821LO	00000334	00000323	2008673915			2010342830	043008C
200821LO	00000335	00000323	2008673915			2010342830	043008C
200821LO	00000336	00000323	2008673915			2010342830	043008C
200821LO	00000337	00000323	2008673915			2010342830	043008C
200821LO	00000338	00000323	2008673915			2010342830	043008C
200821LO	00000339	00000323	2008673915			2010342830	043008C
200821LO	00000340	00000323	2008673915			2010342830	043008C
200821LO	00000341	00000341	2008673915			2010342830	043008D
200821LO	00000342	00000341	2008544921			2010342830	043008D
200821LO	00000343	00000341	2008544921			2010342830	043008D
200821LO	00000344	00000341	2008544921			2010342830	043008D
200821LO	00000345	00000341	2008544921			2010342830	043008D
200821LO	00000346	00000341	2008544921			2010342830	043008D
200821LO	00000347	00000341	2008544921			2010342830	043008D
200821LO	00000348	00000341	2008544921			2010342830	043008D
200821LO	00000349	00000341	2008544921			2010342830	043008D
200821LO	00000350	00000341	2008544921			2010342833	043008D
200821LO	00000351	00000341	2008408214			2010342833	043008D
200821LO	00000352	00000341	2008408214			2010342833	043008D
200821LO	00000353	00000341	2008408214			2010342833	043008D
200821LO	00000354	00000341	2008408214			2010342833	043008D
200821LO	00000355	00000341	2008408214			2010342833	043008D
200821LO	00000356	00000341	2008408214			2010342833	043008D
200821LO	00000357	00000341	2008408214			2010342833	043008D
200821LO	00000358	00000341	2008408214			2010342833	043008D

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000359	00000359	2009462582			2010342833	043008D
200821LO	00000360	00000359	2009462582			2010342833	043008D
200821LO	00000361	00000359	2009462582			2010342833	043008D
200821LO	00000362	00000359	2009462582			2010342833	043008D
200821LO	00000363	00000359	2009462582			2010342833	043008D
200821LO	00000364	00000359	2009462582			2010342833	043008D
200821LO	00000365	00000359	2009462582			2010342833	043008D
200821LO	00000366	00000359	2009462582			2010342833	043008D
200821LO	00000367	00000359	2009462582			2010342827	043008D
200821LO	00000368	00000359	2008408202			2010342827	043008D
200821LO	00000369	00000359	2008408202			2010342827	043008D
200821LO	00000370	00000359	2008408202			2010342827	043008D
200821LO	00000371	00000359	2008408202			2010342827	043008D
200821LO	00000372	00000359	2008408202			2010342827	043008D
200821LO	00000373	00000359	2008408202			2010342827	043008D
200821LO	00000374	00000359	2008408202			2010342827	043008D
200821LO	00000375	00000359	2008408202			2010342827	043008D
200821LO	00000376	00000359	2008443528			2010342827	043008D
200821LO	00000377	00000377	2008443528			2010342827	043008D
200821LO	00000378	00000377	2008443528			2010342827	043008D
200821LO	00000379	00000377	2008443528			2010342827	043008D
200821LO	00000380	00000377	2008443528			2010342827	043008D
200821LO	00000381	00000377	2008443528			2010342827	043008D
200821LO	00000382	00000377	2008443528			2010342827	043008D
200821LO	00000385	00000385	2008443528			2010342849	050108C
200821LO	00000386	00000385	2008443528			2010342849	050108C
200821LO	00000387	00000385	2010231215			2010342849	050108C
200821LO	00000388	00000385	2010231215			2010342849	050108C
200821LO	00000389	00000385	2010231215			2010342849	050108C
200821LO	00000390	00000385	2010231215			2010342849	050108C
200821LO	00000391	00000385	2010231215			2010342849	050108C
200821LO	00000392	00000385	2010231215			2010342849	050108C
200821LO	00000393	00000385	2010231215			2010342849	050108C
200821LO	00000394	00000385	2010231215			2010342849	050108C
200821LO	00000395	00000385	2010231215			2010342849	050108C

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000396	00000385	2010231214			2010342849	050108C
200821LO	00000397	00000385	2010231214			2010342849	050108C
200821LO	00000398	00000385	2010231214			2010342849	050108C
200821LO	00000399	00000385	2010231214			2010342849	050108C
200821LO	00000400	00000385	2010231214			2010342847	050108C
200821LO	00000401	00000385	2010231214			2010342847	050108C
200821LO	00000402	00000385	2010231214			2010342847	050108C
200821LO	00000403	00000403	2010231214			2010342847	050108C
200821LO	00000404	00000403	2010231214			2010342847	050108C
200821LO	00000405	00000403	2010231222			2010342847	050108C
200821LO	00000406	00000403	2010231222			2010342847	050108C
200821LO	00000407	00000403	2010231222			2010342847	050108C
200821LO	00000408	00000403	2010231222			2010342847	050108C
200821LO	00000409	00000403	2010231222			2010342847	050108C
200821LO	00000410	00000403	2010231222			2010342847	050108C
200821LO	00000411	00000403	2010231222			2010342847	050108C
200821LO	00000412	00000403	2010231222			2010342847	050108C
200821LO	00000413	00000403	2010231222			2010342847	050108C
200821LO	00000414	00000403	2010231222			2010342847	050108C
200821LO	00000415	00000403	2010231210			2010342847	050108C
200821LO	00000416	00000403	2010231210			2010342845	050108C
200821LO	00000417	00000403	2010231210			2010342845	050108C
200821LO	00000418	00000403	2010231210			2010342845	050108C
200821LO	00000419	00000403	2010231210			2010342845	050108C
200821LO	00000420	00000403	2010231210			2010342845	050108C
200821LO	00000421	00000421	2010231210			2010342845	050108C
200821LO	00000422	00000421	2010231210			2010342845	050108C
200821LO	00000423	00000421	2010231210			2010342845	050108C
200821LO	00000424	00000421	2010231210			2010342845	050108C
200821LO	00000425	00000421	2010231210			2010342845	050108C
200821LO	00000426	00000421	2010231235			2010342845	050108D
200821LO	00000427	00000421	2010231235			2010342845	050108D
200821LO	00000428	00000421	2010231235			2010342845	050108D
200821LO	00000429	00000421	2010231235			2010342845	050108D
200821LO	00000430	00000421	2010231235			2010342845	050108D

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000431	00000421	2010231235			2010342845	050108D
200821LO	00000432	00000421	2010231235			2010342848	050108D
200821LO	00000433	00000421	2010231208			2010342848	050108D
200821LO	00000434	00000421	2010231208			2010342848	050108D
200821LO	00000435	00000421	2010231208			2010342848	050108D
200821LO	00000436	00000421	2010231208			2010342848	050108D
200821LO	00000437	00000421	2010231208			2010342848	050108D
200821LO	00000438	00000421	2010231208			2010342848	050108D
200821LO	00000439	00000439	2010231208			2010342848	050108D
200821LO	00000440	00000439	2010231208			2010342848	050108D
200821LO	00000441	00000439	2010231208			2010342848	050108D
200821LO	00000442	00000439	2010231208			2010342848	050108D
200821LO	00000443	00000439	2010231208			2010342848	050108D
200821LO	00000444	00000439	2010257138			2010342848	050108D
200821LO	00000445	00000439	2010257138			2010342848	050108D
200821LO	00000446	00000439	2010257138			2010342848	050108D
200821LO	00000447	00000439	2010257138			2010342848	050108D
200821LO	00000448	00000439	2010257138			2010342848	050108D
200821LO	00000449	00000439	2010257138			2010342843	050108D
200821LO	00000450	00000439	2010257138			2010342843	050108D
200821LO	00000451	00000439	2010257138			2010342843	050108D
200821LO	00000452	00000439	2010257138			2010342843	050108D
200821LO	00000453	00000439	2010231180			2010342843	050108D
200821LO	00000454	00000439	2010231180			2010342843	050108D
200821LO	00000455	00000439	2010231180			2010342843	050108D
200821LO	00000456	00000439	2010231180			2010342843	050108D
200821LO	00000457	00000457	2010231180			2010342843	050108D
200821LO	00000458	00000457	2010231180			2010342843	050108D
200821LO	00000459	00000457	2010231180			2010342843	050108D
200821LO	00000460	00000457	2010231180			2010342843	050108D
200821LO	00000461	00000457	2010231180			2010342843	050108D
200821LO	00000462	00000457	2010231200			2010342843	050108D
200821LO	00000463	00000457	2010231200			2010342843	050108D
200821LO	00000464	00000457	2010231200			2010342843	050108D
200821LO	00000465	00000457	2010231200			2010342843	050208A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000467	00000467	200819CV	00001813	00001810	2010431246	051008A
200822LO	00000468	00000467	200819CV	00001813	00001810	2010431246	051008A
200822LO	00000470	00000467	200819CV	00001813	00001810	2010431246	051008A
200822LO	00000471	00000467	200819CV	00001813	00001810	2010431246	051008A
200822LO	00000472	00000467	2010231181			2010431246	051008A
200822LO	00000473	00000467	2010231181			2010431246	051008A
200822LO	00000474	00000467	2010231181			2010431246	051008A
200822LO	00000481	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000484	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000485	00000485	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000487	00000485	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000489	00000485	2010231159			2010431247	051008A
200822LO	00000494	00000485	2010231159			2010162646	051008A
200822LO	00000496	00000485	2010231159			2010162646	051008A
200822LO	00000497	00000485	2010015423			2010162646	051008A
200822LO	00000498	00000485	2010015423			2010162646	051008A
200822LO	00000500	00000485	2010015423			2010162646	051008A
200822LO	00000502	00000485	2010015423			2010162646	051008A
200822LO	00000503	00000503	2010015423			2010162646	051008A
200822LO	00000504	00000503	2010015423			2010162646	051008A
200822LO	00000505	00000503	2010231137			2010162646	051008A
200822LO	00000506	00000503	2010231137			2010162646	051008A
200822LO	00000507	00000503	2010231137			2010162646	051008A
200822LO	00000508	00000503	2010231137			2010431237	051008A
200822LO	00000509	00000503	2010231137			2010431237	051008A
200822LO	00000510	00000503	2010231137			2010431237	051008B
200822LO	00000511	00000503	2010231137			2010431237	051008B
200822LO	00000512	00000503	2010231137			2010431237	051008B
200822LO	00000513	00000503	2010231139			2010431237	051008B
200822LO	00000514	00000503	2010231139			2010431237	051008B
200822LO	00000515	00000503	2010231139			2010431237	051008B
200822LO	00000516	00000503	2010231139			2010431237	051008B
200822LO	00000517	00000503	2010231139			2010431237	051008B
200822LO	00000518	00000503	2010231139			2010431237	051008B
200822LO	00000520	00000503	2010231139			2010431237	051008B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000522	00000521	2010015461			2010431139	051008B
200822LO	00000523	00000521	2010015461			2010431139	051008B
200822LO	00000524	00000521	2010015461			2010431139	051008B
200822LO	00000525	00000521	2010015461			2010431139	051008B
200822LO	00000526	00000521	2010015461			2010431139	051008B
200822LO	00000527	00000521	2010015461			2010431139	051008B
200822LO	00000528	00000521	2010015461			2010431139	051008B
200822LO	00000529	00000521	2010015461			2010431139	051008B
200822LO	00000530	00000521	2010015461			2010431241	051008B
200822LO	00000531	00000521	2010231163			2010431241	051008B
200822LO	00000532	00000521	2010231163			2010431241	051008B
200822LO	00000533	00000521	2010231163			2010431241	051008B
200822LO	00000534	00000521	2010231163			2010431241	051008B
200822LO	00000535	00000521	2010231163			2010431241	051008B
200822LO	00000536	00000521	2010231163			2010431241	051008B
200822LO	00000537	00000521	2010231163			2010431241	051008B
200822LO	00000538	00000521	2010231163			2010431241	051008B
200822LO	00000539	00000539	2010231162			2010431241	051008B
200822LO	00000540	00000539	2010231162			2010431241	051008B
200822LO	00000541	00000539	2010231162			2010431241	051008B
200822LO	00000542	00000539	2010231162			2010431241	051008B
200822LO	00000543	00000539	2010231162			2010431241	051008B
200822LO	00000544	00000539	2010231162			2010431241	051008B
200822LO	00000545	00000539	2010231162			2010438009	051008B
200822LO	00000546	00000539	2010231162			2020438009	051008B
200822LO	00000547	00000539	2010231162			2020438009	051008B
200822LO	00000548	00000539	2010231162			2020438009	051008B
200822LO	00000549	00000539	2010231162			2020438009	051008B
200822LO	00000550	00000539	2010231162			2020438009	051008B
200822LO	00000551	00000539	2010080866			2020438009	051008B
200822LO	00000552	00000539	2010080866			2020438009	051008B
200822LO	00000553	00000539	2010080866			2020438009	051008B
200822LO	00000554	00000539	2010080866			2020438009	051008B
200822LO	00000555	00000539	2010080866			2020438009	051008B
200822LO	00000556	00000539	2010080866			2020438009	051208A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000557	00000557	2010080866			2020438009	051208A
200822LO	00000558	00000557	2010080866			2020438009	051208A
200822LO	00000559	00000557	2010231183			2020438009	051208A
200822LO	00000560	00000557	2010231183			2020438009	051208A
200822LO	00000561	00000557	2010231183			2020438009	051208A
200822LO	00000562	00000557	2010231183			2020438009	051208A
200822LO	00000563	00000557	2010231183			2010437128	051208A
200822LO	00000564	00000557	2010231183			2010437128	051208A
200822LO	00000565	00000557	2010231183			2010437128	051208A
200822LO	00000566	00000557	2010231183			2010437128	051208A
200822LO	00000567	00000557	2010231183			2010437128	051208A
200822LO	00000568	00000557	2010015465			2010437128	051208A
200822LO	00000569	00000557	2010015465			2010437128	051208A
200822LO	00000570	00000557	2010015465			2010437128	051208A
200822LO	00000571	00000557	2010015465			2010437128	051208A
200822LO	00000572	00000557	2010015465			2010437128	051208A
200822LO	00000573	00000557	2010015465			2010437128	051208A
200822LO	00000575	00000575	2010015465			2010437128	051208A
200822LO	00000576	00000575	2010231145			2010162650	051208A
200822LO	00000577	00000575	2010231145			2010162650	051208A
200822LO	00000578	00000575	2010231145			2010162650	051208A
200822LO	00000579	00000575	2010231145			2010162650	051208A
200822LO	00000580	00000575	2010231145			2010162650	051208A
200822LO	00000581	00000575	2010231145			2010162650	051208A
200822LO	00000582	00000575	2010231145			2010162650	051208A
200822LO	00000583	00000575	2010231145			2010162650	051208A
200822LO	00000584	00000575	2010231145			2010162650	051208A
200822LO	00000585	00000575	2010231145			2010162650	051208A
200822LO	00000586	00000575	2010231145			2010162650	051208A
200822LO	00000587	00000575	2010231238			2010162650	051208A
200822LO	00000588	00000575	2010231238			2010162650	051208A
200822LO	00000589	00000575	2010231238			2010162650	051208A
200822LO	00000591	00000575	2010231238			2010162650	051208B
200822LO	00000592	00000575	2010231238			2010162650	051208B
200822LO	00000593	00000593	2010231238			2010162650	051208B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000594	00000593	2010231238			2010431240	051208B
200822LO	00000595	00000593	2010231238			2010431240	051208B
200822LO	00000596	00000593	2010231238			2010431240	051208B
200822LO	00000597	00000593	2010231142			2010431240	051208B
200822LO	00000598	00000593	2010231142			2010431240	051208B
200822LO	00000599	00000593	2010231142			2010431240	051208B
200822LO	00000600	00000593	2010231142			2010431240	051208B
200822LO	00000601	00000593	2010231142			2010431240	051208B
200822LO	00000602	00000593	2010231142			2010431240	051208B
200822LO	00000603	00000593	2010231142			2010431240	051208B
200822LO	00000604	00000593	2010231142			2010431240	051208B
200822LO	00000605	00000593	2010231142			2010431240	051208B
200822LO	00000606	00000593	2010231140			2010431240	051208B
200822LO	00000607	00000593	2010231140			2010431240	051208B
200822LO	00000608	00000593	2010231140			2010431240	051208B
200822LO	00000609	00000593	2010231140			2010431240	051208B
200822LO	00000610	00000593	2010231140			2010431240	051208B
200822LO	00000611	00000611	2010231140			2010431240	051208B
200822LO	00000612	00000611	2010231140			2010438013	051208B
200822LO	00000613	00000611	2010231140			2010438013	051208B
200822LO	00000614	00000611	2010231144			2010438013	051208B
200822LO	00000615	00000611	2010231144			2010438013	051208B
200822LO	00000616	00000611	2010231144			2010438013	051208B
200822LO	00000617	00000611	2010231144			2010438013	051208B
200822LO	00000618	00000611	2010231144			2010438013	051208B
200822LO	00000619	00000611	2010231144			2010438013	051208B
200822LO	00000620	00000611	2010231144			2010438013	051208B
200822LO	00000621	00000611	2010231144			2010438013	051208B
200822LO	00000622	00000611	2010231144			2010438013	051208B
200822LO	00000623	00000611	2010231144			2010438013	051208B
200822LO	00000624	00000611	2010231138			2010438013	051208B
200822LO	00000625	00000611	2010231138			2010438013	051208B
200822LO	00000626	00000611	2010231138			2010438013	051208B
200822LO	00000627	00000611	2010231138			2010438013	051208B
200822LO	00000628	00000611	2010231138			2010437150	051208B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000629	00000629	2010231138			2010437150	051208B
200822LO	00000630	00000629	2010231182			2010437150	051208B
200822LO	00000631	00000629	2010231182			2010437150	051208B
200822LO	00000632	00000629	2010231182			2010437150	051208B
200822LO	00000633	00000629	2010231182			2010437150	051208B
200822LO	00000634	00000629	2010231182			2010437150	051208B
200822LO	00000635	00000629	2010231182			2010437150	051208C
200822LO	00000636	00000629	2010231182			2010437150	051208C
200822LO	00000637	00000629	2010231182			2010437150	051208C
200822LO	00000638	00000629	2010231182			2010437150	051208C
200822LO	00000639	00000629	2010231182			2010437150	051208C
200822LO	00000640	00000629	2010231171			2010437150	051208C
200822LO	00000641	00000629	2010231171			2010437150	051208C
200822LO	00000642	00000629	2010231171			2010437150	051208C
200822LO	00000643	00000629	2010231171			2010437150	051208C
200822LO	00000644	00000629	2010231171			2010437150	051208C
200822LO	00000645	00000629	2010231171			2010437150	051208C
200822LO	00000646	00000629	2010231171			2010437145	051208C
200822LO	00000647	00000647	2010231171			2010437145	051208C
200822LO	00000648	00000647	2010231171			2010437145	051208C
200822LO	00000649	00000647	2010231171			2010437145	051208C
200822LO	00000650	00000647	2010231141			2010437145	051208C
200822LO	00000651	00000647	2010231141			2010437145	051208C
200822LO	00000652	00000647	2010231141			2010437145	051208C
200822LO	00000653	00000647	2010231141			2010437145	051208C
200822LO	00000654	00000647	2010231141			2010437145	051208C
200822LO	00000655	00000647	2010231141			2010437145	051208C
200822LO	00000656	00000647	2010231141			2010437145	051208C
200822LO	00000657	00000647	2010231141			2010437145	051208C
200822LO	00000658	00000647	2010231141			2010437145	051208C
200822LO	00000659	00000647	2010231147			2010437145	051208C
200822LO	00000660	00000647	2010231147			2010437145	051208C
200822LO	00000661	00000647	2010231147			2010437145	051208C
200822LO	00000662	00000647	2010231147			2010437145	051208C
200822LO	00000663	00000647	2010231147			2010437145	051208C

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000664	00000647	2010231147			2010437145	051208C
200822LO	00000665	00000665	2010231147			2010437145	051208C
200822LO	00000666	00000665	2010231161			2010438010	051208C
200822LO	00000667	00000665	2010231161			2010438010	051208C
200822LO	00000669	00000665	2010231161			2010438010	051208C
200822LO	00000670	00000665	2010231161			2010438010	051208C
200822LO	00000671	00000665	2010231161			2010438010	051208C
200822LO	00000672	00000665	2010231161			2010438010	051208C
200822LO	00000673	00000665	2010231161			2010438010	051208C
200822LO	00000674	00000665	2010231161			2010438010	051208C
200822LO	00000675	00000665	2008443524			2010438010	051208C
200822LO	00000676	00000665	2008443524			2010438010	051208C
200822LO	00000677	00000665	2008443524			2010431239	051308A
200822LO	00000678	00000665	2008443524			2010431239	051308A
200822LO	00000679	00000665	2008443524			2010431239	051308A
200822LO	00000680	00000665	2008443524			2010431239	051308A
200822LO	00000681	00000665	2008443524			2010461239	051308A
200822LO	00000682	00000665	2008443524			2010431239	051308A
200822LO	00000683	00000683	2008443524			2010431239	051308A
200822LO	00000684	00000683	2010231172			2010431239	051308A
200822LO	00000685	00000683	2010231172			2010431239	051308A
200822LO	00000686	00000683	2010231172			2010431239	051308A
200822LO	00000687	00000683	2010231172			2010342898	051308A
200822LO	00000688	00000683	2010231172			2010342898	051308A
200822LO	00000689	00000683	2010231172			2010342898	051308A
200822LO	00000690	00000683	2010231172			2010342898	051308A
200822LO	00000691	00000683	2010231172			2010342898	051308A
200822LO	00000692	00000683	2010231172			2010342898	051308A
200822LO	00000693	00000683	2010231172			2010342898	051308A
200822LO	00000694	00000683	2010231172			2010342898	051308A
200822LO	00000695	00000683	2010231172			2010342898	051308A
200822LO	00000696	00000683	2010231172			2010342898	051308A
200822LO	00000697	00000683	2010231172			2010342898	051308A
200822LO	00000698	00000683	2010231172			2010342898	051308A
200822LO	00000699	00000683	2010231172			2010342898	051308A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000700	00000683	2010231172			2010342898	051308A
200822LO	00000701	00000701	2010231172			2010342898	051308A
200822LO	00000702	00000701	2008673351			2010342898	051308A
200822LO	00000703	00000701	2008673351			2010342898	051308A
200822LO	00000704	00000701	2008673351			2010342898	051308A
200822LO	00000705	00000701	2008673351			2010342898	051308A
200822LO	00000706	00000701	2008673351			2010342898	051308A
200822LO	00000707	00000701	2008673351			2010342898	051308A
200822LO	00000708	00000701	2008673351			2010342898	051308A
200822LO	00000709	00000701	2008673351			2010342828	051308A
200822LO	00000710	00000701	2008673899			2010342828	051308A
200822LO	00000711	00000701	2008673899			2010342828	051308A
200822LO	00000712	00000701	2008673899			2010342828	051308A
200822LO	00000713	00000701	2008673899			2010342828	051308A
200822LO	00000714	00000701	2008673899			2010342828	051308A
200822LO	00000715	00000701	2008673899			2010342828	051308A
200822LO	00000716	00000701	2008673899			2010342828	051308A
200822LO	00000717	00000701	2008673899			2010342828	051308A
200822LO	00000718	00000701	2008673899			2010342828	051308A
200822LO	00000719	00000719	2008673899			2010342828	051308A
200822LO	00000720	00000719	2008408217			2010342828	051308A
200822LO	00000721	00000719	2008408217			2010342828	051308A
200822LO	00000722	00000719	2008408217			2010342828	051308A
200822LO	00000723	00000719	2008408217			2010342828	051308A
200822LO	00000724	00000719	2008408217			2010431242	051308A
200822LO	00000725	00000719	2008408217			2010431242	051308A
200822LO	00000726	00000719	2008408217			2010431242	051308B
200822LO	00000727	00000719	2008408217			2010431242	051308B
200822LO	00000729	00000719	2008408217			2010431242	051308B
200822LO	00000730	00000719	2010231164			2010431242	051308B
200822LO	00000731	00000719	2010231164			2010431242	051308B
200822LO	00000733	00000719	2010231164			2010431242	051308B
200822LO	00000734	00000719	2010231164			2010431242	051308B
200822LO	00000735	00000719	2010231164			2010342844	051308B
200822LO	00000736	00000719	2010231164			2010342844	051308B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000737	00000737	2010231164			2010342844	051308B
200822LO	00000738	00000737	2010231164			2010342844	051308B
200822LO	00000739	00000737	2010015462			2010342844	051308B
200822LO	00000740	00000737	2010015462			2010342844	051308B
200822LO	00000743	00000737	2010015462			2010342844	051308C
200822LO	00000744	00000737	2010015462			2010342844	051308C
200822LO	00000745	00000737	2010015462			2010342844	051308C
200822LO	00000746	00000737	2010015462			2010342844	051308C
200822LO	00000747	00000737	2010015462			2010342844	051308C
200822LO	00000748	00000737	2010015462			2010342844	051308C
200822LO	00000749	00000737	2010015459			2010342844	051308C
200822LO	00000750	00000737	2010015459			2010342844	051308C
200822LO	00000751	00000737	2010015459			2010342844	051308C
200822LO	00000752	00000737	2010015459			2010342844	051308C
200822LO	00000753	00000737	2010015459			2010342844	051308C
200822LO	00000754	00000737	2010015459			2010342844	051308C
200822LO	00000755	00000755	2010015459			2010342844	051308C
200822LO	00000756	00000755	2010015459			2010342844	051308C
200822LO	00000757	00000755	2010015459			2010342844	051308C
200822LO	00000758	00000755	2010015459			2010342844	051308C
200822LO	00000759	00000755	200811CV	00000905	00000902	2010342844	051308C
200822LO	00000760	00000755	200811CV	00000905	00000902	2010342887	051308C
200822LO	00000761	00000755	200811CV	00000905	00000902	2010342887	051308C
200822LO	00000762	00000755	200811CV	00000905	00000902	2010342887	051308C
200822LO	00000763	00000755	200811CV	00000905	00000902	2010342887	051308C
200822LO	00000764	00000755	200811CV	00000905	00000902	2010342887	051308C
200822LO	00000765	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000766	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000767	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000768	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000769	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000770	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000771	00000755	200818CV	00001818	00001708	2010342887	051308C
200822LO	00000772	00000755	200819CV	00001812	00001810	2010342887	051308C
200822LO	00000773	00000773	200819CV	00001812	00001810	2010342887	051308C

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000774	00000773	200819CV	00001812	00001810	2010342887	051308C
200822LO	00000775	00000773	200819CV	00001812	00001810	2010342841	051308C
200822LO	00000776	00000773	200819CV	00001812	00001810	2010342841	051308C
200822LO	00000777	00000773	200819CV	00001812	00001810	2010342841	051308C
200822LO	00000778	00000773	200819CV	00001812	00001810	2010342841	051308C
200822LO	00000780	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000781	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000782	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000783	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000784	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000785	00000773	200805CV	00000316	00000313	2010342841	051308C
200822LO	00000786	00000773	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000787	00000773	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000788	00000773	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000789	00000773	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000790	00000773	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000791	00000791	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000792	00000791	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000793	00000791	200805CV	00000319	00000313	2010342841	051408A
200822LO	00000794	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000795	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000796	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000797	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000799	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000800	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000802	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000803	00000791	200819CV	00001816	00001810	2010353163	051408A
200822LO	00000804	00000791	200819CV	00001810	00001810	2010353163	051408A
200822LO	00000805	00000791	200819CV	00001810	00001810	2010353163	051408A
200822LO	00000806	00000791	200819CV	00001810	00001810	2010353163	051408A
200822LO	00000807	00000791	200819CV	00001810	00001810	2010353163	051408A
200822LO	00000808	00000791	200819CV	00001810	00001810	2010353163	051408A
200822LO	00000809	00000809	200819CV	00001810	00001810	2010342850	051408A
200822LO	00000810	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000811	00000809	200819CV	00001815	00001810	2010342850	051408A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000812	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000813	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000814	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000815	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000816	00000809	200819CV	00001815	00001810	2010342850	051408A
200822LO	00000817	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000818	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000819	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000820	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000821	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000822	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000823	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000824	00000809	200819CV	00001809	00001800	2010342850	051408A
200822LO	00000825	00000809	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000826	00000809	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000827	00000827	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000828	00000827	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000829	00000827	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000830	00000827	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000831	00000827	200813CV	00001128	00001124	2010342881	051408A
200822LO	00000832	00000827	200814CV	00001162	00001157	2010342881	051408B

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200820LO	00000001	0.88	65.5	4.2
LO-BENTOMAT SDN	200820LO	00000019	0.90	65.5	8.6
LO-BENTOMAT SDN	200820LO	00000037	0.91	65.5	13.6
LO-BENTOMAT SDN	200820LO	00000055	1.04	65.5	9.7
LO-BENTOMAT SDN	200820LO	00000073	1.02	61.5	12.8
LO-BENTOMAT SDN	200820LO	00000091	0.96	61.5	8.8
LO-BENTOMAT SDN	200821LO	00000101	0.94	54.0	11.2
LO-BENTOMAT SDN	200821LO	00000119	0.95	54.0	6.5
LO-BENTOMAT SDN	200821LO	00000137	0.94	54.0	11
LO-BENTOMAT SDN	200821LO	00000155	0.93	54.0	11.3
LO-BENTOMAT SDN	200821LO	00000173	0.95	54.0	6.5
LO-BENTOMAT SDN	200821LO	00000191	0.93	57.9	12.1
LO-BENTOMAT SDN	200821LO	00000209	0.93	57.9	11.9
LO-BENTOMAT SDN	200821LO	00000227	0.91	57.9	8.5
LO-BENTOMAT SDN	200821LO	00000245	0.92	57.9	6.7
LO-BENTOMAT SDN	200821LO	00000251	0.97	53.5	6
LO-BENTOMAT SDN	200821LO	00000269	0.96	53.5	7.1
LO-BENTOMAT SDN	200821LO	00000287	1.00	53.5	9.7
LO-BENTOMAT SDN	200821LO	00000305	0.83	53.5	12.8
LO-BENTOMAT SDN	200821LO	00000323	0.85	53.5	10.8
LO-BENTOMAT SDN	200821LO	00000341	0.91	37.1	8.1
LO-BENTOMAT SDN	200821LO	00000359	0.88	37.1	8.6
LO-BENTOMAT SDN	200821LO	00000377	0.89	37.1	10
LO-BENTOMAT SDN	200821LO	00000385	0.90	34.1	9.5
LO-BENTOMAT SDN	200821LO	00000403	0.87	34.1	5.6
LO-BENTOMAT SDN	200821LO	00000421	0.87	34.1	7.9
LO-BENTOMAT SDN	200821LO	00000439	0.85	31.4	4.7
LO-BENTOMAT SDN	200821LO	00000457	0.87	31.4	6
LO-BENTOMAT SDN	200822LO	00000467	0.91	34.7	5.3
LO-BENTOMAT SDN	200822LO	00000485	0.85	34.7	5.9
LO-BENTOMAT SDN	200822LO	00000503	0.92	34.7	5.7

LO-BENTOMAT SDN	200822LO	00000521	[illegible]	[illegible]	[illegible]
LO-BENTOMAT SDN	200822LO	00000539	0.88	42.1	5.8
LO-BENTOMAT SDN	200822LO	00000557	0.88	42.1	8.8
LO-BENTOMAT SDN	200822LO	00000575	0.94	42.1	8.1
LO-BENTOMAT SDN	200822LO	00000593	0.89	42.1	8.3
LO-BENTOMAT SDN	200822LO	00000611	0.94	42.1	9
LO-BENTOMAT SDN	200822LO	00000629	0.89	51.8	8.4
LO-BENTOMAT SDN	200822LO	00000647	0.90	51.8	9.2
LO-BENTOMAT SDN	200822LO	00000665	0.85	51.8	9.2
LO-BENTOMAT SDN	200822LO	00000683	0.86	51.8	11.2
LO-BENTOMAT SDN	200822LO	00000701	0.90	51.8	7.4
LO-BENTOMAT SDN	200822LO	00000719	0.90	37.6	7.7
LO-BENTOMAT SDN	200822LO	00000737	0.88	37.6	5.6
LO-BENTOMAT SDN	200822LO	00000755	0.91	33.4	5.4
LO-BENTOMAT SDN	200822LO	00000773	0.88	33.4	6
LO-BENTOMAT SDN	200822LO	00000791	0.85	33.4	6.8
LO-BENTOMAT SDN	200822LO	00000809	0.86	33.4	7.5
LO-BENTOMAT SDN	200822LO	00000827	0.85	33.4	6.4

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200820LO	00000001	27.5	262.2
LO-BENTOMAT SDN	200820LO	00000019	45.6	262.2
LO-BENTOMAT SDN	200820LO	00000037	64.7	262.2
LO-BENTOMAT SDN	200820LO	00000055	49.5	262.2
LO-BENTOMAT SDN	200820LO	00000073	64.3	246.0
LO-BENTOMAT SDN	200820LO	00000091	47.5	246.0
LO-BENTOMAT SDN	200821LO	00000101	55.9	216.1
LO-BENTOMAT SDN	200821LO	00000119	35.8	216.1
LO-BENTOMAT SDN	200821LO	00000137	56.5	216.1
LO-BENTOMAT SDN	200821LO	00000155	56.8	216.1
LO-BENTOMAT SDN	200821LO	00000173	37.0	216.1
LO-BENTOMAT SDN	200821LO	00000191	61.5	231.7
LO-BENTOMAT SDN	200821LO	00000209	59.2	231.7
LO-BENTOMAT SDN	200821LO	00000227	44.2	231.7
LO-BENTOMAT SDN	200821LO	00000245	34.2	231.7
LO-BENTOMAT SDN	200821LO	00000251	37.5	214.6
LO-BENTOMAT SDN	200821LO	00000269	38.0	214.2
LO-BENTOMAT SDN	200821LO	00000287	55.5	214.2
LO-BENTOMAT SDN	200821LO	00000305	65.3	214.2
LO-BENTOMAT SDN	200821LO	00000323	64.0	214.2
LO-BENTOMAT SDN	200821LO	00000341	55.8	148.4
LO-BENTOMAT SDN	200821LO	00000359	45.7	148.4
LO-BENTOMAT SDN	200821LO	00000377	57.2	148.4
LO-BENTOMAT SDN	200821LO	00000385	54.2	136.5
LO-BENTOMAT SDN	200821LO	00000403	29.6	136.5
LO-BENTOMAT SDN	200821LO	00000421	41.2	136.5
LO-BENTOMAT SDN	200821LO	00000439	30.1	125.7
LO-BENTOMAT SDN	200821LO	00000457	34.9	125.7
LO-BENTOMAT SDN	200822LO	00000467	27.0	138.8
LO-BENTOMAT SDN	200822LO	00000485	29.9	138.8
LO-BENTOMAT SDN	200822LO	00000503	30.2	138.8

LO-BENTOMAT SDN	200822LO	00000521	37.8	138.8
LO-BENTOMAT SDN	200822LO	00000539	30.8	168.6
LO-BENTOMAT SDN	200822LO	00000557	46.3	168.6
LO-BENTOMAT SDN	200822LO	00000575	42.6	168.6
LO-BENTOMAT SDN	200822LO	00000593	42.9	168.6
LO-BENTOMAT SDN	200822LO	00000611	49.1	168.6
LO-BENTOMAT SDN	200822LO	00000629	48.6	207.2
LO-BENTOMAT SDN	200822LO	00000647	50.5	207.2
LO-BENTOMAT SDN	200822LO	00000665	48.4	207.2
LO-BENTOMAT SDN	200822LO	00000683	54.0	207.2
LO-BENTOMAT SDN	200822LO	00000701	39.3	207.2
LO-BENTOMAT SDN	200822LO	00000719	39.5	150.7
LO-BENTOMAT SDN	200822LO	00000737	29.3	150.7
LO-BENTOMAT SDN	200822LO	00000755	30.4	133.9
LO-BENTOMAT SDN	200822LO	00000773	33.7	133.9
LO-BENTOMAT SDN	200822LO	00000791	43.8	133.9
LO-BENTOMAT SDN	200822LO	00000809	41.8	133.9
LO-BENTOMAT SDN	200822LO	00000827	33.4	133.9

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
042608C	27.0	15.6
042608D	27.0	14.4
042608E	30.0	14.4
042708A	27.0	13.8
042908A	25.0	16.4
043008A	28.0	16.4
043008B	25.0	15.6
043008C	28.0	15.6
043008D	26.0	16.8
050108C	28.0	16.2
050108D	28.0	16.8
050208A	24.0	16.2
051008A	26.0	17.2
051008B	25.0	17.2
051208A	27.0	15.4
051208B	26.0	15.8
051208C	27.0	15.6
051308A	28.0	15.8
051308B	29.0	15.4
051308C	28.0	15.6
051408A	28.0	15.0
051408B	27.0	15.4

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200805CV	00000313	6.6	35.0
CV-NON-WOVEN	200811CV	00000902	6.6	31.4
CV-NON-WOVEN	200813CV	00001124	7.2	43.8
CV-NON-WOVEN	200814CV	00001157	6.7	50.1
CV-NON-WOVEN	200818CV	00001708	6.7	39.9
CV-NON-WOVEN	200819CV	00001800	6.6	42.5
CV-NON-WOVEN	200819CV	00001810	6.7	42.5
CV-NON-WOVEN	200819CV	00001820	6.7	35.3

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 311	2009028215	3.3	85.4
PPX 311	2009032520	3.3	86.9
PPX 311	2009032521	3.3	86.9
PPX 311	2009032523	3.5	86.2
PPX 311	2009032524	3.5	86.2
PPX 311	2009032525	3.8	105.0
PPX 311	2009032527	3.8	105.0
PPX 311	2009032528	3.3	92.3
PPX 311	2009032529	3.3	92.3
PPX 311	2009032530	3.3	92.3
PPX 311	2009032531	3.4	96.7
PPX 311	2009032532	3.4	96.7
PPX 311	2009032533	3.4	96.7
PPX 311	2009032535	3.8	100.7
PPX 311	2009032536	3.8	100.7
PPX 311	2009032537	3.8	100.7
PPX 311	2010162646	3.4	83.7
PPX 311	2010162650	4.0	92.7
PPX 311	2010342827	3.0	66.0
PPX 311	2010342828	3.0	66.0
PPX 311	2010342830	3.0	66.0
PPX 311	2010342832	3.0	66.0
PPX 311	2010342832	3.0	66.0
PPX 311	2010342833	3.0	66.0
PPX 311	2010342838	3.0	66.0
PPX 311	2010342841	3.7	76.6
PPX 311	2010342843	3.7	76.6
PPX 311	2010342844	3.7	76.6
PPX 311	2010342845	3.7	76.6
PPX 311	2010342847	3.7	76.6
PPX 311	2010342848	3.7	76.6
PPX 311	2010342849	3.7	76.6
PPX 311	2010342850	3.7	76.6

PPX 311	2010342880	3.4	85.2
PPX 311	2010342881	3.4	85.2
PPX 311	2010342884	3.4	85.2
PPX 311	2010342887	3.4	85.2
PPX 311	2010342898	3.4	85.2
PPX 311	2010353163	3.6	77.7
PPX 311	2010422547	3.6	79.2
PPX 311	2010431237	3.9	96.5
PPX 311	2010431239	3.9	96.5
PPX 311	2010431240	3.9	96.5
PPX 311	2010431241	3.9	96.5
PPX 311	2010431242	3.9	96.5
PPX 311	2010431246	3.8	85.8
PPX 311	2010431247	3.8	85.8
PPX 311	2010437128	3.6	79.7
PPX 311	2010437145	3.6	70.2
PPX 311	2010437150	3.6	70.2
PPX 311	2010438009	3.7	75.8
PPX 311	2010438010	3.7	75.8
PPX 311	2010438013	3.7	75.8
PPX 311	2010438729	3.5	78.3
PPX HH65L	2010494123	7.3	152.1

CAP

Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 650	2007381469	7.2	79.4
PPX 650	2007381475	7.0	89.9
PPX 650	2007381516	7.3	95.9
PPX 650	2008408202	8.0	127.0
PPX 650	2008408214	6.5	113.7
PPX 650	2008408217	6.5	113.7
PPX 650	2008411170	6.4	93.8
PPX 650	2008443524	6.7	87.3
PPX 650	2008443528	6.7	87.3
PPX 650	2008544921	6.9	66.3
PPX 650	2008544951	6.8	60.2
PPX 650	2008673331	6.7	124.6
PPX 650	2008673332	6.7	124.6
PPX 650	2008673351	7.2	101.6
PPX 650	2008673731	7.3	80.1
PPX 650	2008673734	6.6	82.4
PPX 650	2008673884	7.2	87.1
PPX 650	2008673888	7.1	113.9
PPX 650	2008673899	7.2	87.1
PPX 650	2008673913	6.9	71.3
PPX 650	2008673915	6.5	93.0
PPX 650	2008673922	6.5	79.6
PPX 650	2008673925	6.2	69.0
PPX 650	2008673936	6.9	95.7
PPX 650	2009462582	6.7	160.8

PPX 650	2009462583	6.2	197.2
PPX 650	2009462584	6.2	197.2
PPX 650	2009462601	6.3	144.4
PPX 650	2009476165	6.4	82.4
PPX 650	2009476388	6.9	80.5
PPX 650	2009476391	7.2	111.0
PPX 650	2009476392	7.2	111.0
PPX 650	2009476399	6.5	95.8
PPX 650	2009476401	6.5	95.8
PPX 650	2009476406	6.7	125.4
PPX 650	2009476414	6.9	80.8
PPX 650	2009476416	6.9	80.8
PPX 650	2010015423	7.3	115.1
PPX 650	2010015429	7.2	113.7
PPX 650	2010015459	7.0	83.9
PPX 650	2010015461	7.0	83.9
PPX 650	2010015462	7.0	83.9
PPX 650	2010015465	6.6	87.4
PPX 650	2010015534	7.1	82.2
PPX 650	2010015538	7.5	86.1
PPX 650	2010080866	7.1	115.8
PPX 650	2010082554	8.3	178.6
PPX 650	2010082556	8.3	182.1
PPX 650	2010082557	8.3	182.1
PPX 650	2010231137	6.9	84.2
PPX 650	2010231138	6.9	84.2
PPX 650	2010231139	6.9	84.2
PPX 650	2010231140	6.9	84.2
PPX 650	2010231141	6.9	84.2
PPX 650	2010231142	7.4	83.8
PPX 650	2010231144	7.4	83.8
PPX 650	2010231145	7.4	83.8
PPX 650	2010231147	7.6	91.5
PPX 650	2010231159	7.1	93.5
PPX 650	2010231161	7.1	93.5
PPX 650	2010231162	6.9	84.8
PPX 650	2010231163	6.9	84.8
PPX 650	2010231164	6.9	84.8
PPX 650	2010231171	6.9	98.6
PPX 650	2010231172	6.9	98.6
PPX 650	2010231179	7.2	87.2
PPX 650	2010231181	7.2	87.2
PPX 650	2010231182	7.2	87.2
PPX 650	2010231183	7.0	81.3
PPX 650	2010231185	7.0	93.5
PPX 650	2010231208	6.8	85.6
PPX 650	2010231210	6.8	85.6
PPX 650	2010231214	7.0	87.1
PPX 650	2010231215	6.7	77.2
PPX 650	2010231222	6.8	91.0

PPX 650	2010231235	6.7	80.6
PPX 650	2010231238	7.2	80.5
PPX 650	2010257138	7.7	106.2
PPX 650	2010257164	7.7	100.4

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

CETCO
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Date: 6/7/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940242, 023940244, 023940246, 023940248

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/6/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940242, 023940244, 023940246, 023940248
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
LINING TECHNOLOGIES
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Ship Date: 6/6/2008
Order Numbers: 023940242, 023940244, 023940246, 023940248
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940246	LO-BENTOMAT SDN	200820LO	00000030	150	13.5	2025	2590
023940246	LO-BENTOMAT SDN	200820LO	00000038	150	13.5	2025	2540
023940242	LO-BENTOMAT SDN	200820LO	00000047	150	13.5	2025	2535
023940246	LO-BENTOMAT SDN	200820LO	00000051	150	13.5	2025	2560
023940246	LO-BENTOMAT SDN	200820LO	00000056	150	13.5	2025	2570
023940242	LO-BENTOMAT SDN	200820LO	00000058	150	13.5	2025	2600
023940248	LO-BENTOMAT SDN	200820LO	00000062	150	13.5	2025	2635
023940242	LO-BENTOMAT SDN	200820LO	00000063	150	13.5	2025	2620
023940242	LO-BENTOMAT SDN	200820LO	00000064	150	13.5	2025	2625
023940246	LO-BENTOMAT SDN	200820LO	00000068	150	13.5	2025	2615
023940246	LO-BENTOMAT SDN	200820LO	00000069	150	13.5	2025	2620
023940248	LO-BENTOMAT SDN	200820LO	00000081	150	13.5	2025	2535
023940242	LO-BENTOMAT SDN	200820LO	00000083	150	13.5	2025	2510
023940242	LO-BENTOMAT SDN	200820LO	00000084	150	13.5	2025	2525
023940246	LO-BENTOMAT SDN	200820LO	00000087	150	13.5	2025	2540
023940246	LO-BENTOMAT SDN	200820LO	00000088	150	13.5	2025	2520
023940248	LO-BENTOMAT SDN	200820LO	00000099	150	13.5	2025	2535
023940242	LO-BENTOMAT SDN	200821LO	00000104	150	13.5	2025	2540
023940242	LO-BENTOMAT SDN	200821LO	00000114	150	13.5	2025	2580
023940246	LO-BENTOMAT SDN	200821LO	00000120	150	13.5	2025	2580
023940246	LO-BENTOMAT SDN	200821LO	00000121	150	13.5	2025	2460
023940248	LO-BENTOMAT SDN	200821LO	00000128	150	13.5	2025	2485
023940248	LO-BENTOMAT SDN	200821LO	00000129	150	13.5	2025	2550
023940242	LO-BENTOMAT SDN	200821LO	00000130	150	13.5	2025	2530
023940246	LO-BENTOMAT SDN	200821LO	00000131	150	13.5	2025	2525
023940246	LO-BENTOMAT SDN	200821LO	00000132	150	13.5	2025	2530
023940246	LO-BENTOMAT SDN	200821LO	00000136	150	13.5	2025	2540

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940242	LO-BENTOMAT SDN	200821LO	00000138	150	13.5	2025	2525
023940248	LO-BENTOMAT SDN	200821LO	00000141	150	13.5	2025	2540
023940248	LO-BENTOMAT SDN	200821LO	00000143	150	13.5	2025	2535
023940242	LO-BENTOMAT SDN	200821LO	00000146	150	13.5	2025	2550
023940242	LO-BENTOMAT SDN	200821LO	00000148	150	13.5	2025	2525
023940246	LO-BENTOMAT SDN	200821LO	00000151	150	13.5	2025	2540
023940246	LO-BENTOMAT SDN	200821LO	00000152	150	13.5	2025	2525
023940242	LO-BENTOMAT SDN	200821LO	00000153	150	13.5	2025	2535
023940248	LO-BENTOMAT SDN	200821LO	00000154	150	13.5	2025	2540
023940246	LO-BENTOMAT SDN	200821LO	00000157	150	13.5	2025	2520
023940246	LO-BENTOMAT SDN	200821LO	00000159	150	13.5	2025	2540
023940242	LO-BENTOMAT SDN	200821LO	00000164	150	13.5	2025	2475
023940242	LO-BENTOMAT SDN	200821LO	00000165	150	13.5	2025	2460
023940248	LO-BENTOMAT SDN	200821LO	00000168	150	13.5	2025	2610
023940248	LO-BENTOMAT SDN	200821LO	00000169	150	13.5	2025	2620
023940248	LO-BENTOMAT SDN	200821LO	00000170	150	13.5	2025	2610
023940242	LO-BENTOMAT SDN	200821LO	00000171	150	13.5	2025	2600
023940242	LO-BENTOMAT SDN	200821LO	00000172	150	13.5	2025	2620
023940248	LO-BENTOMAT SDN	200821LO	00000187	150	13.5	2025	2570
023940248	LO-BENTOMAT SDN	200821LO	00000189	150	13.5	2025	2580
023940248	LO-BENTOMAT SDN	200822LO	00000475	150	14.5	2175	2485
023940248	LO-BENTOMAT SDN	200822LO	00000476	150	14.5	2175	2475
023940244	LO-BENTOMAT SDN	200822LO	00000477	150	14.5	2175	2460
023940248	LO-BENTOMAT SDN	200822LO	00000478	150	14.5	2175	2545
023940248	LO-BENTOMAT SDN	200822LO	00000479	150	14.5	2175	2435
023940244	LO-BENTOMAT SDN	200822LO	00000480	150	14.5	2175	2430
023940244	LO-BENTOMAT SDN	200822LO	00000482	150	14.5	2175	2410
023940244	LO-BENTOMAT SDN	200822LO	00000483	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000486	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000488	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000490	150	14.5	2175	2415
023940244	LO-BENTOMAT SDN	200822LO	00000492	150	14.5	2175	2351

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940244	LO-BENTOMAT SDN	200822LO	00000493	150	14.5	2175	2415
023940244	LO-BENTOMAT SDN	200822LO	00000495	150	14.5	2175	2460
023940244	LO-BENTOMAT SDN	200822LO	00000499	150	14.5	2175	2390
023940244	LO-BENTOMAT SDN	200822LO	00000501	150	14.5	2175	2335
023940244	LO-BENTOMAT SDN	200822LO	00000519	150	14.5	2175	2450
023940244	LO-BENTOMAT SDN	200822LO	00000521	150	14.5	2175	2300
023940244	LO-BENTOMAT SDN	200822LO	00000574	150	14.5	2175	2470
023940244	LO-BENTOMAT SDN	200822LO	00000728	150	14.5	2175	2680
023940244	LO-BENTOMAT SDN	200822LO	00000732	150	14.5	2175	2640
			Totals:	**10200**	**939**	**140850**	**171421**
							Total Number of Rolls Certified: **68**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200820LO	00000030	00000019	2010082556			2009032537	042608C
200820LO	00000038	00000037	2008676316			2009032530	042608D
200820LO	00000047	00000037	2008676316			2009032530	042608D
200820LO	00000051	00000037	2010015534			2009032530	042608D
200820LO	00000056	00000055	2010015534			2009032528	042608D
200820LO	00000058	00000055	2009476399			2009032528	042608D
200820LO	00000062	00000055	2009476399			2009032528	042608D
200820LO	00000063	00000055	2009476399			2009032528	042608D
200820LO	00000064	00000055	2009476399			2009032528	042608D
200820LO	00000068	00000055	2010082554			2009032528	042608D
200820LO	00000069	00000055	2010082554			2009032529	042608D
200820LO	00000081	00000073	2008673884			2009032529	042608E
200820LO	00000083	00000073	2008673884			2009032529	042608E
200820LO	00000084	00000073	2008673884			2009032529	042608E
200820LO	00000087	00000073	2010257164			2009032527	042608E
200820LO	00000088	00000073	2010257164			2009032527	042608E
200820LO	00000099	00000091	2009476416			2009032527	042608E
200821LO	00000104	00000101	2009476416			2009032533	042608E
200821LO	00000114	00000101	2007381516			2009032533	042608E
200821LO	00000120	00000119	2009462584			2009032532	042708A
200821LO	00000121	00000119	2009462584			2009032532	042708A
200821LO	00000128	00000119	2009476392			2009032532	042708A
200821LO	00000129	00000119	2009476392			2009032532	042708A
200821LO	00000130	00000119	2009476392			2009032532	042708A
200821LO	00000131	00000119	2009476392			2009032532	042708A
200821LO	00000132	00000119	2009476392			2009032532	042708A
200821LO	00000136	00000119	2009476392			2009032532	042708A
200821LO	00000138	00000137	2008673922			2009032520	042708A
200821LO	00000141	00000137	2008673922			2009032520	042708A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200821LO	00000143	00000137	2008673922			2009032520	042708A
200821LO	00000146	00000137	2008673922			2009032520	042708A
200821LO	00000148	00000137	2008673888			2009032520	042708A
200821LO	00000151	00000137	2008673888			2009032520	042708A
200821LO	00000152	00000137	2008673888			2009032520	042708A
200821LO	00000153	00000137	2008673888			2009032520	042708A
200821LO	00000154	00000137	2008673888			2009032525	042708A
200821LO	00000157	00000155	2008673888			2009032525	042708A
200821LO	00000159	00000155	2010082557			2009032525	042708A
200821LO	00000164	00000155	2010082557			2009032525	042908A
200821LO	00000165	00000155	2010082557			2009032525	042908A
200821LO	00000168	00000155	2009476414			2009032525	042908A
200821LO	00000169	00000155	2009476414			2009032525	042908A
200821LO	00000170	00000155	2009476414			2009032525	042908A
200821LO	00000171	00000155	2009476414			2009032536	042908A
200821LO	00000172	00000155	2009476414			2009032536	042908A
200821LO	00000187	00000173	2009476388			2009032536	042908A
200821LO	00000189	00000173	2009476388			2009032521	042908A
200822LO	00000475	00000467	2010231181			2010431246	051008A
200822LO	00000476	00000467	2010231181			2010431246	051008A
200822LO	00000477	00000467	2010231181			2010431246	051008A
200822LO	00000478	00000467	2010231181			2010431246	051008A
200822LO	00000479	00000467	2010231181			2010431246	051008A
200822LO	00000480	00000467	2010231181			2010431246	051008A
200822LO	00000482	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000483	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000486	00000485	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000488	00000485	2010231159			2010431247	051008A
200822LO	00000490	00000485	2010231159			2010431247	051008A
200822LO	00000492	00000485	2010231159			2010431247	051008A
200822LO	00000493	00000485	2010231159			2010162646	051008A
200822LO	00000495	00000485	2010231159			2010162646	051008A
200822LO	00000499	00000485	2010015423			2010162646	051008A
200822LO	00000501	00000485	2010015423			2010162646	051008A
200822LO	00000519	00000503	2010231139			2010431237	051008B

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000521	00000521	2010015461			2010431237	051008B
200822LO	00000574	00000557	2010015465			2010437128	051208A
200822LO	00000728	00000719	2008408217			2010431242	051308B
200822LO	00000732	00000719	2010231164			2010431242	051308B

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200820LO	00000019	0.90	65.5	8.6
LO-BENTOMAT SDN	200820LO	00000037	0.91	65.5	13.6
LO-BENTOMAT SDN	200820LO	00000055	1.04	65.5	9.7
LO-BENTOMAT SDN	200820LO	00000073	1.02	61.5	12.8
LO-BENTOMAT SDN	200820LO	00000091	0.96	61.5	8.8
LO-BENTOMAT SDN	200821LO	00000101	0.94	54.0	11.2
LO-BENTOMAT SDN	200821LO	00000119	0.95	54.0	6.5
LO-BENTOMAT SDN	200821LO	00000137	0.94	54.0	11
LO-BENTOMAT SDN	200821LO	00000155	0.93	54.0	11.3
LO-BENTOMAT SDN	200821LO	00000173	0.95	54.0	6.5
LO-BENTOMAT SDN	200822LO	00000467	0.91	34.7	5.3
LO-BENTOMAT SDN	200822LO	00000485	0.85	34.7	5.9
LO-BENTOMAT SDN	200822LO	00000503	0.92	34.7	5.7
LO-BENTOMAT SDN	200822LO	00000521	0.85	34.7	6.9
LO-BENTOMAT SDN	200822LO	00000557	0.88	42.1	8.8
LO-BENTOMAT SDN	200822LO	00000719	0.90	37.6	7.7

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200820LO	00000019	45.6	262.2
LO-BENTOMAT SDN	200820LO	00000037	64.7	262.2
LO-BENTOMAT SDN	200820LO	00000055	49.5	262.2
LO-BENTOMAT SDN	200820LO	00000073	64.3	246.0
LO-BENTOMAT SDN	200820LO	00000091	47.5	246.0
LO-BENTOMAT SDN	200821LO	00000101	55.9	216.1
LO-BENTOMAT SDN	200821LO	00000119	35.8	216.1
LO-BENTOMAT SDN	200821LO	00000137	56.5	216.1
LO-BENTOMAT SDN	200821LO	00000155	56.8	216.1
LO-BENTOMAT SDN	200821LO	00000173	37.0	216.1
LO-BENTOMAT SDN	200822LO	00000467	27.0	138.8
LO-BENTOMAT SDN	200822LO	00000485	29.9	138.8
LO-BENTOMAT SDN	200822LO	00000503	30.2	138.8
LO-BENTOMAT SDN	200822LO	00000521	37.8	138.8

LO-BENTOMAT SDN	200822LO	00000557	46.3	168.6
LO-BENTOMAT SDN	200822LO	00000719	39.5	150.7

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
042608C	27.0	15.6
042608D	27.0	14.4
042608E	30.0	14.4
042708A	27.0	13.8
042908A	25.0	16.4
051008A	26.0	17.2
051008B	25.0	17.2
051208A	27.0	15.4
051308B	29.0	15.4

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200819CV	00001820	6.7	35.3

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 311	2009032520	3.3	86.9
PPX 311	2009032521	3.3	86.9
PPX 311	2009032525	3.8	105.0
PPX 311	2009032527	3.8	105.0
PPX 311	2009032528	3.3	92.3
PPX 311	2009032529	3.3	92.3
PPX 311	2009032530	3.3	92.3
PPX 311	2009032532	3.4	96.7
PPX 311	2009032533	3.4	96.7
PPX 311	2009032536	3.8	100.7
PPX 311	2009032537	3.8	100.7
PPX 311	2010162646	3.4	83.7
PPX 311	2010431237	3.9	96.5
PPX 311	2010431242	3.9	96.5
PPX 311	2010431246	3.8	85.8
PPX 311	2010431247	3.8	85.8
PPX 311	2010437128	3.6	79.7

CAP

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 650	2007381516	7.3	95.9
PPX 650	2008408217	6.5	113.7
PPX 650	2008673884	7.2	87.1
PPX 650	2008673888	7.1	113.9
PPX 650	2008673922	6.5	79.6
PPX 650	2008673936	6.9	95.7
PPX 650	2009462584	6.2	197.2
PPX 650	2009476388	6.9	80.5
PPX 650	2009476392	7.2	111.0
PPX 650	2009476399	6.5	95.8
PPX 650	2009476414	6.9	80.8
PPX 650	2009476416	6.9	80.8
PPX 650	2010015423	7.3	115.1

PPX 650	2010015461	7.0	83.9
PPX 650	2010015465	6.6	87.4
PPX 650	2010015534	7.1	82.2
PPX 650	2010082554	8.3	178.6
PPX 650	2010082556	8.3	182.1
PPX 650	2010082557	8.3	182.1
PPX 650	2010231139	6.9	84.2
PPX 650	2010231159	7.1	93.5
PPX 650	2010231164	6.9	84.8
PPX 650	2010231181	7.2	87.2
PPX 650	2010257164	7.7	100.4

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 6/10/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940244, 023940252, 023940255

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/9/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940244, 023940252, 023940255
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
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Ship Date: 6/9/2008
Order Numbers: 023940244, 023940252, 023940255
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST
GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940252	LO-BENTOMAT SDN	200820LO	00000012	150	14	2100	2570
023940252	LO-BENTOMAT SDN	200820LO	00000016	150	14	2100	2570
023940252	LO-BENTOMAT SDN	200820LO	00000019	150	13.5	2025	2560
023940252	LO-BENTOMAT SDN	200820LO	00000020	150	13.5	2025	2535
023940255	LO-BENTOMAT SDN	200820LO	00000021	150	13.5	2025	2550
023940255	LO-BENTOMAT SDN	200820LO	00000023	150	13.5	2025	2525
023940255	LO-BENTOMAT SDN	200820LO	00000025	150	13.5	2025	2555
023940255	LO-BENTOMAT SDN	200820LO	00000028	150	13.5	2025	2540
023940252	LO-BENTOMAT SDN	200820LO	00000040	150	13.5	2025	2545
023940252	LO-BENTOMAT SDN	200820LO	00000050	150	13.5	2025	2575
023940252	LO-BENTOMAT SDN	200820LO	00000054	150	13.5	2025	2560
023940252	LO-BENTOMAT SDN	200820LO	00000055	150	13.5	2025	2555
023940255	LO-BENTOMAT SDN	200821LO	00000149	150	13.5	2025	2515
023940244	LO-BENTOMAT SDN	200822LO	00000477	150	14.5	2175	2460
023940244	LO-BENTOMAT SDN	200822LO	00000480	150	14.5	2175	2430
023940244	LO-BENTOMAT SDN	200822LO	00000482	150	14.5	2175	2410
023940252	LO-BENTOMAT SDN	200822LO	00000483	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000486	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000488	150	14.5	2175	2420
023940244	LO-BENTOMAT SDN	200822LO	00000490	150	14.5	2175	2415
023940244	LO-BENTOMAT SDN	200822LO	00000491	150	14.5	2175	2355
023940244	LO-BENTOMAT SDN	200822LO	00000492	150	14.5	2175	2351
023940244	LO-BENTOMAT SDN	200822LO	00000493	150	14.5	2175	2415
023940244	LO-BENTOMAT SDN	200822LO	00000495	150	14.5	2175	2460
023940244	LO-BENTOMAT SDN	200822LO	00000499	150	14.5	2175	2390
023940244	LO-BENTOMAT SDN	200822LO	00000501	150	14.5	2175	2335
023940244	LO-BENTOMAT SDN	200822LO	00000519	150	14.5	2175	2450

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940244	LO-BENTOMAT SDN	200822LO	00000521	150	14.5	2175	2300
023940244	LO-BENTOMAT SDN	200822LO	00000574	150	14.5	2175	2470
023940255	LO-BENTOMAT SDN	200822LO	00000668	150	14.5	2175	2495
023940244	LO-BENTOMAT SDN	200822LO	00000728	150	14.5	2175	2680
023940244	LO-BENTOMAT SDN	200822LO	00000732	150	14.5	2175	2640
023940255	LO-BENTOMAT SDN	200823LO	00000848	150	13.5	2025	2465
023940255	LO-BENTOMAT SDN	200823LO	00000850	150	13.5	2025	2415
023940255	LO-BENTOMAT SDN	200823LO	00000851	150	13.5	2025	2475
023940255	LO-BENTOMAT SDN	200823LO	00000852	150	14	2100	2435
023940255	LO-BENTOMAT SDN	200823LO	00000853	150	14	2100	2450
023940255	LO-BENTOMAT SDN	200823LO	00000854	150	14	2100	2470
023940255	LO-BENTOMAT SDN	200823LO	00000855	150	14	2100	2445
023940255	LO-BENTOMAT SDN	200823LO	00000876	150	14	2100	2470
023940255	LO-BENTOMAT SDN	200823LO	00000888	150	15	2250	2560
023940255	LO-BENTOMAT SDN	200823LO	00000903	150	15	2250	2500
023940255	LO-BENTOMAT SDN	200823LO	00000924	150	14.5	2175	2520
			Totals:	**6450**	**607**	**91050**	**106676**
						Total Number of Rolls Certified:	**43**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200820LO	00000012	00000001	2010015538			2009032535	042608C
200820LO	00000016	00000001	2010015538			2009032535	042608C
200820LO	00000019	00000019	2010015429			2009032537	042608C
200820LO	00000020	00000019	2010015429			2009032537	042608C
200820LO	00000021	00000019	2010015429			2009032537	042608C
200820LO	00000023	00000019	2010015429			2009032537	042608C
200820LO	00000025	00000019	2010015429			2009032537	042608C
200820LO	00000028	00000019	2010082556			2009032537	042608C
200820LO	00000040	00000037	2008676316			2009032530	042608D
200820LO	00000050	00000037	2010015534			2009032530	042608D
200820LO	00000054	00000037	2010015534			2009032528	042608D
200820LO	00000055	00000055	2010015534			2009032528	042608D
200821LO	00000149	00000137	2008673888			2009032520	042708A
200822LO	00000477	00000467	2010231181			2010431246	051008A
200822LO	00000480	00000467	2010231181			2010431246	051008A
200822LO	00000482	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000483	00000467	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000486	00000485	200819CV	00001820	00001820	2010431247	051008A
200822LO	00000488	00000485	2010231159			2010431247	051008A
200822LO	00000490	00000485	2010231159			2010431247	051008A
200822LO	00000491	00000485	2010231159			2010431247	051008A
200822LO	00000492	00000485	2010231159			2010431247	051008A
200822LO	00000493	00000485	2010231159			2010162646	051008A
200822LO	00000495	00000485	2010231159			2010162646	051008A
200822LO	00000499	00000485	2010015423			2010162646	051008A
200822LO	00000501	00000485	2010015423			2010162646	051008A
200822LO	00000519	00000503	2010231139			2010431237	051008B
200822LO	00000521	00000521	2010015461			2010431237	051008B
200822LO	00000574	00000557	2010015465			2010437128	051208A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200822LO	00000668	00000665	2010231161			2010438010	051208C
200822LO	00000728	00000719	2008408217			2010431242	051308B
200822LO	00000732	00000719	2010231164			2010431242	051308B
200823LO	00000848	00000836	2010231177			2009032519	052308D
200823LO	00000850	00000836	2010231177			2010437146	052308D
200823LO	00000851	00000836	2010242448			2010437146	052308D
200823LO	00000852	00000836	2010242448			2010437146	052308D
200823LO	00000853	00000836	2010242448			2010437146	052308D
200823LO	00000854	00000854	2010242448			2010437146	052308D
200823LO	00000855	00000854	2010242448			2010437146	052308D
200823LO	00000876	00000872	2010231216			2009032526	052308D
200823LO	00000888	00000872	2010231188			2010431244	052408A
200823LO	00000903	00000890	2010231191			2010342881	052408A
200823LO	00000924	00000908	2010257123			2010342842	052408A

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200820LO	00000001	0.88	65.5	4.2
LO-BENTOMAT SDN	200820LO	00000019	0.90	65.5	8.6
LO-BENTOMAT SDN	200820LO	00000037	0.91	65.5	13.6
LO-BENTOMAT SDN	200820LO	00000055	1.04	65.5	9.7
LO-BENTOMAT SDN	200821LO	00000137	0.94	54.0	11
LO-BENTOMAT SDN	200822LO	00000467	0.91	34.7	5.3
LO-BENTOMAT SDN	200822LO	00000485	0.85	34.7	5.9
LO-BENTOMAT SDN	200822LO	00000503	0.92	34.7	5.7
LO-BENTOMAT SDN	200822LO	00000521	0.85	34.7	6.9
LO-BENTOMAT SDN	200822LO	00000557	0.88	42.1	8.8
LO-BENTOMAT SDN	200822LO	00000665	0.85	51.8	9.2
LO-BENTOMAT SDN	200822LO	00000719	0.90	37.6	7.7
LO-BENTOMAT SDN	200823LO	00000836	0.93	62.5	6.2
LO-BENTOMAT SDN	200823LO	00000854	0.86	62.5	7.3
LO-BENTOMAT SDN	200823LO	00000872	0.94	62.5	7.9
LO-BENTOMAT SDN	200823LO	00000890	0.85	62.5	9.1
LO-BENTOMAT SDN	200823LO	00000908	0.87	62.5	10.8

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200820LO	00000001	27.5	262.2
LO-BENTOMAT SDN	200820LO	00000019	45.6	262.2
LO-BENTOMAT SDN	200820LO	00000037	64.7	262.2
LO-BENTOMAT SDN	200820LO	00000055	49.5	262.2
LO-BENTOMAT SDN	200821LO	00000137	56.5	216.1
LO-BENTOMAT SDN	200822LO	00000467	27.0	138.8
LO-BENTOMAT SDN	200822LO	00000485	29.9	138.8
LO-BENTOMAT SDN	200822LO	00000503	30.2	138.8
LO-BENTOMAT SDN	200822LO	00000521	37.8	138.8
LO-BENTOMAT SDN	200822LO	00000557	46.3	168.6
LO-BENTOMAT SDN	200822LO	00000665	48.4	207.2
LO-BENTOMAT SDN	200822LO	00000719	39.5	150.7
LO-BENTOMAT SDN	200823LO	00000836	33.3	250.1

LO-BENTOMAT SDN	200823LO	00000854	40.3	250.1
LO-BENTOMAT SDN	200823LO	00000872	43.0	250.1
LO-BENTOMAT SDN	200823LO	00000890	49.6	250.1
LO-BENTOMAT SDN	200823LO	00000908	51.7	250.1

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
042608C	27.0	15.6
042608D	27.0	14.4
042708A	27.0	13.8
051008A	26.0	17.2
051008B	25.0	17.2
051208A	27.0	15.4
051208C	27.0	15.6
051308B	29.0	15.4
052308D	25.0	15.2
052408A	26.0	15.8

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200819CV	00001820	6.7	35.3

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 311	2009032519	3.3	86.9
PPX 311	2009032520	3.3	86.9
PPX 311	2009032526	3.8	105.0
PPX 311	2009032528	3.3	92.3
PPX 311	2009032530	3.3	92.3
PPX 311	2009032535	3.8	100.7
PPX 311	2009032537	3.8	100.7
PPX 311	2010162646	3.4	83.7
PPX 311	2010342842	3.7	76.6
PPX 311	2010342881	3.4	85.2
PPX 311	2010431237	3.9	96.5
PPX 311	2010431242	3.9	96.5
PPX 311	2010431244	3.9	96.5
PPX 311	2010431246	3.8	85.8
PPX 311	2010431247	3.8	85.8
PPX 311	2010437128	3.6	79.7
PPX 311	2010437146	3.6	70.2
PPX 311	2010438010	3.7	75.8

CAP

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 650	2008408217	6.5	113.7
PPX 650	2008673888	7.1	113.9
PPX 650	2008673936	6.9	95.7
PPX 650	2010015423	7.3	115.1
PPX 650	2010015429	7.2	113.7
PPX 650	2010015461	7.0	83.9
PPX 650	2010015465	6.6	87.4
PPX 650	2010015534	7.1	82.2
PPX 650	2010015538	7.5	86.1
PPX 650	2010082556	8.3	182.1
PPX 650	2010231139	6.9	84.2
PPX 650	2010231159	7.1	93.5

PPX 650	2010231161	7.1	93.5
PPX 650	2010231164	6.9	84.8
PPX 650	2010231177	6.7	73.3
PPX 650	2010231181	7.2	87.2
PPX 650	2010231188	7.0	81.3
PPX 650	2010231191	7.3	85.1
PPX 650	2010231216	6.7	77.2
PPX 650	2010242448	7.6	94.2
PPX 650	2010257123	7.5	88.7

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 8/29/2008
Purchase Order: 12738-00
ORDER NUMBER: 023940247

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 06/06/2008.

If you have any questions regarding this information, please contact Chris Athanassopoulos, Technical Support Engineer, at (847) 818-7945.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBER: 023940247
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

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Ship Date: 06/06/2008
Order Number: 023940247
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf (48 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 023940247

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940247	LO-BENTOMAT SDN	200820LO	00000042	150	13.5	2025	2560
023940247	LO-BENTOMAT SDN	200820LO	00000043	150	13.5	2025	2550
023940247	LO-BENTOMAT SDN	200820LO	00000044	150	13.5	2025	2520
023940247	LO-BENTOMAT SDN	200820LO	00000046	150	13.5	2025	2520
023940247	LO-BENTOMAT SDN	200820LO	00000089	150	13.5	2025	2535
023940247	LO-BENTOMAT SDN	200820LO	00000090	150	13.5	2025	2525
023940247	LO-BENTOMAT SDN	200820LO	00000091	150	13.5	2025	2530
023940247	LO-BENTOMAT SDN	200820LO	00000092	150	13.5	2025	2520
023940247	LO-BENTOMAT SDN	200820LO	00000093	150	13.5	2025	2525
023940247	LO-BENTOMAT SDN	200821LO	00000106	150	13.5	2025	2555
023940247	LO-BENTOMAT SDN	200821LO	00000107	150	13.5	2025	2630
023940247	LO-BENTOMAT SDN	200821LO	00000115	150	13.5	2025	2570
023940247	LO-BENTOMAT SDN	200821LO	00000124	150	13.5	2025	2505
023940247	LO-BENTOMAT SDN	200821LO	00000125	150	13.5	2025	2490
023940247	LO-BENTOMAT SDN	200821LO	00000133	150	13.5	2025	2515
023940247	LO-BENTOMAT SDN	200821LO	00000134	150	13.5	2025	2520
023940247	LO-BENTOMAT SDN	200821LO	00000137	150	13.5	2025	2530
			Totals:	**2550**	**229.5**	**34425**	**43100**
						Total Number of Rolls Certified:	**17**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 023940247

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200820LO	00000042	00000037	2008676316			2009032530	042608D
200820LO	00000043	00000037	2008676316			2009032530	042608D
200820LO	00000044	00000037	2008676316			2009032530	042608D
200820LO	00000046	00000037	2008676316			2009032530	042608D
200820LO	00000089	00000073	2010257164			2009032527	042608E
200820LO	00000090	00000073	2010257164			2009032527	042608E
200820LO	00000091	00000091	2010257164			2009032527	042608E
200820LO	00000092	00000091	2010257164			2009032527	042608E
200820LO	00000093	00000091	2010257164			2009032527	042608E
200821LO	00000106	00000101	2009476416			2009032533	042608E
200821LO	00000107	00000101	2009476416			2009032533	042608E
200821LO	00000115	00000101	2007381516			2009032533	042708A
200821LO	00000124	00000119	2009462584			2009032532	042708A
200821LO	00000125	00000119	2009462584			2009032532	042708A
200821LO	00000133	00000119	2009476392			2009032532	042708A
200821LO	00000134	00000119	2009476392			2009032532	042708A
200821LO	00000137	00000137	2008673922			2009032520	042708A

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 023940247 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in Min
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200820LO	00000037	0.91	65.5	13.6
LO-BENTOMAT SDN	200820LO	00000073	1.02	61.5	12.8
LO-BENTOMAT SDN	200820LO	00000091	0.96	61.5	8.8
LO-BENTOMAT SDN	200821LO	00000101	0.94	54.0	11.2
LO-BENTOMAT SDN	200821LO	00000119	0.95	54.0	6.5
LO-BENTOMAT SDN	200821LO	00000137	0.94	54.0	11

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200820LO	00000037	64.7	262.2
LO-BENTOMAT SDN	200820LO	00000073	64.3	246.0
LO-BENTOMAT SDN	200820LO	00000091	47.5	246.0
LO-BENTOMAT SDN	200821LO	00000101	55.9	216.1
LO-BENTOMAT SDN	200821LO	00000119	35.8	216.1
LO-BENTOMAT SDN	200821LO	00000137	56.5	216.1

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 023940247 has been tested by American Colloid Company and yeilded the following test results.

Reference	Moist	Swell	Fluid Loss
Test Method:	ASTM D 2216	ASTM D 5890	ASTM D 5891
Specification:	12% Max	24 ml/2g Min	18 ml Max
042608D	10.4	27.0	14.4
042608E	10.4	30.0	14.4
042708A	10.4	27.0	13.8

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 023940247 was manufactured with geotextiles which were tested with the following results.

BASE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 311	2009032520	3.3	86.9
PPX 311	2009032527	3.8	105.0
PPX 311	2009032530	3.3	92.3
PPX 311	2009032532	3.4	96.7
PPX 311	2009032533	3.4	96.7

CAP

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 650	2007381516	7.3	95.9
PPX 650	2008673922	6.5	79.6
PPX 650	2008673936	6.9	95.7
PPX 650	2009462584	6.2	197.2
PPX 650	2009476392	7.2	111.0
PPX 650	2009476416	6.9	80.8
PPX 650	2010257164	7.7	100.4

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 6/9/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940249, 023940250, 023940251, 023940253, 023940254

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/8/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940249, 023940250, 023940251, 023940253, 023940254
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
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Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Ship Date: 6/8/2008
Order Numbers: 023940249, 023940250, 023940251, 023940253, 023940254
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940249	LO-BENTOMAT SDN	200820LO	00000070	150	13.5	2025	2610
023940250	LO-BENTOMAT SDN	200820LO	00000072	150	13.5	2025	2620
023940250	LO-BENTOMAT SDN	200820LO	00000073	150	13.5	2025	2575
023940250	LO-BENTOMAT SDN	200820LO	00000074	150	13.5	2025	2590
023940250	LO-BENTOMAT SDN	200820LO	00000094	150	13.5	2025	2515
023940250	LO-BENTOMAT SDN	200820LO	00000095	150	13.5	2025	2545
023940251	LO-BENTOMAT SDN	200821LO	00000105	150	13.5	2025	2545
023940250	LO-BENTOMAT SDN	200823LO	00000836	150	13.5	2025	2650
023940251	LO-BENTOMAT SDN	200823LO	00000837	150	13.5	2025	2620
023940251	LO-BENTOMAT SDN	200823LO	00000838	150	13.5	2025	2645
023940249	LO-BENTOMAT SDN	200823LO	00000839	150	13.5	2025	2605
023940251	LO-BENTOMAT SDN	200823LO	00000840	150	13.5	2025	2490
023940251	LO-BENTOMAT SDN	200823LO	00000841	150	13.5	2025	2450
023940251	LO-BENTOMAT SDN	200823LO	00000842	150	13.5	2025	2435
023940249	LO-BENTOMAT SDN	200823LO	00000843	150	13.5	2025	2410
023940249	LO-BENTOMAT SDN	200823LO	00000844	150	13.5	2025	2430
023940249	LO-BENTOMAT SDN	200823LO	00000845	150	13.5	2025	2420
023940249	LO-BENTOMAT SDN	200823LO	00000846	150	13.5	2025	2435
023940249	LO-BENTOMAT SDN	200823LO	00000847	150	13.5	2025	2410
023940249	LO-BENTOMAT SDN	200823LO	00000849	150	13.5	2025	2430
023940249	LO-BENTOMAT SDN	200823LO	00000856	150	14	2100	2435
023940254	LO-BENTOMAT SDN	200823LO	00000857	150	14	2100	2460
023940250	LO-BENTOMAT SDN	200823LO	00000858	150	14	2100	2485
023940254	LO-BENTOMAT SDN	200823LO	00000859	150	14	2100	2490
023940253	LO-BENTOMAT SDN	200823LO	00000860	150	14	2100	2440
023940249	LO-BENTOMAT SDN	200823LO	00000861	150	14	2100	2450
023940249	LO-BENTOMAT SDN	200823LO	00000862	150	14	2100	2485

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940251	LO-BENTOMAT SDN	200823LO	00000863	150	14	2100	2470
023940250	LO-BENTOMAT SDN	200823LO	00000864	150	14	2100	2465
023940249	LO-BENTOMAT SDN	200823LO	00000865	150	14	2100	2420
023940254	LO-BENTOMAT SDN	200823LO	00000866	150	14	2100	2455
023940254	LO-BENTOMAT SDN	200823LO	00000867	150	14	2100	2460
023940254	LO-BENTOMAT SDN	200823LO	00000868	150	14	2100	2475
023940251	LO-BENTOMAT SDN	200823LO	00000869	150	13.5	2025	2480
023940250	LO-BENTOMAT SDN	200823LO	00000870	150	14	2100	2495
023940253	LO-BENTOMAT SDN	200823LO	00000871	150	14	2100	2440
023940253	LO-BENTOMAT SDN	200823LO	00000872	150	14	2100	2500
023940249	LO-BENTOMAT SDN	200823LO	00000873	150	14	2100	2495
023940249	LO-BENTOMAT SDN	200823LO	00000874	150	14	2100	2510
023940249	LO-BENTOMAT SDN	200823LO	00000875	150	14	2100	2505
023940254	LO-BENTOMAT SDN	200823LO	00000877	150	14	2100	2480
023940254	LO-BENTOMAT SDN	200823LO	00000878	150	14	2100	2510
023940254	LO-BENTOMAT SDN	200823LO	00000879	150	14	2100	2490
023940253	LO-BENTOMAT SDN	200823LO	00000880	150	14	2100	2520
023940249	LO-BENTOMAT SDN	200823LO	00000881	150	14	2100	2535
023940251	LO-BENTOMAT SDN	200823LO	00000882	150	14	2100	2505
023940250	LO-BENTOMAT SDN	200823LO	00000883	150	14	2100	2510
023940254	LO-BENTOMAT SDN	200823LO	00000884	150	14	2100	2530
023940253	LO-BENTOMAT SDN	200823LO	00000885	150	14	2100	2500
023940249	LO-BENTOMAT SDN	200823LO	00000886	150	15	2250	2585
023940254	LO-BENTOMAT SDN	200823LO	00000887	150	15	2250	2570
023940254	LO-BENTOMAT SDN	200823LO	00000889	150	15	2250	2545
023940254	LO-BENTOMAT SDN	200823LO	00000890	150	15	2250	2530
023940253	LO-BENTOMAT SDN	200823LO	00000891	150	15	2250	2575
023940253	LO-BENTOMAT SDN	200823LO	00000892	150	15	2250	2590
023940251	LO-BENTOMAT SDN	200823LO	00000893	150	15	2250	2580
023940251	LO-BENTOMAT SDN	200823LO	00000894	150	15	2250	2555
023940251	LO-BENTOMAT SDN	200823LO	00000895	150	15	2250	2545
023940250	LO-BENTOMAT SDN	200823LO	00000896	150	15	2250	2555

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940250	LO-BENTOMAT SDN	200823LO	00000897	150	15	2250	2505
023940254	LO-BENTOMAT SDN	200823LO	00000898	150	15	2250	2525
023940253	LO-BENTOMAT SDN	200823LO	00000899	150	15	2250	2530
023940254	LO-BENTOMAT SDN	200823LO	00000900	150	15	2250	2595
023940254	LO-BENTOMAT SDN	200823LO	00000901	150	15	2250	2570
023940251	LO-BENTOMAT SDN	200823LO	00000902	150	15	2250	2540
023940250	LO-BENTOMAT SDN	200823LO	00000904	150	15	2250	2540
023940250	LO-BENTOMAT SDN	200823LO	00000905	150	15	2250	2520
023940254	LO-BENTOMAT SDN	200823LO	00000906	150	15	2250	2535
023940250	LO-BENTOMAT SDN	200823LO	00000907	150	15	2250	2530
023940253	LO-BENTOMAT SDN	200823LO	00000908	150	15	2250	2545
023940251	LO-BENTOMAT SDN	200823LO	00000909	150	15	2250	2530
023940253	LO-BENTOMAT SDN	200823LO	00000910	150	14.5	2175	2545
023940253	LO-BENTOMAT SDN	200823LO	00000911	150	14.5	2175	2530
023940251	LO-BENTOMAT SDN	200823LO	00000912	150	14.5	2175	2525
023940253	LO-BENTOMAT SDN	200823LO	00000913	150	14.5	2175	2500
023940253	LO-BENTOMAT SDN	200823LO	00000914	150	14.5	2175	2510
023940253	LO-BENTOMAT SDN	200823LO	00000915	150	14.5	2175	2525
023940253	LO-BENTOMAT SDN	200823LO	00000916	150	14.5	2175	2540
023940251	LO-BENTOMAT SDN	200823LO	00000917	150	14.5	2175	2515
023940250	LO-BENTOMAT SDN	200823LO	00000918	150	14.5	2175	2530
023940251	LO-BENTOMAT SDN	200823LO	00000919	150	14.5	2175	2500
023940250	LO-BENTOMAT SDN	200823LO	00000920	150	14.5	2175	2490
023940253	LO-BENTOMAT SDN	200823LO	00000921	150	14.5	2175	2485
023940253	LO-BENTOMAT SDN	200823LO	00000922	150	14.5	2175	2490
023940254	LO-BENTOMAT SDN	200823LO	00000923	150	14.5	2175	2505
			Totals:	**12750**	**1208.5**	**181275**	**213710**

Total Number of Rolls Certified: **85**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200820LO	00000070	00000055	2010082554			2009032529	042608D
200820LO	00000072	00000055	2010082554			2009032529	042608D
200820LO	00000073	00000073	2010082554			2009032529	042608D
200820LO	00000074	00000073	2010082554			2009032529	042608D
200820LO	00000094	00000091	2010257164			2009032527	042608E
200820LO	00000095	00000091	2010257164			2009032527	042608E
200821LO	00000105	00000101	2009476416			2009032533	042608E
200823LO	00000836	00000836	2010231467			2009032519	052308D
200823LO	00000837	00000836	2010231467			2009032519	052308D
200823LO	00000838	00000836	2010231467			2009032519	052308D
200823LO	00000839	00000836	2010231467			2009032519	052308D
200823LO	00000840	00000836	2010231467			2009032519	052308D
200823LO	00000841	00000836	2010231467			2009032519	052308D
200823LO	00000842	00000836	2010231177			2009032519	052308D
200823LO	00000843	00000836	2010231177			2009032519	052308D
200823LO	00000844	00000836	2010231177			2009032519	052308D
200823LO	00000845	00000836	2010231177			2009032519	052308D
200823LO	00000846	00000836	2010231177			2009032519	052308D
200823LO	00000847	00000836	2010231177			2009032519	052308D
200823LO	00000849	00000836	2010231177			2009032519	052308D
200823LO	00000856	00000854	2010242448			2010437146	052308D
200823LO	00000857	00000854	2010242448			2010437146	052308D
200823LO	00000858	00000854	2010242448			2010437146	052308D
200823LO	00000859	00000854	2010242448			2010437146	052308D
200823LO	00000860	00000854	2010231211			2010437146	052308D
200823LO	00000861	00000854	2010231211			2010437146	052308D
200823LO	00000862	00000854	2010231211			2010437146	052308D
200823LO	00000863	00000854	2010231211			2010437146	052308D
200823LO	00000864	00000854	2010231211			2010437146	052308D

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200823LO	00000865	00000854	2010231211			2010437146	052308D
200823LO	00000866	00000854	2010231211			2010437146	052308D
200823LO	00000867	00000854	2010231211			2010437146	052308D
200823LO	00000868	00000854	2010231211			2010437146	052308D
200823LO	00000869	00000854	2010231211			2009032526	052308D
200823LO	00000870	00000854	2010231216			2009032526	052308D
200823LO	00000871	00000854	2010231216			2009032526	052308D
200823LO	00000872	00000872	2010231216			2009032526	052308D
200823LO	00000873	00000872	2010231216			2009032526	052308D
200823LO	00000874	00000872	2010231216			2009032526	052308D
200823LO	00000875	00000872	2010231216			2009032526	052308D
200823LO	00000877	00000872	2010231216			2009032526	052308D
200823LO	00000878	00000872	2010231216			2009032526	052308D
200823LO	00000879	00000872	2010231206			2009032526	052308D
200823LO	00000880	00000872	2010231206			2009032526	052408A
200823LO	00000881	00000872	2010231206			2009032526	052408A
200823LO	00000882	00000872	2010231206			2009032526	052408A
200823LO	00000883	00000872	2010231206			2009032526	052408A
200823LO	00000884	00000872	2010231206			2009032526	052408A
200823LO	00000885	00000872	2010231206			2010431244	052408A
200823LO	00000886	00000872	2010231206			2010431244	052408A
200823LO	00000887	00000872	2010231206			2010431244	052408A
200823LO	00000889	00000872	2010231188			2010431244	052408A
200823LO	00000890	00000890	2010231188			2010431244	052408A
200823LO	00000891	00000890	2010231188			2010431244	052408A
200823LO	00000892	00000890	2010231188			2010431244	052408A
200823LO	00000893	00000890	2010231188			2010431244	052408A
200823LO	00000894	00000890	2010231188			2010431244	052408A
200823LO	00000895	00000890	2010231188			2010431244	052408A
200823LO	00000896	00000890	2010231188			2010431244	052408A
200823LO	00000897	00000890	2010231188			2010431244	052408A
200823LO	00000898	00000890	2010231191			2010431244	052408A
200823LO	00000899	00000890	2010231191			2010431244	052408A
200823LO	00000900	00000890	2010231191			2010342881	052408A
200823LO	00000901	00000890	2010231191			2010342881	052408A

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200823LO	00000902	00000890	2010231191			2010342881	052408A
200823LO	00000904	00000890	2010231191			2010342881	052408A
200823LO	00000905	00000890	2010231191			2010437149	052408A
200823LO	00000906	00000890	2010231191			2010437149	052408A
200823LO	00000907	00000890	2010257133			2010437149	052408A
200823LO	00000908	00000908	2010257133			2010437149	052408A
200823LO	00000909	00000908	2010257133			2010437149	052408A
200823LO	00000910	00000908	2010257133			2010437149	052408A
200823LO	00000911	00000908	2010257133			2010437149	052408A
200823LO	00000912	00000908	2010257133			2010437149	052408A
200823LO	00000913	00000908	2010257133			2010437149	052408A
200823LO	00000914	00000908	2010257133			2010437149	052408A
200823LO	00000915	00000908	2010257133			2010437149	052408A
200823LO	00000916	00000908	2010257123			2010437149	052408A
200823LO	00000917	00000908	2010257123			2010437149	052408A
200823LO	00000918	00000908	2010257123			2010437149	052408A
200823LO	00000919	00000908	2010257123			2010437149	052408A
200823LO	00000920	00000908	2010257123			2010437149	052408A
200823LO	00000921	00000908	2010257123			2010437149	052408A
200823LO	00000922	00000908	2010257123			2010437149	052408A
200823LO	00000923	00000908	2010257123			2010342842	052408A

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200820LO	00000055	1.04	65.5	9.7
LO-BENTOMAT SDN	200820LO	00000073	1.02	61.5	12.8
LO-BENTOMAT SDN	200820LO	00000091	0.96	61.5	8.8
LO-BENTOMAT SDN	200821LO	00000101	0.94	54.0	11.2
LO-BENTOMAT SDN	200823LO	00000836	0.93	62.5	6.2
LO-BENTOMAT SDN	200823LO	00000854	0.86	62.5	7.3
LO-BENTOMAT SDN	200823LO	00000872	0.94	62.5	7.9
LO-BENTOMAT SDN	200823LO	00000890	0.85	62.5	9.1
LO-BENTOMAT SDN	200823LO	00000908	0.87	62.5	10.8

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200820LO	00000055	49.5	262.2
LO-BENTOMAT SDN	200820LO	00000073	64.3	246.0
LO-BENTOMAT SDN	200820LO	00000091	47.5	246.0
LO-BENTOMAT SDN	200821LO	00000101	55.9	216.1
LO-BENTOMAT SDN	200823LO	00000836	33.3	250.1
LO-BENTOMAT SDN	200823LO	00000854	40.3	250.1
LO-BENTOMAT SDN	200823LO	00000872	43.0	250.1
LO-BENTOMAT SDN	200823LO	00000890	49.6	250.1
LO-BENTOMAT SDN	200823LO	00000908	51.7	250.1

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
042608D	27.0	14.4
042608E	30.0	14.4
052308D	25.0	15.2
052408A	26.0	15.8

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 311	2009032519	3.3	86.9
PPX 311	2009032526	3.8	105.0
PPX 311	2009032527	3.8	105.0
PPX 311	2009032529	3.3	92.3
PPX 311	2009032533	3.4	96.7
PPX 311	2010342842	3.7	76.6
PPX 311	2010342881	3.4	85.2
PPX 311	2010431244	3.9	96.5
PPX 311	2010437146	3.6	70.2
PPX 311	2010437149	3.6	70.2

CAP			
Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 650	2009476416	6.9	80.8
PPX 650	2010082554	8.3	178.6
PPX 650	2010231177	6.7	73.3
PPX 650	2010231188	7.0	81.3
PPX 650	2010231191	7.3	85.1
PPX 650	2010231206	6.9	85.7
PPX 650	2010231211	7.0	87.1
PPX 650	2010231216	6.7	77.2
PPX 650	2010231259	7.2	80.6
PPX 650	2010242448	7.6	94.2
PPX 650	2010257123	7.5	88.7
PPX 650	2010257133	7.6	81.7
PPX 650	2010257164	7.7	100.4

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 6/20/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940256, 023940258, 023940260

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/19/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940256, 023940258, 023940260
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Ship Date: 6/19/2008
Order Numbers: 023940256, 023940258, 023940260
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940256	LO-BENTOMAT SDN	200825LO	00001411	150	15	2250	2530
023940258	LO-BENTOMAT SDN	200825LO	00001414	150	15	2250	2520
023940258	LO-BENTOMAT SDN	200825LO	00001427	150	15	2250	2480
023940258	LO-BENTOMAT SDN	200825LO	00001430	150	14.5	2175	2470
023940256	LO-BENTOMAT SDN	200825LO	00001458	150	14.5	2175	2480
023940260	LO-BENTOMAT SDN	200825LO	00001476	150	15	2250	2520
023940260	LO-BENTOMAT SDN	200825LO	00001479	150	15	2250	2560
023940260	LO-BENTOMAT SDN	200825LO	00001486	150	15	2250	2610
023940256	LO-BENTOMAT SDN	200825LO	00001494	150	15	2250	2560
023940260	LO-BENTOMAT SDN	200825LO	00001497	150	15	2250	2550
023940258	LO-BENTOMAT SDN	200825LO	00001499	150	15	2250	2540
023940260	LO-BENTOMAT SDN	200825LO	00001501	150	15	2250	2565
023940256	LO-BENTOMAT SDN	200825LO	00001503	150	15	2250	2575
023940256	LO-BENTOMAT SDN	200825LO	00001504	150	15	2250	2545
023940260	LO-BENTOMAT SDN	200825LO	00001509	150	14.5	2175	2550
023940260	LO-BENTOMAT SDN	200825LO	00001510	150	14.5	2175	2555
023940256	LO-BENTOMAT SDN	200825LO	00001511	150	14.5	2175	2540
023940258	LO-BENTOMAT SDN	200825LO	00001512	150	14.5	2175	2555
023940260	LO-BENTOMAT SDN	200825LO	00001513	150	14.5	2175	2540
023940258	LO-BENTOMAT SDN	200825LO	00001514	150	14.5	2175	2535
023940260	LO-BENTOMAT SDN	200825LO	00001517	150	14.5	2175	2540
023940260	LO-BENTOMAT SDN	200825LO	00001518	150	14.5	2175	2530
023940260	LO-BENTOMAT SDN	200825LO	00001519	150	14.5	2175	2535
023940256	LO-BENTOMAT SDN	200825LO	00001520	150	14.5	2175	2540
023940260	LO-BENTOMAT SDN	200825LO	00001521	150	14.5	2175	2550
023940256	LO-BENTOMAT SDN	200825LO	00001522	150	14.5	2175	2545
023940256	LO-BENTOMAT SDN	200825LO	00001526	150	14.5	2175	2585

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940260	LO-BENTOMAT SDN	200825LO	00001527	150	14.5	2175	2565
023940256	LO-BENTOMAT SDN	200825LO	00001528	150	14.5	2175	2565
023940260	LO-BENTOMAT SDN	200825LO	00001530	150	14.5	2175	2560
023940260	LO-BENTOMAT SDN	200825LO	00001533	150	14.5	2175	2550
023940256	LO-BENTOMAT SDN	200825LO	00001534	150	14.5	2175	2540
023940256	LO-BENTOMAT SDN	200825LO	00001536	150	14.5	2175	2520
023940260	LO-BENTOMAT SDN	200825LO	00001537	150	14.5	2175	2515
023940260	LO-BENTOMAT SDN	200825LO	00001540	150	14.5	2175	2520
023940256	LO-BENTOMAT SDN	200825LO	00001541	150	14.5	2175	2530
023940256	LO-BENTOMAT SDN	200825LO	00001542	150	14.5	2175	2525
023940256	LO-BENTOMAT SDN	200825LO	00001543	150	14.5	2175	2515
023940256	LO-BENTOMAT SDN	200825LO	00001548	150	14.5	2175	2610
023940256	LO-BENTOMAT SDN	200825LO	00001549	150	14.5	2175	2605
023940258	LO-BENTOMAT SDN	200825LO	00001550	150	14.5	2175	2605
023940258	LO-BENTOMAT SDN	200825LO	00001551	150	14.5	2175	2615
023940258	LO-BENTOMAT SDN	200825LO	00001552	150	14.5	2175	2630
023940258	LO-BENTOMAT SDN	200825LO	00001553	150	14.5	2175	2675
023940258	LO-BENTOMAT SDN	200825LO	00001554	150	14.5	2175	2590
023940258	LO-BENTOMAT SDN	200825LO	00001555	150	14.5	2175	2595
023940258	LO-BENTOMAT SDN	200825LO	00001556	150	14.5	2175	2595
023940258	LO-BENTOMAT SDN	200825LO	00001557	150	14.5	2175	2615
023940258	LO-BENTOMAT SDN	200825LO	00001558	150	14.5	2175	2615
023940258	LO-BENTOMAT SDN	200825LO	00001559	150	14.5	2175	2620
023940258	LO-BENTOMAT SDN	200825LO	00001560	150	14.5	2175	2635
			Totals:	**7650**	**745.5**	**111825**	**130515**
						Total Number of Rolls Certified:	**51**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200825LO	00001411	00001383	2010495074			2010170130	060608C
200825LO	00001414	00001383	2010495085			2010170130	060608C
200825LO	00001427	00001383	2010495094			2010437136	060608D
200825LO	00001430	00001383	2010495070			2010437136	060608D
200825LO	00001458	00001383	2010496877			2010431248	060608D
200825LO	00001476	00001473	2010496888			2010437127	060608E
200825LO	00001479	00001473	2010496888			2010437127	060608E
200825LO	00001486	00001473	2010496878			2010437127	060608E
200825LO	00001494	00001491	2010496887			2010170122	060608E
200825LO	00001497	00001491	2010496885			2010170122	060608E
200825LO	00001499	00001491	2010496885			2010170122	060608E
200825LO	00001501	00001491	2010496885			2010170122	060608E
200825LO	00001503	00001491	2010496885			2010170122	060608E
200825LO	00001504	00001491	200818CV	00001612	00001610	2010170122	060608E
200825LO	00001509	00001508	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001510	00001508	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001511	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001512	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001513	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001514	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001517	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001518	00001508	200817CV	00001532	00001523	2010495964	060608F
200825LO	00001519	00001508	200817CV	00001532	00001523	2010495964	060608F
200825LO	00001520	00001508	200817CV	00001532	00001523	2010495964	060608F
200825LO	00001521	00001508	200817CV	00001532	00001523	2010495964	060608F
200825LO	00001522	00001508	200817CV	00001532	00001523	2010496428	060608F
200825LO	00001526	00001526	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001527	00001526	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001528	00001526	200817CV	00001535	00001533	2010496428	060608F

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200825LO	00001530	00001526	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001533	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001534	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001536	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001537	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001540	00001526	200817CV	00001467	00001467	2010497627	060608F
200825LO	00001541	00001526	200817CV	00001467	00001467	2010497627	060608F
200825LO	00001542	00001526	200817CV	00001467	00001467	2010497627	060608F
200825LO	00001543	00001526	200817CV	00001467	00001467	2010497627	060608F
200825LO	00001548	00001544	200817CV	00001502	00001498	2010497627	060608F
200825LO	00001549	00001544	200817CV	00001502	00001498	2010497627	060608F
200825LO	00001550	00001544	200817CV	00001502	00001498	2010497627	060608F
200825LO	00001551	00001544	200817CV	00001502	00001498	2010496440	060608F
200825LO	00001552	00001544	200817CV	00001473	00001467	2010496440	060608F
200825LO	00001553	00001544	200817CV	00001473	00001467	2010496440	060608F
200825LO	00001554	00001544	200817CV	00001473	00001467	2010496440	060608F
200825LO	00001555	00001544	200817CV	00001473	00001467	2010496440	060608F
200825LO	00001556	00001544	200817CV	00001473	00001467	2010496440	060708A
200825LO	00001557	00001544	200817CV	00001473	00001467	2010496440	060708A
200825LO	00001558	00001544	200817CV	00001473	00001467	2010496440	060708A
200825LO	00001559	00001544	200817CV	00001473	00001467	2010496440	060708A
200825LO	00001560	00001544	200817CV	00001473	00001467	2010496440	060708A

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200825LO	00001383	0.85	30.5	9
LO-BENTOMAT SDN	200825LO	00001473	0.86	44.2	7
LO-BENTOMAT SDN	200825LO	00001491	0.87	44.2	7.4
LO-BENTOMAT SDN	200825LO	00001508	0.89	44.2	6.5
LO-BENTOMAT SDN	200825LO	00001526	0.85	44.2	6.5
LO-BENTOMAT SDN	200825LO	00001544	0.90	30.7	7.2

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200825LO	00001383	47.5	119.4
LO-BENTOMAT SDN	200825LO	00001473	43.7	177.1
LO-BENTOMAT SDN	200825LO	00001491	37.0	177.0
LO-BENTOMAT SDN	200825LO	00001508	32.5	177.0
LO-BENTOMAT SDN	200825LO	00001526	33.6	177.0
LO-BENTOMAT SDN	200825LO	00001544	36.8	123.0

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
060608C	27.0	15.0
060608D	28.0	15.0
060608E	27.0	15.0
060608F	27.0	15.0
060708A	26.0	14.8

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200817CV	00001467	6.4	35.9
CV-NON-WOVEN	200817CV	00001498	6.7	42.7
CV-NON-WOVEN	200817CV	00001523	6.8	41.1
CV-NON-WOVEN	200817CV	00001533	6.6	34.7
CV-NON-WOVEN	200818CV	00001610	6.3	42.6

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 311	2010170122	3.5	72.9
PPX 311	2010170130	3.7	77.6
PPX 311	2010431248	3.6	68.8
PPX 311	2010437127	3.7	87.8
PPX 311	2010437136	4.0	74.1
PPX 311	2010495964	3.3	74.4
PPX 311	2010496428	3.9	80.4
PPX 311	2010496440	3.1	68.6
PPX 311	2010497626	3.3	72.3

CAP

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 650	2010495070	7.2	61.9
PPX 650	2010495074	7.2	83.7
PPX 650	2010495085	7.4	62.8
PPX 650	2010495094	7.4	65.5
PPX 650	2010496877	7.5	75.0
PPX 650	2010496878	7.2	64.1
PPX 650	2010496885	7.0	58.6
PPX 650	2010496887	7.2	61.9
PPX 650	2010496888	7.2	61.9

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 6/21/2008
Purchase Order: 12738-00
ORDER NUMBERS: 023940257, 023940259, 023940261, 023940262, 023940263, 023940264, 023940266

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/20/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBERS: 023940257, 023940259, 023940261, 023940262, 023940263, 023940264, 023940266
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
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800.527.9948 www.cetco.com

Ship Date: 6/20/2008
Order Numbers: 023940257, 023940259, 023940261, 023940262, 023940263, 023940264, 023940266
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940261	LO-BENTOMAT SDN	200825LO	00001342	150	15	2250	2470
023940261	LO-BENTOMAT SDN	200825LO	00001347	150	15	2250	2470
023940261	LO-BENTOMAT SDN	200825LO	00001348	150	15	2250	2495
023940261	LO-BENTOMAT SDN	200825LO	00001350	150	15	2250	2520
023940262	LO-BENTOMAT SDN	200825LO	00001362	150	14.5	2175	2475
023940266	LO-BENTOMAT SDN	200825LO	00001366	150	14.5	2175	2460
023940266	LO-BENTOMAT SDN	200825LO	00001368	150	14.5	2175	2430
023940266	LO-BENTOMAT SDN	200825LO	00001369	150	15	2250	2450
023940261	LO-BENTOMAT SDN	200825LO	00001372	150	15	2250	2565
023940263	LO-BENTOMAT SDN	200825LO	00001373	150	15	2250	2570
023940266	LO-BENTOMAT SDN	200825LO	00001380	150	15	2250	2560
023940262	LO-BENTOMAT SDN	200825LO	00001388	150	15	2250	2580
023940257	LO-BENTOMAT SDN	200825LO	00001390	150	15	2250	2550
023940261	LO-BENTOMAT SDN	200825LO	00001391	150	15	2250	2565
023940262	LO-BENTOMAT SDN	200825LO	00001392	150	15	2250	2540
023940257	LO-BENTOMAT SDN	200825LO	00001393	150	14.5	2175	2535
023940257	LO-BENTOMAT SDN	200825LO	00001394	150	14.5	2175	2560
023940262	LO-BENTOMAT SDN	200825LO	00001395	150	15	2250	2585
023940259	LO-BENTOMAT SDN	200825LO	00001396	150	15	2250	2595
023940266	LO-BENTOMAT SDN	200825LO	00001397	150	15	2250	2530
023940262	LO-BENTOMAT SDN	200825LO	00001398	150	15	2250	2515
023940266	LO-BENTOMAT SDN	200825LO	00001399	150	15	2250	2510
023940262	LO-BENTOMAT SDN	200825LO	00001400	150	15	2250	2530
023940261	LO-BENTOMAT SDN	200825LO	00001401	150	15	2250	2545
023940259	LO-BENTOMAT SDN	200825LO	00001402	150	15	2250	2505
023940262	LO-BENTOMAT SDN	200825LO	00001403	150	15	2250	2500
023940262	LO-BENTOMAT SDN	200825LO	00001405	150	15	2250	2520

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940262	LO-BENTOMAT SDN	200825LO	00001406	150	15	2250	2540
023940261	LO-BENTOMAT SDN	200825LO	00001407	150	15	2250	2525
023940261	LO-BENTOMAT SDN	200825LO	00001408	150	15	2250	2535
023940266	LO-BENTOMAT SDN	200825LO	00001409	150	15	2250	2545
023940264	LO-BENTOMAT SDN	200825LO	00001410	150	15	2250	2510
023940263	LO-BENTOMAT SDN	200825LO	00001412	150	15	2250	2505
023940261	LO-BENTOMAT SDN	200825LO	00001413	150	15	2250	2535
023940261	LO-BENTOMAT SDN	200825LO	00001415	150	15	2250	2505
023940266	LO-BENTOMAT SDN	200825LO	00001416	150	15	2250	2540
023940266	LO-BENTOMAT SDN	200825LO	00001417	150	15	2250	2510
023940266	LO-BENTOMAT SDN	200825LO	00001418	150	15	2250	2500
023940266	LO-BENTOMAT SDN	200825LO	00001419	150	15	2250	2495
023940261	LO-BENTOMAT SDN	200825LO	00001420	150	15	2250	2485
023940262	LO-BENTOMAT SDN	200825LO	00001421	150	15	2250	2470
023940262	LO-BENTOMAT SDN	200825LO	00001422	150	15	2250	2485
023940262	LO-BENTOMAT SDN	200825LO	00001423	150	15	2250	2490
023940263	LO-BENTOMAT SDN	200825LO	00001425	150	15	2250	2475
023940261	LO-BENTOMAT SDN	200825LO	00001426	150	15	2250	2455
023940259	LO-BENTOMAT SDN	200825LO	00001428	150	14.5	2175	2450
023940257	LO-BENTOMAT SDN	200825LO	00001429	150	14.5	2175	2445
023940261	LO-BENTOMAT SDN	200825LO	00001431	150	14.5	2175	2490
023940266	LO-BENTOMAT SDN	200825LO	00001432	150	14.5	2175	2505
023940266	LO-BENTOMAT SDN	200825LO	00001433	150	14.5	2175	2510
023940266	LO-BENTOMAT SDN	200825LO	00001434	150	14.5	2175	2480
023940261	LO-BENTOMAT SDN	200825LO	00001435	150	14.5	2175	2495
023940262	LO-BENTOMAT SDN	200825LO	00001436	150	14.5	2175	2460
023940259	LO-BENTOMAT SDN	200825LO	00001437	150	14.5	2175	2475
023940263	LO-BENTOMAT SDN	200825LO	00001438	150	14.5	2175	2490
023940263	LO-BENTOMAT SDN	200825LO	00001439	150	14.5	2175	2465
023940261	LO-BENTOMAT SDN	200825LO	00001440	150	14.5	2175	2470
023940266	LO-BENTOMAT SDN	200825LO	00001441	150	14.5	2175	2455
023940259	LO-BENTOMAT SDN	200825LO	00001442	150	14.5	2175	2460

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940266	LO-BENTOMAT SDN	200825LO	00001443	150	14.5	2175	2470
023940264	LO-BENTOMAT SDN	200825LO	00001444	150	14.5	2175	2475
023940262	LO-BENTOMAT SDN	200825LO	00001445	150	14.5	2175	2460
023940259	LO-BENTOMAT SDN	200825LO	00001446	150	14.5	2175	2480
023940263	LO-BENTOMAT SDN	200825LO	00001447	150	14.5	2175	2485
023940266	LO-BENTOMAT SDN	200825LO	00001448	150	14.5	2175	2440
023940259	LO-BENTOMAT SDN	200825LO	00001449	150	14.5	2175	2450
023940259	LO-BENTOMAT SDN	200825LO	00001450	150	14.5	2175	2455
023940263	LO-BENTOMAT SDN	200825LO	00001451	150	14.5	2175	2450
023940264	LO-BENTOMAT SDN	200825LO	00001452	150	14.5	2175	2450
023940261	LO-BENTOMAT SDN	200825LO	00001453	150	14.5	2175	2490
023940262	LO-BENTOMAT SDN	200825LO	00001454	150	14.5	2175	2475
023940259	LO-BENTOMAT SDN	200825LO	00001455	150	14.5	2175	2480
023940259	LO-BENTOMAT SDN	200825LO	00001456	150	14.5	2175	2460
023940259	LO-BENTOMAT SDN	200825LO	00001457	150	14.5	2175	2465
023940264	LO-BENTOMAT SDN	200825LO	00001459	150	14.5	2175	2450
023940259	LO-BENTOMAT SDN	200825LO	00001460	150	14.5	2175	2460
023940259	LO-BENTOMAT SDN	200825LO	00001461	150	14.5	2175	2455
023940259	LO-BENTOMAT SDN	200825LO	00001462	150	14.5	2175	2490
023940264	LO-BENTOMAT SDN	200825LO	00001463	150	14.5	2175	2510
023940263	LO-BENTOMAT SDN	200825LO	00001464	150	14.5	2175	2520
023940259	LO-BENTOMAT SDN	200825LO	00001465	150	14.5	2175	2500
023940263	LO-BENTOMAT SDN	200825LO	00001466	150	14.5	2175	2485
023940262	LO-BENTOMAT SDN	200825LO	00001467	150	14.5	2175	2470
023940262	LO-BENTOMAT SDN	200825LO	00001468	150	14.5	2175	2465
023940259	LO-BENTOMAT SDN	200825LO	00001469	150	14.5	2175	2440
023940259	LO-BENTOMAT SDN	200825LO	00001470	150	14.5	2175	2455
023940263	LO-BENTOMAT SDN	200825LO	00001471	150	14.5	2175	2520
023940264	LO-BENTOMAT SDN	200825LO	00001472	150	14.5	2175	2515
023940264	LO-BENTOMAT SDN	200825LO	00001473	150	14.5	2175	2530
023940264	LO-BENTOMAT SDN	200825LO	00001474	150	15	2250	2545
023940264	LO-BENTOMAT SDN	200825LO	00001475	150	15	2250	2560

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940264	LO-BENTOMAT SDN	200825LO	00001477	150	15	2250	2510
023940264	LO-BENTOMAT SDN	200825LO	00001478	150	15	2250	2525
023940257	LO-BENTOMAT SDN	200825LO	00001480	150	15	2250	2500
023940264	LO-BENTOMAT SDN	200825LO	00001481	150	15	2250	2505
023940257	LO-BENTOMAT SDN	200825LO	00001482	150	15	2250	2635
023940257	LO-BENTOMAT SDN	200825LO	00001483	150	15	2250	2620
023940257	LO-BENTOMAT SDN	200825LO	00001484	150	15	2250	2605
023940263	LO-BENTOMAT SDN	200825LO	00001485	150	15	2250	2600
023940263	LO-BENTOMAT SDN	200825LO	00001487	150	15	2250	2605
023940264	LO-BENTOMAT SDN	200825LO	00001489	150	15	2250	2600
023940264	LO-BENTOMAT SDN	200825LO	00001490	150	15	2250	2590
023940264	LO-BENTOMAT SDN	200825LO	00001491	150	15	2250	2545
023940257	LO-BENTOMAT SDN	200825LO	00001492	150	15	2250	2560
023940263	LO-BENTOMAT SDN	200825LO	00001493	150	15	2250	2590
023940264	LO-BENTOMAT SDN	200825LO	00001495	150	15	2250	2555
023940263	LO-BENTOMAT SDN	200825LO	00001496	150	15	2250	2540
023940264	LO-BENTOMAT SDN	200825LO	00001498	150	15	2250	2545
023940257	LO-BENTOMAT SDN	200825LO	00001505	150	14.5	2175	2550
023940263	LO-BENTOMAT SDN	200825LO	00001506	150	14.5	2175	2525
023940257	LO-BENTOMAT SDN	200825LO	00001508	150	14.5	2175	2545
023940263	LO-BENTOMAT SDN	200825LO	00001515	150	14.5	2175	2550
023940257	LO-BENTOMAT SDN	200825LO	00001516	150	14.5	2175	2545
023940263	LO-BENTOMAT SDN	200825LO	00001523	150	14.5	2175	2540
023940257	LO-BENTOMAT SDN	200825LO	00001524	150	14.5	2175	2525
023940257	LO-BENTOMAT SDN	200825LO	00001525	150	14.5	2175	2595
023940257	LO-BENTOMAT SDN	200825LO	00001529	150	14.5	2175	2570
023940257	LO-BENTOMAT SDN	200825LO	00001544	150	14.5	2175	2520
023940257	LO-BENTOMAT SDN	200825LO	00001545	150	14.5	2175	2530
			Totals:	**17850**	**1755**	**263250**	**298865**
						Total Number of Rolls Certified:	**119**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200825LO	00001342	00001329	2010496879			2010342857	060508C
200825LO	00001347	00001347	2010496546			2010342857	060508C
200825LO	00001348	00001347	2010496546			2010342857	060508C
200825LO	00001350	00001347	2010496546			2010342857	060508C
200825LO	00001362	00001347	2010496551			2010342888	060608B
200825LO	00001366	00001365	2010496551			2010342888	060608B
200825LO	00001368	00001365	2010495066			2010342888	060608B
200825LO	00001369	00001365	2010495066			2010342879	060608B
200825LO	00001372	00001365	2010495066			2010342879	060608B
200825LO	00001373	00001365	2010495066			2010342879	060608B
200825LO	00001380	00001365	2010495082			2010342879	060608C
200825LO	00001388	00001383	2010496567			2010342851	060608C
200825LO	00001390	00001383	2010496876			2010342851	060608C
200825LO	00001391	00001383	2010496876			2010342851	060608C
200825LO	00001392	00001383	2010496876			2010342851	060608C
200825LO	00001393	00001383	2010496876			2010342851	060608C
200825LO	00001394	00001383	2010496876			2010342851	060608C
200825LO	00001395	00001383	2010496876			2010431249	060608C
200825LO	00001396	00001383	2010496876			2010431249	060608C
200825LO	00001397	00001383	2010496876			2010431249	060608C
200825LO	00001398	00001383	2010495058			2010431249	060608C
200825LO	00001399	00001383	2010495058			2010431249	060608C
200825LO	00001400	00001383	2010495058			2010431249	060608C
200825LO	00001401	00001401	2010495058			2010431249	060608C
200825LO	00001402	00001401	2010495058			2010431249	060608C
200825LO	00001403	00001401	2010495058			2010431249	060608C
200825LO	00001405	00001401	2010495058			2010431249	060608C
200825LO	00001406	00001401	2010495074			2010431249	060608C
200825LO	00001407	00001401	2010495074			2010431249	060608C

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200825LO	00001408	00001401	2010495074			2010431249	060608C
200825LO	00001409	00001401	2010495074			2010431249	060608C
200825LO	00001410	00001401	2010495074			2010170130	060608C
200825LO	00001412	00001401	2010495074			2010170130	060608C
200825LO	00001413	00001401	2010495085			2010170130	060608C
200825LO	00001415	00001401	2010495085			2010170130	060608C
200825LO	00001416	00001401	2010495085			2010170130	060608C
200825LO	00001417	00001401	2010495085			2010170130	060608C
200825LO	00001418	00001401	2010495085			2010170130	060608C
200825LO	00001419	00001419	2010495085			2010170130	060608C
200825LO	00001420	00001419	2010495085			2010170130	060608C
200825LO	00001421	00001419	2010495094			2010170130	060608C
200825LO	00001422	00001419	2010495094			2010170130	060608D
200825LO	00001423	00001419	2010495094			2010170130	060608D
200825LO	00001425	00001419	2010495094			2010170130	060608D
200825LO	00001426	00001419	2010495094			2010170130	060608D
200825LO	00001428	00001419	2010495094			2010437136	060608D
200825LO	00001429	00001419	2010495070			2010437136	060608D
200825LO	00001431	00001419	2010495070			2010437136	060608D
200825LO	00001432	00001419	2010495070			2010437136	060608D
200825LO	00001433	00001419	2010495070			2010437136	060608D
200825LO	00001434	00001419	2010495070			2010437136	060608D
200825LO	00001435	00001419	2010495070			2010437136	060608D
200825LO	00001436	00001419	2010495070			2010437136	060608D
200825LO	00001437	00001437	2010495077			2010437136	060608D
200825LO	00001438	00001437	2010495077			2010437136	060608D
200825LO	00001439	00001437	2010495077			2010437136	060608D
200825LO	00001440	00001437	2010495077			2010437136	060608D
200825LO	00001441	00001437	2010495077			2010437136	060608D
200825LO	00001442	00001437	2010495077			2010437136	060608D
200825LO	00001443	00001437	2010495077			2010495959	060608D
200825LO	00001444	00001437	2010496889			2010495959	060608D
200825LO	00001445	00001437	2010496889			2010495959	060608D
200825LO	00001446	00001437	2010496889			2010495959	060608D
200825LO	00001447	00001437	2010496889			2010495959	060608D

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200825LO	00001448	00001437	2010496889			2010495959	060608D
200825LO	00001449	00001437	2010496889			2010495959	060608D
200825LO	00001450	00001437	2010496889			2010495959	060608D
200825LO	00001451	00001437	2010495080			2010495959	060608D
200825LO	00001452	00001437	2010495080			2010431248	060608D
200825LO	00001453	00001437	2010495080			2010431248	060608D
200825LO	00001454	00001437	2010495080			2010431248	060608D
200825LO	00001455	00001455	2010495080			2010431248	060608D
200825LO	00001456	00001455	2010495080			2010431248	060608D
200825LO	00001457	00001455	2010495080			2010431248	060608D
200825LO	00001459	00001455	2010496877			2010431248	060608D
200825LO	00001460	00001455	2010496877			2010431248	060608D
200825LO	00001461	00001455	2010496877			2010431248	060608D
200825LO	00001462	00001455	2010496877			2010431248	060608D
200825LO	00001463	00001455	2010496877			2010431248	060608D
200825LO	00001464	00001455	2010496877			2010431248	060608D
200825LO	00001465	00001455	2010496877			2010431248	060608E
200825LO	00001466	00001455	2010495084			2010431248	060608E
200825LO	00001467	00001455	2010495084			2010431248	060608E
200825LO	00001468	00001455	2010495084			2010431248	060608E
200825LO	00001469	00001455	2010495084			2010431248	060608E
200825LO	00001470	00001455	2010495084			2010431248	060608E
200825LO	00001471	00001455	2010495084			2010431248	060608E
200825LO	00001472	00001455	2010495084			2010431248	060608E
200825LO	00001473	00001473	2010496888			2010437127	060608E
200825LO	00001474	00001473	2010496888			2010437127	060608E
200825LO	00001475	00001473	2010496888			2010437127	060608E
200825LO	00001477	00001473	2010496888			2010437127	060608E
200825LO	00001478	00001473	2010496888			2010437127	060608E
200825LO	00001480	00001473	2010496888			2010437127	060608E
200825LO	00001481	00001473	2010496878			2010437127	060608E
200825LO	00001482	00001473	2010496878			2010437127	060608E
200825LO	00001483	00001473	2010496878			2010437127	060608E
200825LO	00001484	00001473	2010496878			2010437127	060608E
200825LO	00001485	00001473	2010496878			2010437127	060608E

GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200825LO	00001487	00001473	2010496878			2010437127	060608E
200825LO	00001489	00001473	2010496887			2010170122	060608E
200825LO	00001490	00001473	2010496887			2010170122	060608E
200825LO	00001491	00001491	2010496887			2010170122	060608E
200825LO	00001492	00001491	2010496887			2010170122	060608E
200825LO	00001493	00001491	2010496887			2010170122	060608E
200825LO	00001495	00001491	2010496887			2010170122	060608E
200825LO	00001496	00001491	2010496887			2010170122	060608E
200825LO	00001498	00001491	2010496885			2010170122	060608E
200825LO	00001505	00001491	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001506	00001491	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001508	00001508	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001515	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001516	00001508	200817CV	00001536	00001533	2010495964	060608F
200825LO	00001523	00001508	200817CV	00001532	00001523	2010496428	060608F
200825LO	00001524	00001508	200817CV	00001532	00001523	2010496428	060608F
200825LO	00001525	00001508	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001529	00001526	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001544	00001544	200817CV	00001467	00001467	2010497627	060608F
200825LO	00001545	00001544	200817CV	00001467	00001467	2010497627	060608F

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200825LO	00001329	0.85	38.7	12.1
LO-BENTOMAT SDN	200825LO	00001347	0.88	38.7	10.5
LO-BENTOMAT SDN	200825LO	00001365	0.94	30.5	7.4
LO-BENTOMAT SDN	200825LO	00001383	0.85	30.5	9
LO-BENTOMAT SDN	200825LO	00001401	1.00	30.5	30.5
LO-BENTOMAT SDN	200825LO	00001419	0.88	30.5	6.9
LO-BENTOMAT SDN	200825LO	00001437	0.93	30.5	6.6
LO-BENTOMAT SDN	200825LO	00001455	0.92	44.2	7.1
LO-BENTOMAT SDN	200825LO	00001473	0.89	44.2	7
LO-BENTOMAT SDN	200825LO	00001491	0.87	44.2	7.4
LO-BENTOMAT SDN	200825LO	00001508	0.89	44.2	6.5
LO-BENTOMAT SDN	200825LO	00001526	0.85	44.2	6.5
LO-BENTOMAT SDN	200825LO	00001544	0.90	30.7	7.2

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200825LO	00001329	60.7	154.9
LO-BENTOMAT SDN	200825LO	00001347	38.7	154.9
LO-BENTOMAT SDN	200825LO	00001365	39.3	119.4
LO-BENTOMAT SDN	200825LO	00001383	47.5	119.4
LO-BENTOMAT SDN	200825LO	00001401	45.4	119.4
LO-BENTOMAT SDN	200825LO	00001419	38.8	119.4
LO-BENTOMAT SDN	200825LO	00001437	37.2	119.4
LO-BENTOMAT SDN	200825LO	00001455	35.3	177.1
LO-BENTOMAT SDN	200825LO	00001473	43.7	177.1
LO-BENTOMAT SDN	200825LO	00001491	37.0	177.0
LO-BENTOMAT SDN	200825LO	00001508	32.5	177.0
LO-BENTOMAT SDN	200825LO	00001526	33.6	177.0
LO-BENTOMAT SDN	200825LO	00001544	36.8	123.0

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
060508C	25.0	17.0
060608B	27.0	15.0
060608C	27.0	15.0
060608D	28.0	15.0
060608E	27.0	15.0
060608F	27.0	15.0

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200817CV	00001467	6.4	35.9
CV-NON-WOVEN	200817CV	00001523	6.8	41.1
CV-NON-WOVEN	200817CV	00001533	6.6	34.7
CV-NON-WOVEN	200818CV	00001610	6.3	42.6

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 311	2010170122	3.5	72.9
PPX 311	2010170130	3.7	77.6
PPX 311	2010342851	3.9	92.1
PPX 311	2010342857	3.6	91.5
PPX 311	2010342879	3.6	85.1
PPX 311	2010342888	3.6	85.3
PPX 311	2010431248	3.6	68.8
PPX 311	2010431249	3.6	68.8
PPX 311	2010437127	3.7	87.8
PPX 311	2010437136	4.0	74.1
PPX 311	2010495959	4.1	90.1
PPX 311	2010495964	3.3	74.4
PPX 311	2010496428	3.9	80.4
PPX 311	2010497626	3.3	72.3
CAP			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 650	2010495058	8.0	65.7
PPX 650	2010495066	7.7	70.9
PPX 650	2010495070	7.2	61.9
PPX 650	2010495074	7.2	83.7
PPX 650	2010495077	7.2	83.7
PPX 650	2010495080	8.0	65.5
PPX 650	2010495082	7.4	62.8
PPX 650	2010495084	7.4	62.8
PPX 650	2010495085	7.4	62.8
PPX 650	2010495094	7.4	65.5
PPX 650	2010496546	7.2	69.6
PPX 650	2010496551	6.8	70.0
PPX 650	2010496567	7.9	77.1
PPX 650	2010496876	7.5	75.0
PPX 650	2010496877	7.5	75.0
PPX 650	2010496878	7.2	64.1

PPX 650	2010496879	7.2	64.1
PPX 650	2010496885	7.0	58.6
PPX 650	2010496887	7.2	61.9
PPX 650	2010496888	7.2	61.9
PPX 650	2010496889	7.2	61.9

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

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Date: 6/23/2008
Purchase Order: 12738-00
ORDER NUMBER: 023940265

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/22/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBER: 023940265
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

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PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

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Ship Date: 6/22/2008
Order Number: 023940265
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940265	LO-BENTOMAT SDN	200825LO	00001340	150	15	2250	2500
023940265	LO-BENTOMAT SDN	200825LO	00001343	150	15	2250	2450
023940265	LO-BENTOMAT SDN	200825LO	00001344	150	15	2250	2490
023940265	LO-BENTOMAT SDN	200825LO	00001349	150	15	2250	2505
023940265	LO-BENTOMAT SDN	200825LO	00001351	150	15	2250	2510
023940265	LO-BENTOMAT SDN	200825LO	00001353	150	15	2250	2470
023940265	LO-BENTOMAT SDN	200825LO	00001354	150	14.5	2175	2460
023940265	LO-BENTOMAT SDN	200825LO	00001355	150	14.5	2175	2455
023940265	LO-BENTOMAT SDN	200825LO	00001356	150	14.5	2175	2440
023940265	LO-BENTOMAT SDN	200825LO	00001357	150	14.5	2175	2490
023940265	LO-BENTOMAT SDN	200825LO	00001358	150	14.5	2175	2485
023940265	LO-BENTOMAT SDN	200825LO	00001364	150	14.5	2175	2485
023940265	LO-BENTOMAT SDN	200825LO	00001370	150	15	2250	2510
023940265	LO-BENTOMAT SDN	200825LO	00001375	150	15	2250	2535
023940265	LO-BENTOMAT SDN	200825LO	00001383	150	15	2250	2570
023940265	LO-BENTOMAT SDN	200825LO	00001424	150	15	2250	2460
023940265	LO-BENTOMAT SDN	200825LO	00001488	150	15	2250	2610
			Totals:	**2550**	**252**	**37800**	**42425**
						Total Number of Rolls Certified:	17

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200825LO	00001340	00001329	2010496879			2010342857	060508C
200825LO	00001343	00001329	2010496879			2010342857	060508C
200825LO	00001344	00001329	2010496879			2010342857	060508C
200825LO	00001349	00001347	2010496546			2010342857	060508C
200825LO	00001351	00001347	2010496546			2010342888	060508C
200825LO	00001353	00001347	2010495083			2010342888	060508C
200825LO	00001354	00001347	2010495083			2010342888	060508C
200825LO	00001355	00001347	2010495083			2010342888	060508C
200825LO	00001356	00001347	2010495083			2010342888	060508C
200825LO	00001357	00001347	2010495083			2010342888	060508C
200825LO	00001358	00001347	2010495083			2010342888	060508C
200825LO	00001364	00001347	2010496551			2010342888	060608B
200825LO	00001370	00001365	2010495066			2010342879	060608B
200825LO	00001375	00001365	2010495066			2010342879	060608C
200825LO	00001383	00001383	2010496567			2010342851	060608C
200825LO	00001424	00001419	2010495094			2010170130	060608D
200825LO	00001488	00001473	2010496887			2010170122	060608E

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200825LO	00001329	0.85	38.7	12.1
LO-BENTOMAT SDN	200825LO	00001347	0.88	38.7	10.5
LO-BENTOMAT SDN	200825LO	00001365	0.94	30.5	7.4
LO-BENTOMAT SDN	200825LO	00001383	0.85	30.5	9
LO-BENTOMAT SDN	200825LO	00001419	0.88	30.5	6.9
LO-BENTOMAT SDN	200825LO	00001473	0.89	44.2	7

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200825LO	00001329	60.7	154.9
LO-BENTOMAT SDN	200825LO	00001347	38.7	154.9
LO-BENTOMAT SDN	200825LO	00001365	39.3	119.4
LO-BENTOMAT SDN	200825LO	00001383	47.5	119.4
LO-BENTOMAT SDN	200825LO	00001419	38.8	119.4
LO-BENTOMAT SDN	200825LO	00001473	43.7	177.1

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
060508C	25.0	17.0
060608B	27.0	15.0
060608C	27.0	15.0
060608D	28.0	15.0
060608E	27.0	15.0

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 311	2010170122	3.5	72.9
PPX 311	2010170130	3.7	77.6
PPX 311	2010342851	3.9	92.1
PPX 311	2010342857	3.6	91.5
PPX 311	2010342879	3.6	85.1
PPX 311	2010342888	3.6	85.3
CAP			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 650	2010495066	7.7	70.9
PPX 650	2010495083	7.4	62.8
PPX 650	2010495094	7.4	65.5
PPX 650	2010496546	7.2	69.6
PPX 650	2010496551	6.8	70.0
PPX 650	2010496567	7.9	77.1
PPX 650	2010496879	7.2	64.1
PPX 650	2010496887	7.2	61.9

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

CETCO
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Date: 6/25/2008
Purchase Order: 12738-00
ORDER NUMBER: 023940267

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/24/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBER: 023940267
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
Fax:
E-Mail: rwilke@cetco.com

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
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Ship Date: 6/24/2008
Order Number: 023940267
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940267	LO-BENTOMAT SDN	200825LO	00001341	150	15	2250	2485
023940267	LO-BENTOMAT SDN	200825LO	00001345	150	15	2250	2505
023940267	LO-BENTOMAT SDN	200825LO	00001346	150	15	2250	2510
023940267	LO-BENTOMAT SDN	200825LO	00001352	150	15	2250	2510
023940267	LO-BENTOMAT SDN	200825LO	00001359	150	14.5	2175	2510
023940267	LO-BENTOMAT SDN	200825LO	00001360	150	14.5	2175	2475
023940267	LO-BENTOMAT SDN	200825LO	00001376	150	15	2250	2550
023940267	LO-BENTOMAT SDN	200825LO	00001382	150	15	2250	2555
023940267	LO-BENTOMAT SDN	200825LO	00001386	150	15	2250	2590
023940267	LO-BENTOMAT SDN	200825LO	00001500	150	15	2250	2550
023940267	LO-BENTOMAT SDN	200825LO	00001507	150	14.5	2175	2540
023940267	LO-BENTOMAT SDN	200825LO	00001531	150	14.5	2175	2580
023940267	LO-BENTOMAT SDN	200825LO	00001532	150	14.5	2175	2560
023940267	LO-BENTOMAT SDN	200825LO	00001535	150	14.5	2175	2530
023940267	LO-BENTOMAT SDN	200825LO	00001538	150	14.5	2175	2535
023940267	LO-BENTOMAT SDN	200825LO	00001546	150	14.5	2175	2515
023940267	LO-BENTOMAT SDN	200825LO	00001547	150	14.5	2175	2565
			Totals:	**2550**	**250.5**	**37575**	**43065**
						Total Number of Rolls Certified:	**17**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200825LO	00001341	00001329	2010496879			2010342857	060508C
200825LO	00001345	00001329	2010496546			2010342857	060508C
200825LO	00001346	00001329	2010496546			2010342857	060508C
200825LO	00001352	00001347	2010496546			2010342888	060508C
200825LO	00001359	00001347	2010495083			2010342888	060508C
200825LO	00001360	00001347	2010496551			2010342888	060508C
200825LO	00001376	00001365	2010495082			2010342879	060608C
200825LO	00001382	00001365	2010495082			2010342879	060608C
200825LO	00001386	00001383	2010496567			2010342851	060608C
200825LO	00001500	00001491	2010496885			2010170122	060608E
200825LO	00001507	00001491	200818CV	00001612	00001610	2010495964	060608E
200825LO	00001531	00001526	200817CV	00001535	00001533	2010496428	060608F
200825LO	00001532	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001535	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001538	00001526	200817CV	00001534	00001533	2010496428	060608F
200825LO	00001546	00001544	200817CV	00001502	00001498	2010497627	060608F
200825LO	00001547	00001544	200817CV	00001502	00001498	2010497627	060608F

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200825LO	00001329	0.85	38.7	12.1
LO-BENTOMAT SDN	200825LO	00001347	0.88	38.7	10.5
LO-BENTOMAT SDN	200825LO	00001365	0.94	30.5	7.4
LO-BENTOMAT SDN	200825LO	00001383	0.85	30.5	9
LO-BENTOMAT SDN	200825LO	00001491	0.87	44.2	7.4
LO-BENTOMAT SDN	200825LO	00001526	0.85	44.2	6.5
LO-BENTOMAT SDN	200825LO	00001544	0.90	30.7	7.2

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200825LO	00001329	60.7	154.9
LO-BENTOMAT SDN	200825LO	00001347	38.7	154.9
LO-BENTOMAT SDN	200825LO	00001365	39.3	119.4
LO-BENTOMAT SDN	200825LO	00001383	47.5	119.4
LO-BENTOMAT SDN	200825LO	00001491	37.0	177.0
LO-BENTOMAT SDN	200825LO	00001526	33.6	177.0
LO-BENTOMAT SDN	200825LO	00001544	36.8	123.0

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
060508C	25.0	17.0
060608C	27.0	15.0
060608E	27.0	15.0
060608F	27.0	15.0

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200817CV	00001498	6.7	42.7
CV-NON-WOVEN	200817CV	00001533	6.6	34.7
CV-NON-WOVEN	200818CV	00001610	6.3	42.6

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 311	2010170122	3.5	72.9
PPX 311	2010342851	3.9	92.1
PPX 311	2010342857	3.6	91.5
PPX 311	2010342879	3.6	85.1
PPX 311	2010342888	3.6	85.3
PPX 311	2010495964	3.3	74.4
PPX 311	2010496428	3.9	80.4
PPX 311	2010497626	3.3	72.3
CAP			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX 650	2010495082	7.4	62.8
PPX 650	2010495083	7.4	62.8
PPX 650	2010496546	7.1	61.8
PPX 650	2010496546	7.2	69.6
PPX 650	2010496551	6.8	70.0
PPX 650	2010496551	7.1	61.8
PPX 650	2010496567	7.9	77.1
PPX 650	2010496879	7.2	64.1
PPX 650	2010496885	7.0	58.6

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Date: 7/1/2008
Purchase Order: 12738-00
ORDER NUMBER: 023940268

Tom Heasley
GSI-Headquarters

Waukesha, WI 53188-6904
theasley@geo-synthetics.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to GSI-Headquarters. The shipments left our Lovell, Wyoming plant on 6/30/2008.

If you have any questions regarding this information, please contact me at 800-322-1149 ext. 413.

Sincerely,

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

CETCO
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GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
ORDER NUMBER: 023940268
PREPARED FOR: GSI-Headquarters

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson
Quality Assurance Coordinator
CETCO
P.O. Box 428
92 Hwy. 37
Lovell, WY 82431

Telephone: 800-322-1149 ext. 413
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CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

PRODUCTION CERTIFICATION

PROJECT NAME: Ameren Duck Creek
CUSTOMER P.O.: 12738-00
PREPARED FOR: GSI-Headquarters

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Ship Date: 6/30/2008
Order Number: 023940268
Prepared For: GSI-Headquarters

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT SDN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	90 lbs (400 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	2.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

SPECIALY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT SDN

Test Method	Test Method Property	Requested Frequency	Requested Value	Requested Conditions
ASTM D 4632	GCL Grab Strength	Standard	Standard	Standard
ASTM D 4632	GCL Peel Strength	Standard	Standard	Standard

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT SDN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat SDN Base Nonwoven Fabric	ASTM D 5261	2.7	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Roger B. Wilkerson
Quality Assurance Coordinator
CETCO Lovell Plant

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GCL ORDER PACKING LIST

GCL shipped for certification package number 000239402

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
023940268	LO-BENTOMAT SDN	200825LO	00001363	150	14.5	2175	2460
023940268	LO-BENTOMAT SDN	200825LO	00001365	150	14.5	2175	2490
023940268	LO-BENTOMAT SDN	200825LO	00001367	150	14.5	2175	2455
023940268	LO-BENTOMAT SDN	200825LO	00001371	150	15	2250	2530
023940268	LO-BENTOMAT SDN	200825LO	00001374	150	15	2250	2540
023940268	LO-BENTOMAT SDN	200825LO	00001377	150	15	2250	2515
023940268	LO-BENTOMAT SDN	200825LO	00001378	150	15	2250	2520
023940268	LO-BENTOMAT SDN	200825LO	00001379	150	15	2250	2545
023940268	LO-BENTOMAT SDN	200825LO	00001381	150	15	2250	2580
023940268	LO-BENTOMAT SDN	200825LO	00001384	150	15	2250	2565
023940268	LO-BENTOMAT SDN	200825LO	00001385	150	15	2250	2530
023940268	LO-BENTOMAT SDN	200825LO	00001387	150	15	2250	2575
023940268	LO-BENTOMAT SDN	200825LO	00001389	150	15	2250	2570
023940268	LO-BENTOMAT SDN	200825LO	00001404	150	15	2250	2515
023940268	LO-BENTOMAT SDN	200825LO	00001502	150	15	2250	2570
023940268	LO-BENTOMAT SDN	200825LO	00001539	150	14.5	2175	2510
			Totals:	**2400**	**238**	**35700**	**40470**
						Total Number of Rolls Certified:	**16**

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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000239402

GCL			Geotextiles				Clay
LO-BENTOMAT SDN			LO-N/W-WHITE-DN LW			LO-N/W-BLK-DNLW-2.7	LO-CG 50-DN LWNW
GCL Lot #	GCL Roll #	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
200825LO	00001363	00001347	2010496551			2010342888	060608B
200825LO	00001365	00001365	2010496551			2010342888	060608B
200825LO	00001367	00001365	2010496551			2010342888	060608B
200825LO	00001371	00001365	2010495066			2010342879	060608B
200825LO	00001374	00001365	2010495066			2010342879	060608C
200825LO	00001377	00001365	2010495082			2010342879	060608C
200825LO	00001378	00001365	2010495082			2010342879	060608C
200825LO	00001379	00001365	2010495082			2010342879	060608C
200825LO	00001381	00001365	2010495082			2010342879	060608C
200825LO	00001384	00001383	2010496567			2010342851	060608C
200825LO	00001385	00001383	2010496567			2010342851	060608C
200825LO	00001387	00001383	2010496567			2010342851	060608C
200825LO	00001389	00001383	2010496567			2010342851	060608C
200825LO	00001404	00001401	2010495058			2010431249	060608C
200825LO	00001502	00001491	2010496885			2010170122	060608E
200825LO	00001539	00001526	200817CV	00001467	00001467	2010497627	060608F

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GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000239402 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	30lbs/in MARV	2.5lbs/in MARV
Non-standard specifications were requested for this order as indicated on the attatched property sheet					
LO-BENTOMAT SDN	200825LO	00001347	0.88	38.7	10.5
LO-BENTOMAT SDN	200825LO	00001365	0.94	30.5	7.4
LO-BENTOMAT SDN	200825LO	00001383	0.85	30.5	9
LO-BENTOMAT SDN	200825LO	00001401	1.00	30.5	30.5
LO-BENTOMAT SDN	200825LO	00001491	0.87	44.2	7.4
LO-BENTOMAT SDN	200825LO	00001526	0.85	44.2	6.5

Product	Lot # Tested	Roll # Tested	PEEL 4632	GRAB 4632
LO-BENTOMAT SDN	200825LO	00001347	38.7	154.9
LO-BENTOMAT SDN	200825LO	00001365	39.3	119.4
LO-BENTOMAT SDN	200825LO	00001383	47.5	119.4
LO-BENTOMAT SDN	200825LO	00001401	45.4	119.4
LO-BENTOMAT SDN	200825LO	00001491	37.0	177.0
LO-BENTOMAT SDN	200825LO	00001526	33.6	177.0

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

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BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000239402 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
060608B	27.0	15.0
060608C	27.0	15.0
060608E	27.0	15.0
060608F	27.0	15.0

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GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 000239402 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200817CV	00001467	6.4	35.9

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GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000239402 was manufactured with geotextiles which were tested with the following results.

BASE

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 311	2010170122	3.5	72.9
PPX 311	2010342851	3.9	92.1
PPX 311	2010342879	3.6	85.1
PPX 311	2010342888	3.6	85.3
PPX 311	2010431249	3.6	68.8
PPX 311	2010497626	3.3	72.3

CAP

Material	Roll Number	Mass Area oz/yd2	Grab Strenth lbs
PPX 650	2010495058	8.0	65.7
PPX 650	2010495066	7.7	70.9
PPX 650	2010495082	7.4	62.8
PPX 650	2010496551	6.8	70.0
PPX 650	2010496551	7.1	61.8
PPX 650	2010496567	7.9	77.1
PPX 650	2010496885	7.0	58.6

Certifications from our suppliers are on file at our production facility. An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

GEOSYNTHETIC CLAY LINER MANUFACTURER QUALITY CONTROL PERMEABILITY TESTING RESULTS

CETCO - 92 HWY 37, Lovell, WY. 82431 — Computation Sheet : GRI Accredited ASTM D-5887, Index Flux

Sample: Bentomat SDN
Lot Number: 200820LO
Roll Number: 19
Project Name: Weekly Perm

Permeability equation : ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

Flux equation : ((Inflow+Outflow)/200)/Pi*r^2/Time

Initial Thickness : 0.835 cm. **Hydration :** 48hrs **Permeant :** De-aired DI Water **Date:** 6/6/2008

Test Position : CET-L-306 **Initial Head :** 2psi 140.6 cm. **Analyst :** SW **Date Started:** 5/16/2008

Cell Size : 4 in. **Max. Effective Stress :** 5psi 34.5kPa **Requested by :**

Final Thickness : 0.732 cm. *** indicates value meets Flux Ratio ASTM termination criteria**

Conversions : 1 psi Flux (English) = Flux * 9.2366E+10

Date	Time (min)	Reading In	X	Reading Out	Y	X-Y	Head (cm)	H (cm)	Initial K (cm/sec)	Initial Flux ($m^3/m^2/sec$)		Avg Flux ($m^3/m^2/sec$)	Final K (cm/sec)	Final Flux (Gal/Acre /Day)	Inflow to Outflow Ratio
6/2/2008	0	0.0	24.0	24.0	0.0	24.0	140.63	164.63							
	108	0.7	23.3	23.3	0.7	22.6	140.63	163.23	5.97E-09	1.33E-08			5.23E-9		1.00
	490	3.0	21.0	21.1	2.9	18.1	140.63	158.73	5.52E-09	1.21E-08	*		4.84E-9		1.05
	596	3.6	20.4	20.5	3.5	16.9	140.63	157.53	5.40E-09	1.16E-08	*		4.73E-9		1.00
	741	4.5	19.5	19.7	4.3	15.2	140.63	155.83	5.65E-09	1.21E-08	*		4.95E-9		1.13
6/3/2008	1069	6.4	17.6	17.7	6.3	11.3	140.63	151.93	5.83E-09	1.22E-08	*		5.11E-9		0.95
	1170	7.0	17.0	17.1	6.9	10.1	140.63	150.73	5.92E-09	1.22E-08	*		5.19E-9		1.00
	1368	8.2	15.8	16.0	8.0	7.8	140.63	148.43	5.86E-09	1.19E-08	*		5.14E-9		1.09
	1520	9.0	15.0	15.1	8.9	6.1	140.63	146.73	5.72E-09	1.15E-08	*		5.01E-9		0.89
	2020	11.9	12.1	12.3	11.7	0.4	140.63	141.03	5.98E-09	1.17E-08	*		5.24E-9		1.04
	2190	12.8	11.2	11.4	12.6	-1.4	140.63	139.23	5.70E-09	1.09E-08	*		5.00E-9		1.00
6/4/2008	2490	14.4	9.6	9.7	14.3	-4.7	140.63	135.93	6.03E-09	1.13E-08	*		5.29E-9		0.94
	2596	14.9	9.1	9.2	14.8	-5.7	140.63	134.93	5.26E-09	9.70E-09	*		4.61E-9		1.00
	2805	15.8	8.2	8.1	15.9	-7.7	140.63	132.93	5.39E-09	9.84E-09	*	**1.03E-08**	4.73E-9	950	0.82
							Final Flux	**1.0E-8**	**m^3/m^2/sec**						-1.95

Final Hydraulic Conductivity 4.9E-9 cm/s

CETCO - 92 HWY 37, Lovell, WY. 82431

Computation Sheet : GRI Accredited ASTM D-5887, Index Flux

Sample: Bentomat SDN
Lot Number: 200821LO
Roll Number: 209
Project Name: Weekly Perm

Permeability equation : ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

Flux equation : ((Inflow+Outflow)/200)/Pi*r^2/Time

Initial Thickness : 0.832 cm. **Hydration :** 48hrs **Permeant :** De-aired DI Water **Date:** 9/2/2008

Test Position : CET-L-303 **Initial Head :** 2psi 140.6 cm **Analyst :** SW **Date Started:** 5/22/2008

Cell Size : 4 in. **Max. Effective Stress :** 5psi 34.5kPa **Requested by :**

Final Thickness : 0.730 cm. *** indicates value meets Flux Ratio ASTM termination criteria**

Conversions : 1 psi

Flux (English) = Flux * 9.2366E+10

Date	Time (min)	Reading In	X	Reading Out	Y	X-Y	Head (cm)	H (cm)	Initial K (cm/sec)	Initial Flux ($m^3/m^2/sec$)		Avg Flux ($m^3/m^2/sec$)	Final K (cm/sec)	Final Flux (Gal/Acre /Day)	Inflow to Outflow Ratio
6/30/2008	0	0.0	24.0	24.0	0.0	24.0	140.63	164.63							
	100	0.7	23.3	23.3	0.7	22.6	140.63	163.23	6.42E-09	1.44E-08			5.63E-9		1.00
	237	1.6	22.4	22.4	1.6	20.8	140.63	161.43	6.08E-09	1.35E-08	*		5.34E-9		1.00
	573	3.8	20.2	20.2	3.8	16.4	140.63	157.03	6.18E-09	1.35E-08	*		5.42E-9		1.00
	683	4.6	19.4	19.4	4.6	14.8	140.63	155.43	7.00E-09	1.50E-08	*		6.14E-9		1.00
7/1/2008	1205	7.9	16.1	16.1	7.9	8.2	140.63	148.83	6.25E-09	1.30E-08	*		5.48E-9		1.00
	1351	8.8	15.2	15.3	8.7	6.5	140.63	147.13	5.91E-09	1.20E-08	*		5.19E-9		1.13
	1549	9.9	14.1	14.1	9.9	4.2	140.63	144.83	5.98E-09	1.19E-08	*		5.25E-9		0.92
	1675	10.6	13.4	13.3	10.7	2.7	140.63	143.33	6.21E-09	1.22E-08	*		5.45E-9		0.88
	2151	13.4	10.6	10.6	13.4	-2.8	140.63	137.83	6.18E-09	1.19E-08	*		5.42E-9		1.04
7/2/2008	2642	16.4	7.6	7.6	16.4	-8.8	140.63	131.83	6.81E-09	1.26E-08	*		5.98E-9		1.00
	2767	17.1	6.9	6.9	17.1	-10.2	140.63	130.43	6.42E-09	1.15E-08	*		5.63E-9		1.00
	2998	18.4	5.6	5.6	18.4	-12.8	140.63	127.83	6.55E-09	1.16E-08	*		5.75E-9		1.00
	3118	18.7	5.3	5.3	18.7	-13.4	140.63	127.23	2.95E-09	5.14E-09			2.59E-9		1.00
	3220	19.0	5.0	5.0	19.0	-14.0	140.63	126.63	3.48E-09	6.05E-09	*		3.06E-9		1.00
	3321	19.3	4.7	4.7	19.3	-14.6	140.63	126.03	3.53E-09	6.11E-09	*		3.10E-9		1.00
	3421	19.6	4.4	4.4	19.6	-15.2	140.63	125.43	3.59E-09	6.17E-09	*	**6.11E-09**	3.15E-9	564	1.00

Final Flux 6.1E-9 $m^3/m^2/sec$ -4.45

Final Hydraulic Conductivity 3.1E-9 cm/s

CETCO - 92 HWY 37, Lovell, WY. 82431

Computation Sheet : GRI Accredited ASTM D-5887, Index Flux

Sample: Bentomat SDN
Lot Number: 200822LO
Roll Number: 575
Project Name: Weekly Perm

Permeability equation : ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

Flux equation : ((Inflow+Outflow)/200)/Pi*r^2/Time

Initial Thickness : 0.832 cm. **Hydration :** 48hrs **Permeant :** De-aired DI Water **Date:** 9/2/2008

Test Position : CET-L-303 **Initial Head :** 2psi 140.6 cm. **Analyst :** SW **Date Started:** 5/30/2008

Cell Size : 4 in. **Max. Effective Stress :** 5psi 34.5kPa **Requested by :**

Final Thickness : 0.730 cm. *** indicates value meets Flux Ratio ASTM termination criteria**

Conversions : 1 psi Flux (English) = Flux * 9.2366E+10

Date	Time (min)	Reading In	X	Reading Out	Y	X-Y	Head (cm)	H (cm)	Initial K (cm/sec)	Initial Flux ($m^3/m^2/sec$)		Avg Flux ($m^3/m^2/sec$)	Final K (cm/sec)	Final Flux (Gal/Acre /Day)	Inflow to Outflow Ratio
6/30/2008	0	0.0	24.0	24.0	0.0	24.0	140.63	164.63							
	100	0.7	23.3	23.4	0.6	22.7	140.63	163.33	5.96E-09	1.34E-08			5.23E-9		1.17
	237	1.5	22.5	22.6	1.4	21.1	140.63	161.73	5.40E-09	1.20E-08	*		4.74E-9		1.00
	573	3.5	20.5	20.6	3.4	17.1	140.63	157.73	5.60E-09	1.22E-08	*		4.92E-9		1.00
	683	4.2	19.8	19.9	4.1	15.7	140.63	156.33	6.09E-09	1.31E-08	*		5.35E-9		1.00
7/1/2008	1205	7.2	16.8	16.9	7.1	9.7	140.63	150.33	5.64E-09	1.18E-08	*		4.94E-9		1.00
	1351	8.0	16.0	16.1	7.9	8.1	140.63	148.73	5.51E-09	1.13E-08	*		4.83E-9		1.00
	1549	9.1	14.9	15.1	8.9	6.0	140.63	146.63	5.40E-09	1.09E-08	*		4.74E-9		1.10
	1675	9.7	14.3	14.4	9.6	4.7	140.63	145.33	5.31E-09	1.06E-08	*		4.66E-9		0.86
	2151	12.3	11.7	11.8	12.2	-0.5	140.63	140.13	5.75E-09	1.12E-08	*		5.05E-9		1.00
7/2/2008	2642	15.0	9.0	9.0	15.0	-6.0	140.63	134.63	6.13E-09	1.15E-08	*		5.38E-9		0.96
	2767	15.7	8.3	8.4	15.6	-7.3	140.63	133.33	5.83E-09	1.07E-08	*		5.12E-9		1.17
	2998	16.9	7.1	7.2	16.8	-9.7	140.63	130.93	5.91E-09	1.07E-08	*		5.19E-9		1.00
	3118	17.2	6.8	6.9	17.1	-10.3	140.63	130.33	2.88E-09	5.14E-09			2.52E-9		1.00
	3220	17.5	6.5	6.6	17.4	-10.9	140.63	129.73	3.40E-09	6.05E-09	*		2.98E-9		1.00
	3321	17.8	6.2	6.3	17.7	-11.5	140.63	129.13	3.45E-09	6.11E-09	*		3.03E-9		1.00
	3421	18.1	5.9	6.0	18.0	-12.1	140.63	128.53	3.50E-09	6.17E-09	*	**6.11E-09**	3.07E-9	564	1.00

Final Flux 6.1E-9 $m^3/m^2/sec$ -3.02

Final Hydraulic Conductivity 3.0E-9 cm/s

CETCO - 92 HWY 37, Lovell, WY. 82431

Computation Sheet : GRI Accredited ASTM D-5887, Index Flux

Sample: Bentomat SDN
Lot Number: 200823LO
Roll Number: 890
Project Name: Weekly Perm

Permeability equation : ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

Flux equation : ((Inflow+Outflow)/200)/Pi*r^2/Time

Initial Thickness :	0.826 cm.	**Hydration :**	48hrs		**Permeant :**	De-aired DI Water	**Date:** 6/18/2008
Test Position :	CET-L-302	**Initial Head :**	2psi	140.6 cm.	**Analyst :**	SW	**Date Started:** 6/6/2008
Cell Size :	4 in.	**Max. Effective Stress :**	5psi	34.5kPa	**Requested by :**		
Final Thickness :	0.727 cm.						

*** indicates value meets Flux Ratio ASTM termination criteria**

Conversions : 1 psi

Flux (English) = Flux * 9.2366E+10

Date	Time (min)	Reading In	X	Reading Out	Y	X-Y	Head (cm)	H (cm)	Initial K (cm/sec)	Initial Flux ($m^3/m^2/sec$)		Avg Flux ($m^3/m^2/sec$)	Final K (cm/sec)	Final Flux (Gal/Acre /Day)	Inflow to Outflow Ratio
6/16/2008	0	0.0	24.0	24.0	0.0	24.0	140.63	164 63							
	168	1.0	23.0	23.2	0.8	22.2	140 63	162.83	4.88E-09	1.10E-08			4.30E-9		1.25
	274	1 5	22.5	22.7	1.3	21.2	140 63	161.83	4.34E-09	9.70E-09	*		3.82E-9		1.00
	368	2 0	22.0	22.2	1.8	20.2	140.63	160.83	4.92E-09	1.09E-08	*		4.33E-9		1 00
	505	2.7	21.3	21.5	2.5	18.8	140.63	159.43	4.76E-09	1.05E-08	*		4.19E-9		1.00
	658	3.5	20.5	20.8	3.2	17.3	140.63	157.93	4 61E-09	1.01E-08	*		4.06E-9		1.14
	789	4.3	19.7	20.1	3.9	15.8	140.63	156.43	5.44E-09	1.18E-08	*		4.78E-9		1.14
6/17/2008	1372	7 3	16.7	17.2	6.8	9.9	140 63	150.53	4.92E-09	1.04E-08	*		4.33E-9		1.03
	1497	7.9	16.1	16.6	7.4	8.7	140.63	149.33	4.78E-09	9.87E-09	*		4 21E-9		1 00
	1645	8.7	15.3	15.9	8.1	7.2	140 63	147.83	5.09E-09	1 04E-08	*		4.48E-9		1.14
	1889	10 0	14.0	14 6	9.4	4 6	140.63	145.23	5.43E-09	1.10E-08	*		4.78E-9		1 00
	2006	10.6	13.4	14 0	10.0	3.4	140.63	144.03	5.29E-09	1.05E-08	*		4.66E-9		1.00
	2100	11.0	13.0	13.6	10.4	2.6	140.63	143.23	4.42E-09	8.75E-09	*		3.89E-9		1 00
	2229	11.7	12.3	12.9	11 1	1.2	140 63	141.83	5 68E-09	1.12E-08			5.00E-9		1.00
6/18/2008	2740	14.3	9.7	10.5	13 5	-3.8	140 63	136.83	5.24E-09	1.01E-08	*		4.61E-9		1.08
	2856	14 8	9.2	10.0	14.0	-4.8	140.63	135.83	4.72E-09	8.86E-09	*		4.15E-9		1.00
	2980	15.4	8.6	9 4	14.6	-6.0	140 63	134.63	5.34E-09	9.95E-09	*	**9.62E-09**	4 70E-9	889	1 00
															-1 64

Final Flux 9.6E-9 $m^3/m^2/sec$

Final Hydraulic Conductivity 4.5E-9 cm/s

CETCO - 92 HWY 37, Lovell, WY. 82431 Computation Sheet : GRI Accredited ASTM D-5887, Index Flux

Sample: Bentomat SDN
Lot Number: 200824LO
Roll Number: 945
Project Name: Weekly Perm

Permeability equation : ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

Flux equation : ((Inflow+Outflow)/200)/Pi*r^2/Time

Initial Thickness : 0.861 cm. **Hydration :** 48hrs **Permeant :** De-aired DI Water **Date:** 9/2/2008

Test Position : CET-L-301 **Initial Head :** 2psi 140.6 cm **Analyst :** SW **Date Started:** 6/27/2008

Cell Size : 4 in. **Max. Effective Stress :** 5psi 34.5kPa **Requested by :**

Final Thickness : 0.778 cm. *** indicates value meets Flux Ratio ASTM termination criteria**

Conversions : 1 psi Flux (English) = Flux * 9.2366E+10

Date	Time (min)	Reading In	X	Reading Out	Y	X-Y	Head (cm)	H (cm)	Initial K (cm/sec)	Initial Flux (m³/m²/sec)		Avg Flux (m³/m²/sec)	Final K (cm/sec)	Final Flux (Gal/Acre /Day)	Inflow to Outflow Ratio
7/7/2008	0	0.0	24.0	24.0	0.0	24.0	140.63	164.63							
	101	0.5	23.5	23.8	0.2	23.3	140.63	163.93	3.28E-09	7.12E-09			2.97E-9		2.50
	203	0.9	23.1	23.2	0.8	22.3	140.63	162.93	4.67E-09	1.01E-08			4.22E-9		0.67
	373	1.7	22.3	22.4	1.6	20.7	140.63	161.33	4.52E-09	9.67E-09	*		4.08E-9		1.00
7/8/2008	1334	6.5	17.5	17.9	6.1	11.4	140.63	152.03	4.81E-09	9.95E-09	*		4.34E-9		1.07
	1449	7.0	17.0	17.4	6.6	10.4	140.63	151.03	4.46E-09	8.94E-09	*		4.03E-9		1.00
	1695	8.3	15.7	16.3	7.7	8.0	140.63	148.63	5.07E-09	1.00E-08	*		4.58E-9		1.18
	1815	8.8	15.2	15.7	8.3	6.9	140.63	147.53	4.82E-09	9.42E-09	*		4.35E-9		0.83
7/9/2008	2799	13.5	10.5	11.2	12.8	-2.3	140.63	138.33	5.09E-09	9.61E-09	*		4.60E-9		1.04
	2947	14.2	9.8	10.5	13.5	-3.7	140.63	136.93	5.35E-09	9.72E-09	*		4.83E-9		1.00
	3060	14.7	9.3	10.0	14.0	-4.7	140.63	135.93	5.05E-09	9.10E-09	*	**9.48E-09**	4.56E-9	875	1.00

Final Flux 9.5E-9 m^3/m^2**/sec** -1.47

Final Hydraulic Conductivity 4.7E-9 cm/s

INDEX FLUX AND PERMEABILITY OF GCL's
TEST RESULTS
ASTM D-5887 / D-5084

JLT

Client	: CETCO	Date	: 07/09/2008
Project Location	: Weekly Perm	Job No.	: 08LG1342.01
Sample Number	: Roll 1455 Lot: 200825LO	Tested By	: RL
Description	: Bentomat SDN	Checked By	: JB
Permeant Fluid	: De-Aired Water		

Physical Property Data

	Total Sample		Total Sample
Initial Clay Height (in)	0.17	Final Height of Clay (in)	0.19
Initial Diameter (in)	4.00	Final Diameter of Clay (in)	4.00
Initial Wet Weight (g)	42.30	Final Wet Weight(Clay) (g)	65.50
Wet Density (pcf)	75.37	Wet Density (pcf)	104.42
Moisture Content %	33.80	Moisture Content %	107.20
Dry Density (pcf)	56.33	Dry Density (pcf)	50.39

Test Parameters

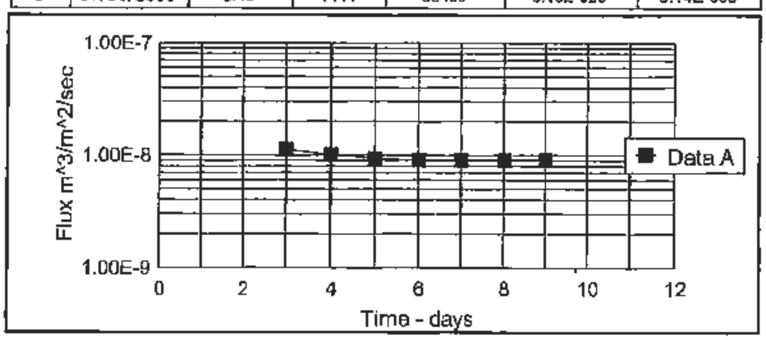
Fluid	: De-Aired Water	**Average Effective**	
Cell Pressure psi)	: 80.00	**Confining Pressure (psi)**	: 4
Head Water psi)	: 77.00	Gradient	: 290.53
Tail Water psi)	: 75.00	Effective Stress at Base	: 5

Flux and Permeability Input Data

Minimum Saturation Time is 48 hours

Area, A = 0.00811 m^2
Thickness, t = 0.19 in

Days	Date	Flow	Time	Elapsed	Flux	k
		cc	min	Time (sec)	(m^3/m^2)/sec	cm/sec
1	06/30/2008	48 hours of hydration per ASTM				
2	07/01/2008					
3	07/02/2008	7.90	1441	86460	1.13E-008	3.88E-009
4	07/03/2008	7.10	1440	86400	1.01E-008	3.49E-009
5	07/04/2008	6.60	1440	86400	9.42E-009	3.24E-009
6	07/05/2008	6.40	1442	86520	9.12E-009	3.14E-009
7	07/06/2008	6.40	1439	86340	9.14E-009	3.15E-009
8	07/07/2008	6.40	1439	86340	9.14E-009	3.15E-009
9	07/08/2008	6.40	1441	86460	9.13E-009	3.14E-009



JLT Laboratories, Inc.
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APPENDIX B
SUPPORTING AQUEOUS ANALYTICAL DATA

APPENDIX **B**.
SUPPORTING AQUEOUS ANALYTICAL DATA
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION
DUCK CREEK POWER PLANT
GMF POND
CANTON, IL

Well ID	Well Type	Date	Parameter	Result	Unit
X301	Leachate	06/09/2020	Boron, total	19.0	mg/L
X301	Leachate	11/19/2020	Boron, total	93.0	mg/L
X301	Leachate	02/24/2021	Boron, total	29.0	mg/L
X301	Leachate	04/14/2021	Boron, total	97.0	mg/L
X301	Leachate	04/29/2021	Boron, total	88.0	mg/L
X301	Leachate	05/12/2021	Boron, total	84.0	mg/L
X301	Leachate	06/01/2021	Boron, total	98.0	mg/L
X301	Leachate	07/26/2021	Boron, total	85.0	mg/L
X301	Leachate	08/12/2021	Boron, total	85.0	mg/L
X301	Leachate	11/19/2021	Boron, total	87.0	mg/L
X301	Leachate	02/21/2022	Boron, total	2.00	mg/L
X301	Leachate	05/10/2023	Boron, total	76.0	mg/L
XTPW02	Porewater	06/23/2021	Boron, total	63.0	mg/L

Notes:
mg/L = milligrams per liter

APPENDIX C
TECHNICAL MEMORANDUM: DRAFT GEOCHEMICAL ANALYSIS OF DUCK CREEK GROUNDWATER IN SUPPORT OF AN ALTERNATIVE SOURCE DEMONSTRATION (ASD)

TECHNICAL MEMORANDUM

DATE November 8, 2023

Reference No. 23RAM01-1

TO Brian G. Hennings - Ramboll
Eric Tlachac - Ramboll

CC Stu Cravens - Vistra

FROM Shannon Zahuranec, Allie Wyman, and Tom Meuzelaar

EMAIL: shannon@lifecyclegeo.com

GEOCHEMICAL ANALYSIS OF DUCK CREEK GMF POND GROUNDWATER IN SUPPORT OF AN ALTERNATE SOURCE DEMONSTRATION (ASD)

1.0 EXECUTIVE SUMMARY

This document serves as an Appendix to the November 11, 2023, Alternative Source Demonstration (ASD) for Duck Creek Power Plant (DC) Gypsum Management Facility Pond (GMF Pond) for monitoring Event 1 (E001) (referred to as the E001 ASD), completed to fulfill the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(e). Life Cycle Geo, LLC (LCG) has completed a review of geochemical conditions to evaluate the feasibility of an ASD at monitoring well G60L associated with the DC GMF Pond. Compliance well G60L monitors conditions in the Uppermost Aquifer (UA) to the east of the GMF Pond and currently exhibits pH levels lower than the groundwater protection standard (GWPS) range for pH. This technical review considered all available groundwater and solid-phase chemical analysis and empirical field observations, and utilized multivariate statistical analysis to conclude the low pH levels at G60L is due to an alternate source and is unrelated to the GMF Pond. Further, information pertaining to flow conditions, lithology, and solid-phase geochemistry are utilized to conclude that the likely source of low pH is a localized pocket of native peat identified in boring logs immediately upgradient of G60L. This scope of work was executed by subcontract to Ramboll Americas Engineering Solutions, Inc. (Ramboll) on behalf of Electric Energy Inc (EEI).

2.0 GROUNDWATER CONDITIONS

Monitoring well G60L is located on the eastern side and downgradient of the GMF Pond (Attachment 1). From 2021 through May 2023 (the period of groundwater monitoring at this well for the 35 I.A.C. § 845 monitoring program), pH at G60L is consistently lower than the GWPS (Table 1).

Table 1: Concentration Ranges for Select Constituents in Compliance Well G60L and Background Groundwater. Data in Appendix B-1

	pH	Sulfate, total (mg/L)	TDS (mg/L)
G60L	5.90-6.42	150-180	510-630
Background	6.42-7.26	ND-56	290-490

3.0 MULTIVARIATE PRINCIPAL COMPONENTS ANALYSIS

3.1 APPROACH

Groundwater chemistry data are by nature multivariate datasets given the high number of parameters observed per sampling location and date. With such a large number of variables, advanced statistical analysis of multivariate groundwater data can provide important insights into spatial and chemical relationships influencing constituent distribution and compliance in groundwater. The multivariate technique Principal Components Analysis (PCA) is used to interrogate the groundwater chemistry around the GMF Pond.

PCA is a multivariate technique that reduces dataset dimensionality to its principal, independent components thereby revealing the inner structure of the dataset. Multivariate techniques such as PCA are valuable because they identify variables that are highly dependent on each other but do not inherently provide insights into water origin, type, or evolution. As an example, calcium, magnesium, and hardness are typically highly correlated in groundwater datasets, but this relationship is known and does not provide additional insight towards the identification of water types and geochemical processes that describe water quality changes. Reducing multivariate data dimensionality reduces redundant information, revealing inner structures in the data that might otherwise be obscured by these dependencies. These structures might include revealing groups of related variables, changing chemical evolution through time, or spatial locations with similar chemical signatures.

PCA results are most easily viewed on biplots, which depict the sample population plotted on two axes, each representing a principal component. The principal components are created from a linear combination of the original variables in the dataset and variance in the data. For natural compositional datasets, the population variance can often be expressed as six or seven principal components (in some cases less and in others, more), each representing decreasing amounts of variance in the data while remaining uncorrelated to previous principal components. Typically, the first few principal components represent significant dataset variance and include a larger number of variables. The principal components are visualized using biplots with the variables expressed as vectors; the location of groups of samples relative to component vectors provides insight into geochemical relationships among groups of variables and samples.

3.2 DATA PREPARATION

In order to perform multivariate analysis, it is first necessary to prepare the dataset. Raw chemical data requires preparation prior to analysis because the data often contains values in two forms unsuitable for advanced analytics: 1) measurements reported below a method detection limit (MDL), referred to as censored data, and 2) missing values. For this work any sample or analyte with a high percentage (≥40%) of missing and/or censored data was assessed for meaningful statistical variance. If variance was determined to be low, the sample or analyte was removed, otherwise data was included in the analysis. Any remaining censored data was converted to half the MDL. Remaining missing values were imputed, a method of assigning an estimated value that accounts for the entire distribution of the material's composition (Sanford et al., 1993) and also takes into consideration the values associated with samples of similar composition. Imputation was done with a nearest neighbor algorithm and resulting values were checked against the overall data distribution for both the analyte and sample to ensure representative results. The resulting dataset includes both compliance wells and other monitoring wells, incorporates data from multiple lithologic units, and spans sampling events from 2014 through 2023. The dataset contains 15 measured analytes, including the hydrogen ion (H+), which represents acidity in groundwater and is proportional to pH. The final dataset contained 1425 values, 54 of which were imputed. This data represents both the most recent data measured at the GMF Pond as well as the most complete set of regularly measured and detectable analytes. All data used in PCA analysis is presented in Electronic Attachment 1.

PCA also requires transformation of the dataset to address the numeric closure problem inherent within chemical compositional datasets (Aitchison, 1986). Numeric closure can often occur in water quality data since water quality concentrations are not completely independent. To address this issue, all data was converted to the same units and the centered-log ratio transformation (CLR; Aitchison 1986; Egozcue et al. 2011) was applied to the prepared dataset. In practice, closure only significantly affects elements present in large concentrations (e.g., major ions in typical water quality samples), but for consistency the entire dataset (i.e., including trace metals) was CLR-transformed.

All data preparation was conducted using python programming language. Only total (i.e., unfiltered) concentrations of major ions and metals were used in this analysis as those data are both relatively complete and consistent across the wells around the GMF Pond and are the parameters of interest for regulatory purposes.

3.3 FINDINGS

A biplot for principal components 1 and 2 (PC1 and PC2) is provided in Attachment 2. PC1 explains approximately 53% of the statistical variance in the entire water quality dataset, and imposes the dominant compositional structure observed in the biplot. PC2 explains approximately 14% of the variability in the dataset.

The compositional vectors on the biplot and their position/spacing reveal the following key insights into groundwater geochemistry at the GMF Pond:

1) Groundwater samples plot along a linear trend from the upper left quadrant toward the lower left quadrant, with significant overlap between background, compliance, and monitoring wells. This suggests overall groundwater chemistry at compliance wells and monitoring wells is compositionally similar to background conditions.
2) Data from G60L plots between H+, calcium, sodium, and sulfate vectors, indicating in this case the concentrations are relatively high compared with other locations consistent with the pH exceedance at this location. Monitoring well G50L also plots between these vectors, suggesting possible compositional end members distinct from the main cluster of background and compliance wells.
3) The majority of porewater and leachate samples plot in the upper right quadrant of the biplot, near the boron, fluoride, and molybdenum vectors. These samples plot far from the groundwater samples, indicating the chemistry of the porewater and leachate is distinct from the chemistry of the groundwater. There are three leachate samples that plot away from the main body of leachate data, with one plotting in the lower right quadrant near the magnesium and chloride vectors. These three samples are (1) chemically distinct from the groundwater samples, (2) irregularly spaced in time, and (3) likely represent anomalous conditions unique to the GMF Pond. These samples are discussed further in Section 4.2.

4.0 MAJOR ION DISTRIBUTION

4.1 APPROACH

Piper diagrams are a useful way to classify water samples based on major ion chemistry. The diagrams include separate ternary anion and cation proportion plots and a central diamond plot for classifying combined cation/anion predominance for overall classification. Piper diagrams account for major ion proportionality, but not for actual concentrations nor trace element chemistry, an important contrast and complement to PCA.

The Piper diagram for the GMF Pond is provided in Attachment 3. Given the large number of sampling locations and sampling instances, the data plotted here is limited to background, leachate, and groundwater wells in the immediate vicinity of G60L over the same time period as the samples included in the PCA. This provides the clearest depiction of both the site-wide data and localized geochemistry around G60L and allows for ease of comparison to the PCA. To provide a more robust evaluation of the local geochemistry in the area of the GMF Pond and to increase the density of datapoints at wells near G60L, the groundwater wells immediately adjacent to G60L are presented as a combination of dissolved and total major ions, rather than exclusively total ions. The difference between total and dissolved major ions was determined qualitatively through comparison of values when both total and dissolved were measured. No major differences were observed, therefore when total phase data was not available, dissolved data was used in place. All data used in the Piper diagram is presented in Appendix B-2.

4.2 FINDINGS

The primary finding from the Piper diagram is that groundwater at G60L exhibits a major ion composition that is distinct from the GMF Pond leachate. The groundwater samples near G60L all have consistent cation proportions with almost equal distributions of calcium and magnesium, consistent with other compliance groundwater wells around the GMF Pond (Ramboll 2023). The leachate samples differ in that they primarily show a more magnesium-dominant signature. Similarly, the anion proportions of groundwater are distinct from leachate, particularly with respect to chloride. The groundwater samples all show low chloride proportion but exhibit a wide range of sulfate proportion. In contrast, the leachate shows a more consistent composition of anions with a substantial proportion of chloride. The chloride-rich signature of the leachate samples provides critical evidence of chemical separation between leachate and G60L groundwater. Chloride is a conservative ion with regard to groundwater transport, such that it does not tend to interact with the solid phase once dissolved into solution. Therefore, groundwater impacted by GMF Pond leachate should contain a chloride proportion similar to the leachate, or at a proportion falling along a mixing line between the groundwater and leachate. Such a mixing signal is not observed, which paired with low chloride proportion in the groundwater (Attachment 5), is strong evidence that the groundwater at G60L is not influenced by the GMF Pond. This is consistent with the PCA results, which showed both the variability in the groundwater composition and the clear distinction between groundwater and leachate.

Notable distinctions on the Piper diagram are leachate samples from Q2 2020, Q2 2022, and Q1 2023, which correspond to the anomalous leachate samples in the PCA. These samples plot between the groundwater data and the main cluster of leachate data in the cation space. These instances are irregularly spaced through time and do not have a temporal trend in concentration nor overall major ion composition. This suggests changes are not related to seasonal changes at the site but rather indicates a more random control, such as operational influences on concentrations (*e.g.*, variable proportions of porewater and surface water passing into the leachate collection system or inconsistencies in sample collection).

5.0 IDENTIFIED PROBABLE ALTERNATE SOURCE

Empirical field observations revealed a localized peat unit in boring B-55 and monitoring well P-60 (Attachment 4), both located immediately upgradient of G60L (Attachment 1). Peat-rich soils in connection with groundwater are known to produce water chemistries with lower pH and higher sulfate concentrations (Bourbonniere, 2009), such as those consistently observed at G60L (Table 1). The peat unit ranges in elevation from 593.2 to 600.6 feet (ft) mean sea level (msl), approximately the same elevation as the top of the filter pack (594.8 ft msl) and just above the elevation of the screened interval (587.4 to 592.4 ft msl) of G60L. The hydraulic conductivity of the filter pack is higher than the surrounding native material and would intercept flow from groundwater under the influence of the local peat. There is a downward vertical component to the hydraulic gradient in this area (Ramboll, 2021), which is consistent with a flow path from the peat unit downgradient horizontally and vertically towards the well screen of G60L.

Other monitoring wells near the local peat unit also exhibit higher sulfate concentrations than background and are stable over time (Attachment 5; Appendix B-1), supporting the conclusion that this region is influenced by an alternate source of sulfate, the local native peat, rather than the GMF Pond. This is particularly meaningful when considered contextually with boron and chloride concentrations, conservative tracers of CCR-related influence. Sulfate, chloride (Attachment 5), and boron (Ramboll 2023, LOE #2) are all elevated in the leachate while only sulfate is elevated above background in the groundwater. The low concentrations of boron and chloride in the groundwater at G60L are a strong indicator that sulfate concentrations originate from an alternate source unrelated to the GMF Pond.

While the local peat is the interpreted source of sulfate (and therefore TDS also), it is notable that other wells in the vicinity of G60L do not reflect the same low pH as G60L. In addition to the peat content of the aquifer solids, carbonate content also influences groundwater pH, with higher proportions of carbonate minerals calcite and dolomite present in the aquifer solids resulting in a higher, or more neutral, pH. Therefore, variation in groundwater pH is a function of variability in both peat and carbonate content in the aquifer solids. Carbonate mineralization is known to buffer against pH changes associated with peat. Solid phase mineralogy analysis including X-ray diffraction (XRD; Attachment 6) and sequential extraction (SEP; Attachment 7) data both show variable carbonate content across the site, indicating that some locations have higher pH buffering capacity than others. Aqueous alkalinity concentration, a contributor of aqueous phase pH buffering capacity, is lower at G60L than at surrounding wells (Attachment 5). These data in combination suggest the presence of peat immediately upgradient with the relatively low buffering capacity of the groundwater observed for monitoring well G60L have naturally resulted in a groundwater pH that is lower than the pH of the surrounding site groundwater.

6.0 CONCLUSIONS

This technical review presents empirical evidence and analysis that demonstrates the GMF Pond is not the source of low pH at compliance well G60L. The PCA identified a geochemical signature in the GMF Pond leachate that is different from groundwater and simultaneously demonstrates that geochemistry at G60L is far more similar to background/compliance wells than to the GMF Pond leachate. This analysis was supported by evaluation of the major ion distribution, which showed a sulfate-chloride leachate signature not evident in the groundwater. The absence of boron and chloride (both conservative tracers) from groundwater further demonstrates the GMF Pond is not impacting G60L. Soil boring logs revealed a localized pocket of native peat immediately upgradient of G60L. The combination of hydraulic gradients, aqueous and solid phase geochemistry, and empirical field observations at this location supports the conclusion that local peat is likely the source of the low pH at G60L.

7.0 ABBREVIATIONS

Alk, bicarb	Alkalinity measured as bicarbonate, also shown as HCO_3^-
As	Arsenic
ASD	Alternative Source Demonstration
B	Boron
Ba	Barium
Ca	Calcium
CCR	Coal combustion residual
Cl	Chloride
CO_3^{2-}	Carbonate ion
DC	Duck Creek
F	Fluoride
Fe	Iron
ft	feet
GMF Pond	Gypsum Management Facility Pond
GWPS	Groundwater Protection Standard
H+	Hydrogen ion, represents acidity in groundwater
HCO3	Bicarbonate alkalinity
K	Potassium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
msl	mean sea level
Na	Sodium
SO4	Sulfate
TDS	Total dissolved solids

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8.0 REFERENCES

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Sandford, R. F., C.T. Pierson, and R.A. Crovelli. 1993. An objective replacement method for censored geochemical data: Math. Geol., 25(1), p. 59–80.

PROJECT: 169000XXXX | DATED: 8/1/2023 | DESIGNER: GALARNMC

Y:\Mapping\Projects\22\2285\MXD\Alt_Source_Dem\DC_GMF\2023\2023_GMF_POND_203_asd.aprx

COMPLIANCE WELL
BACKGROUND WELL
PORE WATER WELL
CCR SOURCE WATER SAMPLE
MONITORING WELL
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 150 300 Feet

NOTES:
1. PARENTHESES INDICATES WELL NOT USED FOR CONTOURING
2.ELEVATION CONTOURS SHOWN IN FEET. NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

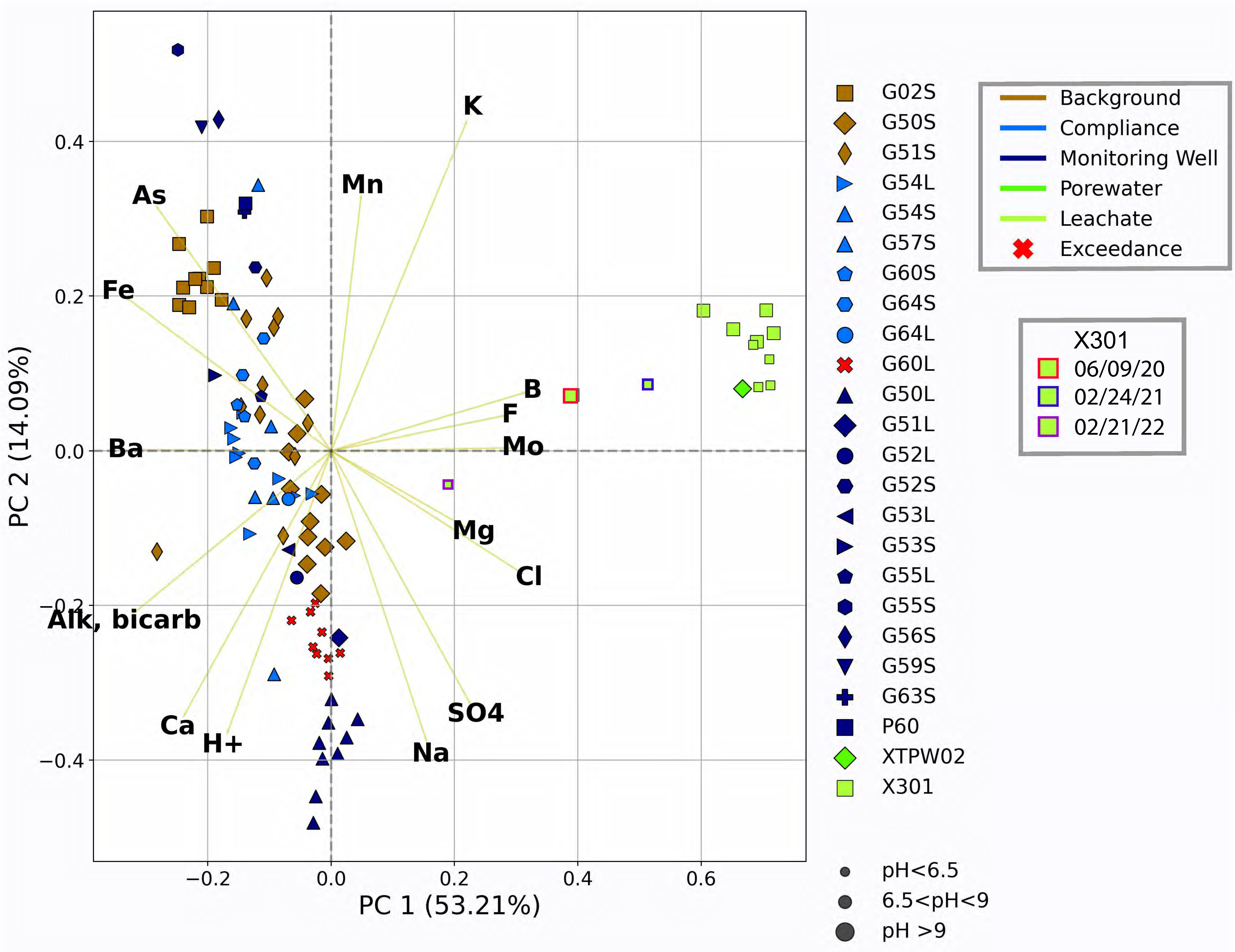
POTENTIOMETRIC SURFACE MAP
JANUARY 9 AND 16, 2023

Attachment 1

ALTERNATE SOURCE DEMONSTRATION
GMF POND (UNIT ID: 203)
DUCK CREEK POWER PLANT
CANTON, ILLINOIS

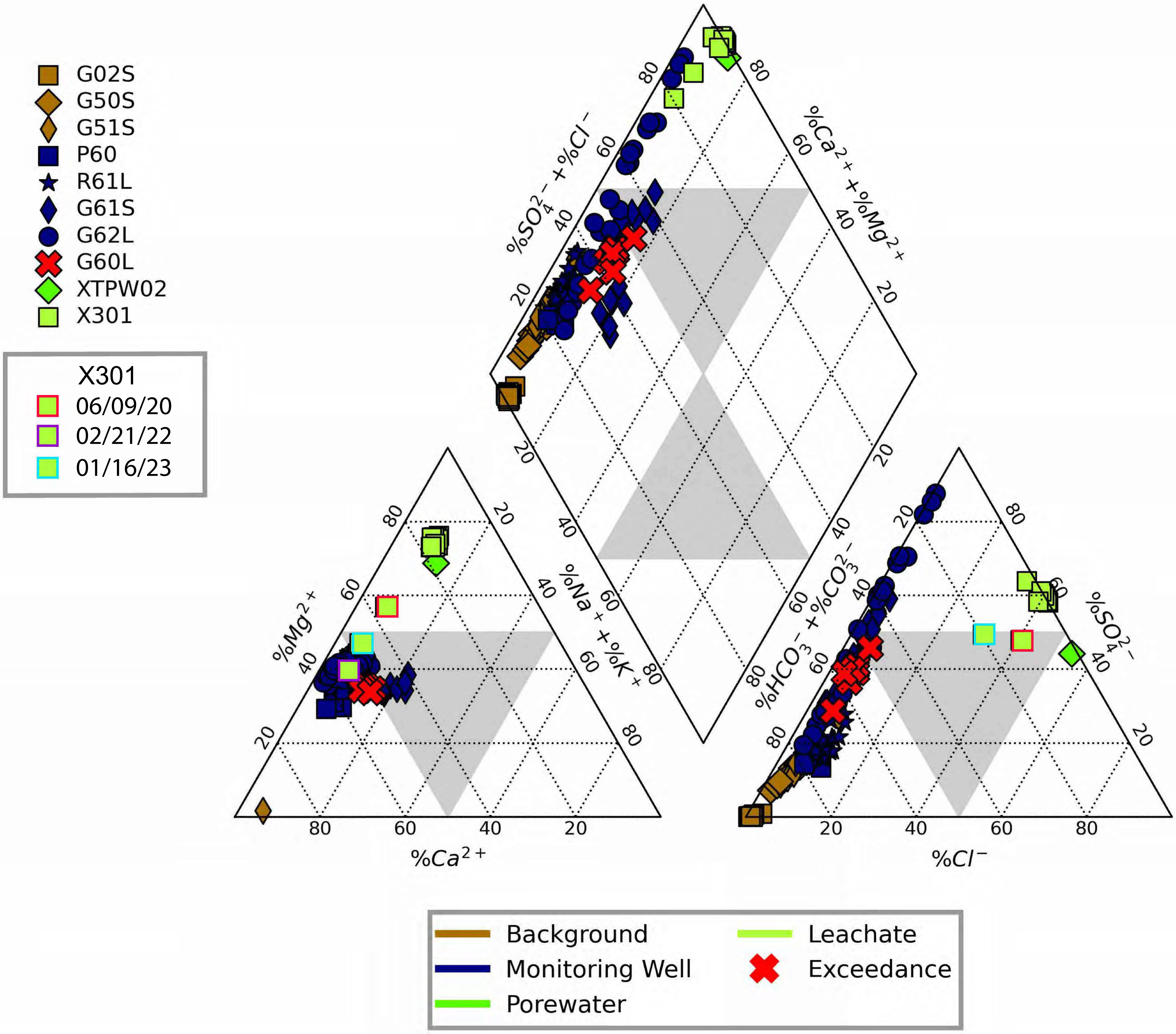
RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL



Principal Components Analysis (PCA) results for Duck Creek Gypsum Management Facility (GMF) Pond. Data is colored according to well classification and sized according to pH. See abbreviations list for complete analyte names.

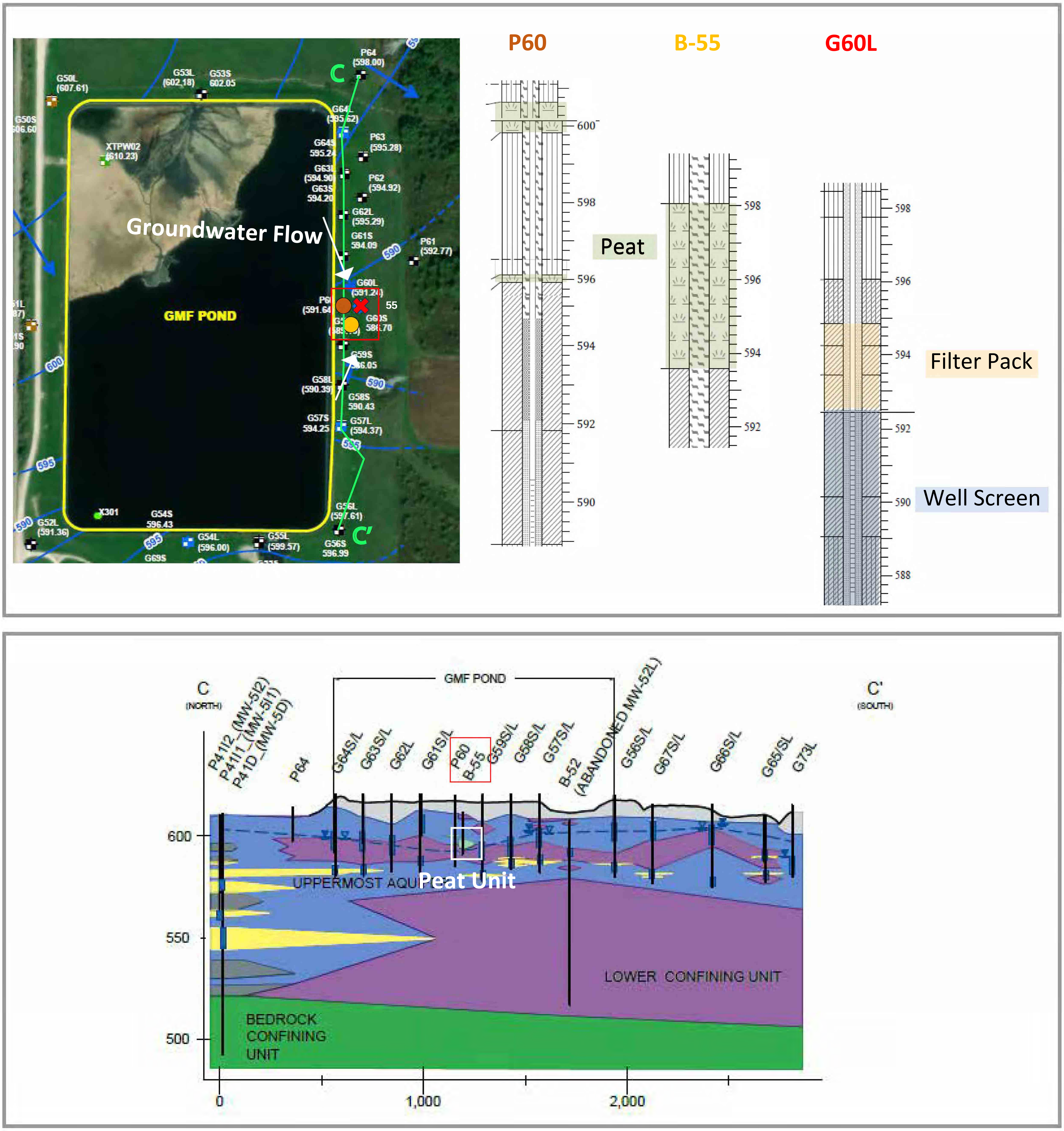
LIFECYCLEGEO	Title: Duck Creek Principal Components Analysis Results		
	Project Name: Duck Creek - GMFP ASD	Project Number: [23RAM01-1] Vistra CCR	Attachment: 2
	Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 8/01/2023	



Piper diagram depicting major ion concentrations for background, leachate, and area around G60L. Total ion concentrations were used for all wells except P60, R61L, G61S, and G62L, which are a combination of dissolved and total ions. Dissolved ions used to improve analysis of local geochemistry near G60L when total phase was not measured.

LIFECYCLEGEO

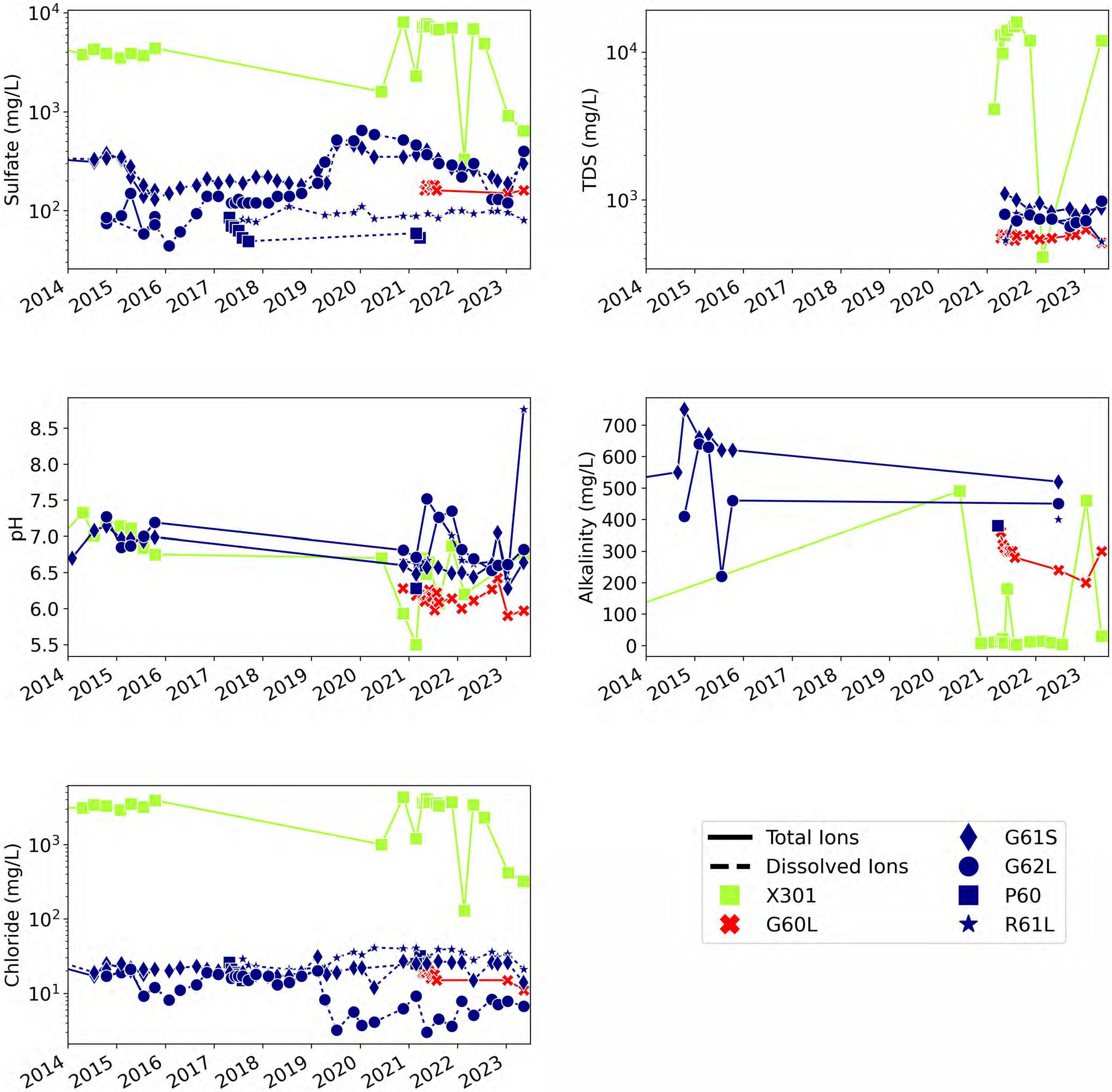
Title: Piper Diagram		Attachment: 3
Project Name: Duck Creek - GMFP ASD	Project Number: [23RAM01-1] Vistra CCR	
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 8/01/2023	



Top) Peat unit relative to filter pack and well screen of G60L. Groundwater contours from January 2023. Boring logs modifed from logs collected by Hanson. Groundwater map modified from Attachment 1. Bottom) Cross-section depicting local peat unit. Cross-section transect shown in top inset. All elevations in feet mean sea level. Cross-section modifed from Ramboll, 2021.

LIFECYCLEGEO

Title	Peat unit relative to G60L
Project Name	Duck Creek - GMFP ASD
Project Number	[23RAM01-1] Vistra CCR
Client Name	Ramboll Americas Engineering Solutions, Inc.
Date	8/02/2023
Attachment	4



Time series depicting sulfate, TDS (total dissolved solids), pH, and alkalinity as bicarbonate concentrations for leachate, G60L, and wells adjacent to G60L. Concentrations for sulfate and TDS are plotted on a log scale.

LIFECYCLEGEO

Title Geochemical Parameters Associated with Peat		Attachment 5
Project Name Duck Creek - GMFP ASD	Project Number [23RAM01-1] Vistra CCR	
Client Name Ramboll Americas Engineering Solutions, Inc.	Date 8/01/2023	

Attachment 6. X-ray diffraction results at Duck Creek Gypsum Management Pond.

Mineral/Compound	B-G52S (wt %)	B-G54L (wt %)	B-G57L (wt %)	B-G57S (wt %)	B-G62L (wt %)	B-G53S (wt %)	B-G02S (wt %)	B-G02L (wt %)
Quartz	48.4	57.6	51.2	59.9	61.7	51.1	61.1	49.2
Hornblende	3.7	1.4	2.4	-	-	-	-	-
Gypsum	-	-	-	-	-	-	-	-
Dolomite	**23.7**	**11.7**	**2.5**	**12.8**	**-**	**23.8**	**-**	**9.2**
Calcite	**6.7**	**0.8**	**0.1**	**0.3**	**-**	**4.1**	**-**	-
Albite	6.7	8.1	17.4	8.2	8.6	5.5	9.9	12.2
Chlorite	0.8	0.3	0.3	0.2	0.4	2.4	5.4	6.0
Muscovite	3.3	13.8	8.8	11.7	18.7	6.7	15.4	12.3
Rhodochrosite	3.2	-	-	-	-	-	0.4	-
Microcline	2.9	5.5	9.4	5.9	10.7	5.7	7.5	9.3
Pyrite	0.4	-	0.3	-	-	-	-	0.3
Halite	-	0.7	-	-	-	-	-	-
Montmorillonite	-	-	5.1	-	-	-	-	-
Goethite	-	-	1.1	-	-	-	-	-
Diaspore	-	-	0.3	-	-	-	-	-
Magnetite	-	-	0.4	-	-	-	-	0.4
Diopside	-	-	1.0	0.5	-	-	0.2	1.0
Actinolite	-	-	-	0.5	-	0.6	0.2	0.3

wt % - weight percent; bolded - carbonate minerals, buffers of groundwater pH

Attachment 7. Calcium sequential extraction (SEP) results at Duck Creek Gypsum Management Pond.

Calcium (mg/kg)		
Sample ID	[1] Step 2: Carbonate Phase	[2] Sum: Steps 1-7
B-G52S	18,000	90,000
B-G54L	2,300	23,000
B-G57L	730	11,000
B-G57S	3,600	39,000
B-G62L	600	3,200
B-G53S	13,000	80,000
B-G02S	210	4,900
B-G02L	2,400	24,000

[1] Step 2 represents the carbonate phase in the tested material.

[2] The sum of all seven SEP steps shows how much calcium was produced throughout testing.

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
G51S	1/12/2023	UA	Background	6.42	160	440	13.0	17.0	51.0	52.0
G02S	8/9/2021	UA	Background	6.43	420	460	2.70	--	<1.0	--
G02S	1/31/2022	UA	Background	6.60	410	400	1.90	--	<1.0	--
G02S	7/21/2022	UA	Background	6.63	440	410	1.60	--	<1.0	--
G02S	1/11/2023	UA	Background	6.63	250	490	<4.8	--	<0.18	--
G02S	5/12/2021	UA	Background	6.65	820	290	2.50	--	<1.0	--
G02S	7/12/2021	UA	Background	6.68	410	420	1.90	--	<1.0	--
G02S	6/1/2021	UA	Background	6.77	400	450	8.20	--	2.70	--
G02S	6/15/2021	UA	Background	6.80	410	390	4.00	--	2.10	--
G50S	1/12/2023	UA	Background	6.80	190	410	11.0	14.0	38.0	36.0
G02S	6/21/2021	UA	Background	6.84	400	440	3.50	--	1.10	--
G02S	5/15/2023	UA	Background	6.85	420	430	2.60	2.30	<1.0	<1.0
G50S	7/19/2022	UA	Background	6.88	310	430	13.0	--	41.0	--
G50S	1/31/2022	UA	Background	6.92	300	340	8.60	10.0	30.0	30.0
G50S	5/2/2022	UA	Background	6.93	--	310	--	9.70	--	30.0
G51S	7/20/2022	UA	Background	6.93	390	480	12.0	--	55.0	--
G02S	7/28/2021	UA	Background	6.94	410	440	1.40	--	<1.0	--
G51S	11/17/2021	UA	Background	6.95	--	370	--	15.0	--	52.0
G51S	7/12/2021	UA	Background	6.98	320	460	16.0	--	51.0	--
G51S	1/31/2022	UA	Background	7.00	310	360	17.0	13.0	52.0	54.0
G51S	8/10/2021	UA	Background	7.01	340	440	17.0	12.0	51.0	51.0
G50S	11/17/2021	UA	Background	7.03	--	370	--	12.0	--	34.0
G51S	6/15/2021	UA	Background	7.03	320	410	12.0	--	54.0	--
G50S	6/1/2021	UA	Background	7.04	300	410	12.0	--	49.0	--
G50S	8/10/2021	UA	Background	7.06	340	450	14.0	11.0	46.0	46.0
G50S	7/28/2021	UA	Background	7.07	310	390	13.0	--	46.0	--
G50S	6/21/2021	UA	Background	7.08	320	430	11.0	--	44.0	--
G50S	9/13/2022	UA	Background	7.08	--	390	--	12.0	--	45.0
G51S	7/27/2021	UA	Background	7.09	340	360	14.0	--	51.0	--
G51S	5/15/2023	UA	Background	7.12	290	430	12.0	13.0	56.0	56.0
G51S	9/13/2022	UA	Background	7.13	--	430	--	13.0	--	58.0
G51S	10/27/2022	UA	Background	7.13	--	420	--	11.0	--	52.0

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
G51S	6/21/2021	UA	Background	7.14	320	410	14.0	--	53.0	--
G50S	7/13/2021	UA	Background	7.15	300	420	13.0	--	46.0	--
G51S	5/13/2021	UA	Background	7.15	320	350	15.0	15.0	55.0	52.0
G50S	10/27/2022	UA	Background	7.16	--	340	--	9.00	--	40.0
G50S	6/10/2021	UA	Background	7.18	320	390	16.0	--	48.0	--
G51S	4/28/2022	UA	Background	7.21	--	410	--	16.0	--	59.0
G51S	6/1/2021	UA	Background	7.22	340	400	17.0	--	51.0	--
G50S	5/13/2021	UA	Background	7.25	310	380	13.0	13.0	47.0	51.0
G50S	5/15/2023	UA	Background	7.26	460	380	9.50	10.0	40.0	39.0
G50S	6/20/2022	UA	Background	--	290	--	--	--	--	--
G51S	6/20/2022	UA	Background	--	310	--	--	--	--	--
G60L	4/22/2016	UA/PMP	Exceedance	--	--	--	--	11.0	--	800
G60L	8/25/2016	UA/PMP	Exceedance	--	--	--	--	12.0	--	1200
G60L	11/7/2016	UA/PMP	Exceedance	--	--	--	--	12.0	--	1500
G60L	2/3/2017	UA/PMP	Exceedance	--	--	--	--	12.0	--	1600
G60L	4/24/2017	UA/PMP	Exceedance	--	--	--	--	--	--	--
G60L	5/11/2017	UA/PMP	Exceedance	--	--	--	--	12.0	--	2100
G60L	6/8/2017	UA/PMP	Exceedance	--	--	--	--	12.0	--	2100
G60L	7/3/2017	UA/PMP	Exceedance	--	--	--	--	12.0	--	2200
G60L	8/3/2017	UA/PMP	Exceedance	--	--	--	--	12.0	--	2200
G60L	9/15/2017	UA/PMP	Exceedance	--	--	--	--	13.0	--	2100
G60L	11/9/2017	UA/PMP	Exceedance	--	--	--	--	13.0	--	2300
G60L	1/19/2018	UA/PMP	Exceedance	--	--	--	--	14.0	--	2000
G60L	4/28/2018	UA/PMP	Exceedance	--	--	--	--	12.0	--	2300
G60L	7/18/2018	UA/PMP	Exceedance	--	--	--	--	13.0	--	2200
G60L	10/17/2018	UA/PMP	Exceedance	--	--	--	--	16.0	--	2200
G60L	2/15/2019	UA/PMP	Exceedance	--	--	--	--	19.0	--	2700
G60L	4/8/2019	UA/PMP	Exceedance	--	--	--	--	16.0	--	1900
G60L	7/19/2019	UA/PMP	Exceedance	--	--	--	--	17.0	--	1500
G60L	11/13/2019	UA/PMP	Exceedance	--	--	--	--	20.0	--	650
G60L	1/14/2020	UA/PMP	Exceedance	--	--	--	--	20.0	--	370
G60L	4/14/2020	UA/PMP	Exceedance	--	--	--	--	18.0	--	1500

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
G60L	11/17/2020	UA/PMP	Exceedance	6.28	--	--	--	18.0	--	220
G60L	2/23/2021	UA/PMP	Exceedance	6.18	--	--	--	23.0	--	190
G60L	4/14/2021	UA/PMP	Exceedance	6.20	360	550	19.0	--	<250.0	--
G60L	4/29/2021	UA/PMP	Exceedance	6.10	320	580	19.0	--	160	--
G60L	5/13/2021	UA/PMP	Exceedance	6.19	310	580	19.0	19.0	180	180
G60L	6/1/2021	UA/PMP	Exceedance	6.26	300	560	20.0	--	170	--
G60L	6/15/2021	UA/PMP	Exceedance	6.18	300	530	16.0	--	180	--
G60L	6/21/2021	UA/PMP	Exceedance	6.16	300	580	18.0	--	180	--
G60L	7/12/2021	UA/PMP	Exceedance	5.98	300	580	18.0	--	180	--
G60L	7/28/2021	UA/PMP	Exceedance	6.22	280	530	15.0	--	160	--
G60L	8/12/2021	UA/PMP	Exceedance	6.09	--	570	--	18.0	--	170
G60L	11/18/2021	UA/PMP	Exceedance	6.14	--	580	--	16.0	--	180
G60L	1/31/2022	UA/PMP	Exceedance	6.00	--	540	--	15.0	--	170
G60L	5/2/2022	UA/PMP	Exceedance	6.11	--	550	--	11.0	--	170
G60L	6/22/2022	UA/PMP	Exceedance	--	240	--	--	--	--	--
G60L	9/15/2022	UA/PMP	Exceedance	6.27	--	570	--	15.0	--	170
G60L	10/28/2022	UA/PMP	Exceedance	6.42	--	580	--	14.0	--	160
G60L	1/12/2023	UA/PMP	Exceedance	5.90	200	630	15.0	19.0	150	170
G60L	5/12/2023	UA/PMP	Exceedance	5.97	300	510	11.0	15.0	160	170
G61S	1/31/2014	UA	Other	6.70	--	--	--	--	--	--
G61S	7/16/2014	UA	Other	7.08	--	--	17.0	19.0	310	330
G61S	8/26/2014	UA	Other	--	550	--	--	--	--	--
G61S	10/15/2014	UA	Other	7.14	750	--	25.0	21.0	380	340
G61S	2/4/2015	UA	Other	6.97	660	--	22.0	25.0	330	350
G61S	4/15/2015	UA	Other	6.97	670	--	22.0	20.0	220	280
G61S	7/21/2015	UA	Other	6.93	620	--	18.0	21.0	140	180
G61S	10/13/2015	UA	Other	6.99	620	--	20.0	21.0	160	130
G61S	1/28/2016	UA	Other	--	--	--	--	20.0	--	150
G61S	4/21/2016	UA	Other	--	--	--	--	22.0	--	170
G61S	8/22/2016	UA	Other	--	--	--	--	23.0	--	180
G61S	11/8/2016	UA	Other	--	--	--	--	21.0	--	210
G61S	2/1/2017	UA	Other	--	--	--	--	20.0	--	190
G61S	4/26/2017	UA	Other	--	--	--	--	19.0	--	200

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
G61S	8/3/2017	UA	Other	--	--	--	--	19.0	--	190
G61S	11/9/2017	UA	Other	--	--	--	--	18.0	--	220
G61S	2/8/2018	UA	Other	--	--	--	--	17.0	--	220
G61S	4/18/2018	UA	Other	--	--	--	--	17.0	--	200
G61S	7/17/2018	UA	Other	--	--	--	--	17.0	--	190
G61S	10/17/2018	UA	Other	--	--	--	--	19.0	--	180
G61S	2/15/2019	UA	Other	--	--	--	--	31.0	--	250
G61S	4/24/2019	UA	Other	--	--	--	--	18.0	--	190
G61S	7/10/2019	UA	Other	--	--	--	--	19.0	--	470
G61S	11/13/2019	UA	Other	--	--	--	--	22.0	--	460
G61S	1/14/2020	UA	Other	--	--	--	--	22.0	--	430
G61S	4/14/2020	UA	Other	--	--	--	--	12.0	--	350
G61S	11/18/2020	UA	Other	6.60	--	--	--	27.0	--	350
G61S	2/23/2021	UA	Other	6.48	--	--	--	25.0	--	370
G61S	5/14/2021	UA	Other	6.57	--	1100	--	25.0	--	410
G61S	8/9/2021	UA	Other	6.57	--	1000	--	27.0	--	330
G61S	11/16/2021	UA	Other	6.49	--	850	--	26.0	--	270
G61S	1/31/2022	UA	Other	6.50	--	950	--	26.0	--	270
G61S	4/28/2022	UA	Other	6.44	--	830	--	15.0	--	260
G61S	6/21/2022	UA	Other	--	520	--	--	--	--	--
G61S	9/14/2022	UA	Other	6.61	--	870	--	26.0	--	220
G61S	10/28/2022	UA	Other	7.05	--	780	--	25.0	--	200
G61S	1/11/2023	UA	Other	6.28	--	840	--	26.0	--	190
G61S	5/9/2023	UA	Other	6.64	--	880	--	14.0	--	300
G62L	10/15/2014	UA/PMP	Other	7.27	410	--	17.0	17.0	74.0	85.0
G62L	2/4/2015	UA/PMP	Other	6.85	640	--	19.0	--	89.0	--
G62L	4/15/2015	UA/PMP	Other	6.87	630	--	20.0	21.0	150	--
G62L	7/22/2015	UA/PMP	Other	7.00	220	--	9.20	9.20	57.0	58.0
G62L	10/13/2015	UA/PMP	Other	7.19	460	--	12.0	12.0	87.0	72.0
G62L	1/28/2016	UA/PMP	Other	--	--	--	--	8.10	--	44.0
G62L	4/21/2016	UA/PMP	Other	--	--	--	--	11.0	--	61.0
G62L	8/22/2016	UA/PMP	Other	--	--	--	--	13.0	--	93.0
G62L	11/8/2016	UA/PMP	Other	--	--	--	--	19.0	--	140

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
G62L	2/1/2017	UA/PMP	Other	--	--	--	--	18.0	--	140
G62L	4/25/2017	UA/PMP	Other	--	--	--	--	--	--	--
G62L	5/11/2017	UA/PMP	Other	--	--	--	--	16.0	--	120
G62L	6/8/2017	UA/PMP	Other	--	--	--	--	17.0	--	120
G62L	7/3/2017	UA/PMP	Other	--	--	--	--	17.0	--	130
G62L	8/3/2017	UA/PMP	Other	--	--	--	--	17.0	--	120
G62L	9/14/2017	UA/PMP	Other	--	--	--	--	15.0	--	120
G62L	11/9/2017	UA/PMP	Other	--	--	--	--	18.0	--	120
G62L	2/12/2018	UA/PMP	Other	--	--	--	--	17.0	--	120
G62L	4/19/2018	UA/PMP	Other	--	--	--	--	13.0	--	140
G62L	7/18/2018	UA/PMP	Other	--	--	--	--	14.0	--	140
G62L	10/19/2018	UA/PMP	Other	--	--	--	--	17.0	--	150
G62L	2/15/2019	UA/PMP	Other	--	--	--	--	20.0	--	190
G62L	4/10/2019	UA/PMP	Other	--	--	--	--	8.20	--	310
G62L	7/9/2019	UA/PMP	Other	--	--	--	--	3.20	--	520
G62L	11/13/2019	UA/PMP	Other	--	--	--	--	5.60	--	510
G62L	1/14/2020	UA/PMP	Other	--	--	--	--	3.70	--	650
G62L	4/16/2020	UA/PMP	Other	--	--	--	--	4.10	--	590
G62L	11/18/2020	UA/PMP	Other	6.81	--	--	--	6.20	--	520
G62L	2/24/2021	UA/PMP	Other	6.71	--	--	--	9.20	--	460
G62L	5/14/2021	UA/PMP	Other	7.52	--	800	--	3.00	--	370
G62L	8/12/2021	UA/PMP	Other	7.26	--	720	--	4.50	--	300
G62L	11/18/2021	UA/PMP	Other	7.35	--	790	--	3.60	--	290
G62L	1/31/2022	UA/PMP	Other	6.82	--	740	--	7.80	--	220
G62L	5/2/2022	UA/PMP	Other	6.69	--	740	--	5.10	--	300
G62L	6/20/2022	UA/PMP	Other	--	450	--	--	--	--	--
G62L	9/15/2022	UA/PMP	Other	6.53	--	660	--	8.30	--	130
G62L	10/31/2022	UA/PMP	Other	6.60	--	700	--	7.10	--	130
G62L	1/12/2023	UA/PMP	Other	6.61	--	720	--	7.80	--	120
G62L	5/11/2023	UA/PMP	Other	6.82	--	980	--	6.70	--	400
P60	4/24/2017	UA/PMP	Other	--	--	--	--	26.0	--	85.0
P60	5/11/2017	UA/PMP	Other	--	--	--	--	21.0	--	70.0
P60	6/8/2017	UA/PMP	Other	--	--	--	--	19.0	--	68.0

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
P60	7/3/2017	UA/PMP	Other	--	--	--	--	18.0	--	63.0
P60	8/2/2017	UA/PMP	Other	--	--	--	--	15.0	--	53.0
P60	9/14/2017	UA/PMP	Other	--	--	--	--	16.0	--	49.0
P60	2/24/2021	UA/PMP	Other	6.28	--	--	--	25.0	--	59.0
P60	3/24/2021	UA/PMP	Other	6.60	380	--	32.0	--	53.0	--
R61L	8/3/2017	PMP	Other	--	--	--	--	29.0	--	82.0
R61L	9/14/2017	PMP	Other	--	--	--	--	24.0	--	80.0
R61L	11/9/2017	PMP	Other	--	--	--	--	23.0	--	77.0
R61L	7/17/2018	PMP	Other	--	--	--	--	21.0	--	110.0
R61L	4/10/2019	PMP	Other	--	--	--	--	22.0	--	90.0
R61L	7/9/2019	PMP	Other	--	--	--	--	30.0	--	93.0
R61L	11/13/2019	PMP	Other	--	--	--	--	36.0	--	96.0
R61L	1/14/2020	PMP	Other	--	--	--	--	33.0	--	110
R61L	4/16/2020	PMP	Other	--	--	--	--	41.0	--	83.0
R61L	11/18/2020	PMP	Other	6.67	--	--	--	40.0	--	88.0
R61L	2/23/2021	PMP	Other	6.61	--	--	--	41.0	--	88.0
R61L	5/21/2021	PMP	Other	6.67	--	530	--	30.0	--	93.0
R61L	8/9/2021	PMP	Other	7.29	--	810	--	39.0	--	84.0
R61L	11/16/2021	PMP	Other	7.01	--	770	--	39.0	--	100
R61L	1/31/2022	PMP	Other	6.67	--	730	--	36.0	--	100
R61L	5/2/2022	PMP	Other	6.62	--	710	--	28.0	--	93.0
R61L	6/21/2022	PMP	Other	--	400	--	--	--	--	--
R61L	9/14/2022	PMP	Other	6.65	--	730	--	36.0	--	99.0
R61L	10/28/2022	PMP	Other	7.04	--	720	--	31.0	--	99.0
R61L	1/12/2023	PMP	Other	6.40	--	710	--	34.0	--	96.0
R61L	5/11/2023	PMP	Other	8.76	--	520	--	21.0	--	80.0
X301	4/22/2014	S	Leachate	7.33	--	--	3100	3100	3800	3800
X301	7/15/2014	S	Leachate	7.01	--	--	3400	3300	4300	4100
X301	10/14/2014	S	Leachate	7.24	--	--	3300	3400	3900	4100
X301	1/30/2015	S	Leachate	7.14	--	--	2900	2800	3500	3500
X301	4/17/2015	S	Leachate	7.11	--	--	3500	3500	3900	3900
X301	7/21/2015	S	Leachate	6.84	--	--	3200	3200	3700	3700
X301	10/15/2015	S	Leachate	6.75	--	--	3900	3700	4400	4200

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Well	Date	HSU	Well Type	pH (field) (SU)	Alkalinity, bicarbonate (mg/L)	Total Dissolved Solids (mg/L)	Chloride, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, total (mg/L)	Sulfate, dissolved (mg/L)
X301	2/1/2016	S	Leachate	--	--	--	--	3600	--	4100
X301	4/19/2016	S	Leachate	--	--	--	--	3700	--	4000
X301	8/16/2016	S	Leachate	--	--	--	--	3800	--	4500
X301	10/22/2016	S	Leachate	--	--	--	--	2600	--	3300
X301	1/20/2017	S	Leachate	--	--	--	--	3300	--	4200
X301	4/5/2017	S	Leachate	--	--	--	--	3700	--	4600
X301	8/14/2017	S	Leachate	--	--	--	--	4000	--	5300
X301	10/6/2017	S	Leachate	--	--	--	--	4000	--	5600
X301	1/8/2018	S	Leachate	--	--	--	--	4000	--	6600
X301	4/20/2018	S	Leachate	--	--	--	--	4400	--	7300
X301	10/10/2018	S	Leachate	--	--	--	--	3600	--	5700
X301	1/8/2019	S	Leachate	--	--	--	--	4500	--	7200
X301	4/10/2019	S	Leachate	--	--	--	--	4100	--	7100
X301	11/15/2019	S	Leachate	--	--	--	--	4600	--	8200
X301	4/16/2020	S	Leachate	--	--	--	--	4200	--	7900
X301	6/9/2020	S	Leachate	6.70	490	--	1000	--	1600	--
X301	11/19/2020	S	Leachate	5.93	7.50	--	4300	4100	8100	7600
X301	2/24/2021	S	Leachate	5.50	10.0	4100	1200	690	2300	1300
X301	4/14/2021	S	Leachate	6.70	12.0	13000	3700	--	7300	--
X301	4/29/2021	S	Leachate	6.60	22.0	9800	3600	--	7200	--
X301	5/12/2021	S	Leachate	6.48	8.00	13000	4100	4500	7700	7700
X301	6/1/2021	S	Leachate	6.64	180	14000	3700	--	7300	--
X301	6/10/2021	S	Leachate	--	--	--	--	--	--	--
X301	7/26/2021	S	Leachate	6.22	3.50	15000	3600	--	6900	--
X301	8/12/2021	S	Leachate	6.07	3.00	16000	3300	3700	6800	7200
X301	11/19/2021	S	Leachate	6.87	12.0	12000	3700	3700	7100	7100
X301	2/21/2022	S	Leachate	6.20	14.0	410	130	140	330	430
X301	4/28/2022	S	Leachate	--	9.00	--	3400	--	6900	--
X301	7/20/2022	S	Leachate	--	4.00	--	2300	--	4900	--
X301	1/16/2023	S	Leachate	--	460	--	420	--	910	--
X301	5/10/2023	S	Leachate	6.76	30.0	12000	320	3200	640	6400

Appendix B-1. Supporting analytical data for Attachment 5 and inline Table 1

Notes:
mg/L = milligrams per liter
SU= standard units
< = less than analytical detection limit; data not included in Attachment 3 and 4 analyses.
-- = data not measured
Table 1: Background wells are G02S, G50S, and G51S. Data from these wells determined the range for pH, TDS, and total sulfate in Table 1.
Data from 2021 through May 2023 for G60L was used for Table 1
Attachment 5: Data from G60L, G61S, G62L, P60, R61L, and X301 were used for Attachment 5.
HSU = hydrostratigraphic unit
CCR = coal combustion residual
UA = uppermost aquifer
PMP = potential migration pathway
S= source water
DC= Duck Creek

Appendix B-2. Supporting groundwater analytical data for Attachment 3

Well	Date	Well Type	pH (field) (SU)	Alkalinity as bicarbonate (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)
G02S	6/28/2017	Background	6.8	440	89	2.6	35	0.77	14	0.50
G02S	2/19/2021	Background	6.5	410	95	2.6	37	0.97	14	0.50
G02S	4/14/2021	Background	6.7	440	89	2.3	34	0.73	14	0.50
G02S	4/29/2021	Background	6.8	410	96	1.6	36	0.70	15	0.50
G02S	5/12/2021	Background	6.65	820	96	2.5	36	0.61	15	0.50
G02S	6/1/2021	Background	6.77	400	94	8.2	36	0.65	14	2.7
G02S	6/15/2021	Background	6.8	410	100	4.0	38	0.83	15	2.1
G02S	6/21/2021	Background	6.84	400	98	3.5	38	0.74	13	1.1
G02S	7/12/2021	Background	6.68	410	96	1.9	37	0.67	12	0.50
G02S	7/28/2021	Background	6.94	410	99	1.4	38	1.1	14	0.50
G02S	8/9/2021	Background	6.43	420	95	2.7	37	0.69	14	0.50
G02S	1/31/2022	Background	6.6	410	94	1.9	36	1.2	14	0.50
G02S	7/21/2022	Background	6.63	440	100	1.6	39	0.71	13	0.50
G02S	1/11/2023	Background	6.63	250	97	2.4	36	1.0	14	0.09
G50S	1/22/2014	Background	7.35	350	85	4.8	36	0.47	7.6	22
G50S	6/28/2017	Background	7.1	340	75	6.6	37	0.51	7.8	26
G50S	1/13/2020	Background	6.93	330	97	8.6	38	0.44	9.0	30
G50S	8/10/2020	Background	6.82	300	91	8.5	36	0.41	9.8	38
G50S	2/19/2021	Background	7	320	95	12	41	1.0	9.4	41
G50S	4/14/2021	Background	7.2	340	88	15	36	0.43	11	52
G50S	4/29/2021	Background	7.1	290	98	14	39	0.46	11	50
G50S	5/13/2021	Background	7.25	310	95	13	40	0.60	11	47
G50S	6/1/2021	Background	7.04	300	93	12	38	0.40	11	49
G50S	6/10/2021	Background	7.18	320	93	16	37	0.40	10	48
G50S	6/21/2021	Background	7.08	320	94	11	39	0.32	9.6	44
G50S	7/13/2021	Background	7.15	300	92	13	39	0.56	10	46
G50S	7/28/2021	Background	7.07	310	95	13	38	0.33	9.9	46
G50S	8/10/2021	Background	7.06	340	98	14	38	0.74	13	46
G50S	1/31/2022	Background	6.92	300	86	8.6	35	0.61	6.9	30
G50S	7/19/2022	Background	6.88	310	91	13	37	0.28	8.9	41
G51S	1/22/2014	Background	7.12	360	98	11	41	1.0	8.8	35

Appendix B-2. Supporting groundwater analytical data for Attachment 3

Well	Date	Well Type	pH (field) (SU)	Alkalinity as bicarbonate (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)
G51S	6/28/2017	Background	6.8	370	82	14	39	0.48	7.0	41
G51S	1/14/2020	Background	7.08	340	100	13	41	0.55	8.0	53
G51S	8/10/2020	Background	6.88	330	99	8.2	40	0.39	7.4	26
G51S	2/19/2021	Background	7.2	340	100	19	43	1.1	6.9	52
G51S	4/14/2021	Background	7.1	350	88	14	38	0.62	7.3	51
G51S	4/29/2021	Background	7.1	310	100	15	44	0.91	7.6	51
G51S	5/13/2021	Background	7.15	320	94	15	41	0.29	7.6	55
G51S	6/1/2021	Background	7.22	340	94	17	41	0.42	7.5	51
G51S	6/15/2021	Background	7.03	320	110	12	1.2	0.05	7.9	54
G51S	6/21/2021	Background	7.14	320	96	14	41	0.32	7.2	53
G51S	7/12/2021	Background	6.98	320	95	16	41	0.44	6.7	51
G51S	7/27/2021	Background	7.09	340	85	14	36	0.27	6.5	51
G51S	8/10/2021	Background	7.01	340	100	17	46	0.86	8.8	51
G51S	1/31/2022	Background	7	310	100	17	42	1.2	6.5	52
G51S	7/20/2022	Background	6.93	390	100	12	42	0.34	6.9	55
G51S	1/12/2023	Background	6.42	160	94	13	39	0.56	7.5	51
G02S	5/15/2023	Background	6.85	420	96	2.6	37	0.70	14	0.50
G50S	5/15/2023	Background	7.26	460	90	9.5	37	0.35	9.0	40
G51S	5/15/2023	Background	7.12	290	98	12	41	0.29	7.3	56
P60	3/24/2021	Other	6.6	380	150	32	75	3.0	22	53
P60	4/24/2017	Other	--	480	140	26	42	4.5	25	85
P60	5/11/2017	Other	--	440	130	21	40	2.9	17	70
P60	6/8/2017	Other	--	420	120	19	44	2.1	20	68
P60	7/3/2017	Other	--	400	130	18	36	2.0	15	63
P60	8/2/2017	Other	--	320	90	15	37	0.94	12	53
P60	9/14/2017	Other	--	340	90	16	36	0.75	11	49
R61L	8/3/2017	Other	--	340	130	29	45	2.2	12	82
R61L	9/14/2017	Other	--	360	95	24	46	1.2	9.7	80
R61L	11/9/2017	Other	--	380	110	23	51	0.91	8.2	77
R61L	7/17/2018	Other	--	360	78	21	46	0.61	12	110
R61L	4/10/2019	Other	--	260	100	22	47	0.55	7.7	90

Appendix B-2. Supporting groundwater analytical data for Attachment 3

Well	Date	Well Type	pH (field) (SU)	Alkalinity as bicarbonate (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)
R61L	7/9/2019	Other	--	380	130	30	62	0.58	16	93
R61L	11/13/2019	Other	--	380	120	36	54	0.45	9.8	96
R61L	1/14/2020	Other	--	350	130	33	59	0.48	9.7	110
R61L	4/16/2020	Other	--	490	140	41	66	0.31	15	83
R61L	11/18/2020	Other	6.67	450	140	40	72	0.42	15	88
R61L	2/23/2021	Other	6.61	440	140	41	61	0.40	12	88
R61L	5/21/2021	Other	6.67	450	140	30	73	0.36	15	93
R61L	8/9/2021	Other	7.29	500	140	39	74	0.35	23	84
R61L	11/16/2021	Other	7.01	510	160	39	80	0.36	19	100
R61L	1/31/2022	Other	6.67	560	150	36	79	0.39	15	100
R61L	5/2/2022	Other	6.62	490	140	28	71	0.32	16	93
R61L	5/11/2023	Other	8.76	350	110	21	58	0.31	17	80
G61S	8/3/2017	Other	--	440	150	19	71	0.85	70	190
G61S	11/9/2017	Other	--	620	140	18	68	0.76	85	220
G61S	2/8/2018	Other	--	600	140	17	66	0.84	74	220
G61S	4/18/2018	Other	--	540	110	17	64	0.80	67	200
G61S	7/17/2018	Other	--	390	120	17	63	0.86	71	190
G61S	10/17/2018	Other	--	510	160	19	68	0.82	65	180
G61S	2/15/2019	Other	--	510	150	31	63	0.79	65	250
G61S	4/24/2019	Other	--	440	150	18	64	0.78	64	190
G61S	7/10/2019	Other	--	440	190	19	81	0.92	78	470
G61S	11/13/2019	Other	--	440	190	22	78	0.80	59	460
G61S	1/14/2020	Other	--	340	210	22	86	0.89	65	430
G61S	4/14/2020	Other	--	380	160	12	72	0.61	48	350
G61S	11/18/2020	Other	6.6	540	190	27	87	0.68	50	350
G61S	2/23/2021	Other	6.48	480	200	25	80	0.70	46	370
G61S	5/14/2021	Other	6.57	460	200	25	88	0.69	50	410
G61S	8/9/2021	Other	6.57	460	180	27	82	0.61	42	330
G61S	11/16/2021	Other	6.49	440	170	26	75	0.61	40	270
G61S	1/31/2022	Other	6.5	410	170	26	76	0.67	40	270
G61S	4/28/2022	Other	6.44	400	140	15	66	0.51	33	260

Appendix B-2. Supporting groundwater analytical data for Attachment 3

Well	Date	Well Type	pH (field) (SU)	Alkalinity as bicarbonate (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)
G61S	5/9/2023	Other	6.64	380	160	14	65	0.63	33	300
G62L	5/11/2017	Other	--	220	160	16	76	0.55	22	120
G62L	6/8/2017	Other	--	310	180	17	79	0.54	28	120
G62L	7/3/2017	Other	--	300	170	17	86	0.57	31	130
G62L	8/3/2017	Other	--	380	170	17	89	0.48	35	120
G62L	9/14/2017	Other	--	440	160	15	87	0.53	36	120
G62L	11/9/2017	Other	--	500	170	18	86	0.64	38	120
G62L	2/12/2018	Other	--	600	160	17	83	0.84	43	120
G62L	4/19/2018	Other	--	220	88	13	49	0.31	18	140
G62L	7/18/2018	Other	--	440	150	14	77	0.62	32	140
G62L	10/19/2018	Other	--	450	180	17	89	0.51	35	150
G62L	2/15/2019	Other	--	250	110	20	51	0.39	19	190
G62L	4/10/2019	Other	--	150	130	8.2	63	0.39	14	310
G62L	7/9/2019	Other	--	140	180	3.2	76	0.40	9.1	520
G62L	11/13/2019	Other	--	420	190	5.6	79	0.36	15	510
G62L	1/14/2020	Other	--	110	210	3.7	76	0.31	9.7	650
G62L	4/16/2020	Other	--	120	210	4.1	82	0.26	9.5	590
G62L	11/18/2020	Other	6.81	290	190	6.2	88	0.37	14	520
G62L	2/24/2021	Other	6.71	380	190	9.2	83	0.43	15	460
G62L	5/14/2021	Other	7.52	190	150	3.0	65	0.44	10	370
G62L	8/12/2021	Other	7.26	220	140	4.5	55	0.33	8.3	300
G62L	11/18/2021	Other	7.35	350	160	3.6	68	0.49	14	290
G62L	1/31/2022	Other	6.82	360	150	7.8	67	0.40	12	220
G62L	5/2/2022	Other	6.69	260	130	5.1	55	0.34	8.8	300
G62L	5/11/2023	Other	6.82	310	170	6.7	75	0.43	10	400
G60L	4/14/2021	Exceedance	6.2	360	110	19	46	0.45	29	125
G60L	4/29/2021	Exceedance	6.1	320	120	19	49	0.39	31	160
G60L	5/13/2021	Exceedance	6.19	310	110	19	46	0.38	30	180
G60L	6/1/2021	Exceedance	6.26	300	110	20	46	0.41	30	170
G60L	6/15/2021	Exceedance	6.18	300	110	16	46	0.33	32	180
G60L	6/21/2021	Exceedance	6.16	300	110	18	45	0.29	29	180

Appendix B-2. Supporting groundwater analytical data for Attachment 3

Well	Date	Well Type	pH (field) (SU)	Alkalinity as bicarbonate (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfate (mg/L)
G60L	7/12/2021	Exceedance	5.98	300	110	18	45	0.27	30	180
G60L	7/28/2021	Exceedance	6.22	280	110	15	43	0.39	29	160
G60L	1/12/2023	Exceedance	5.9	200	110	15	46	0.70	38	150
G60L	5/12/2023	Exceedance	5.97	300	100	11	40	0.33	33	160
XTPW02	6/23/2021	Porewater	6.6	180	750	3900	1700	56	570	4300
X301	6/9/2020	Leachate	6.7	490	420	1000	400	12	85	1600
X301	11/19/2020	Leachate	5.93	7.5	580	4300	1900	62	430	8100
X301	2/24/2021	Leachate	5.5	10	180	1200	470	18	110	2300
X301	4/14/2021	Leachate	6.7	12	580	3700	1800	65	390	7300
X301	4/29/2021	Leachate	6.6	22	560	3600	1700	55	400	7200
X301	5/12/2021	Leachate	6.48	8.0	560	4100	1600	56	410	7700
X301	6/1/2021	Leachate	6.64	180	550	3700	1700	57	400	7300
X301	7/26/2021	Leachate	6.22	3.5	600	3600	1800	53	370	6900
X301	8/12/2021	Leachate	6.07	3.0	630	3300	1700	61	420	6800
X301	11/19/2021	Leachate	6.87	12	590	3700	1700	48	330	7100
X301	2/21/2022	Leachate	6.2	14	88	130	39	2.7	11	330
X301	4/28/2022	Leachate	--	9.0	570	3400	1600	56	380	6900
X301	7/20/2022	Leachate	--	4.0	630	2300	1600	54	360	4900
X301	1/16/2023	Leachate	--	460	430	420	260	7.3	56	910
X301	5/10/2023	Leachate	6.76	30	580	320	1500	50	340	640

Notes:

mg/L = milligrams per liter

SU= standard units

< = less than analytical detection limit; data not included in Attachment 3.

-- = data not measured

FIELD BORING LOG

HANSON

CLIENT: Ameren
Site: Gypsum Stack
Location: Duck Creek Generating Station
Project: 03S5010
DATES: Start: 4/1/407
Finish: 4/4/2007
WEATHER: Overcast, cool

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 3¼" hollow stem auger w/split spoon sampler
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: B-55
Well ID: hole abandoned
Surface Elev: 611.07 ft. MSL
Completion: 20.00 ft. BGS
Station: 15,438.7N
987.3E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Banner
Township: Banner
Section 18, **Tier** 6N; **Range** 5E

WATER LEVEL INFORMATION:
▼ = 13.00 - during drilling
▽ =
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
							0–0.5	Dark brown, clayey TOPSOIL (OL)		
1A	15/18 *83%*	SS	*2-3 3* N=6	29		1.75 *B*	0.5–3	Brown-gray, silty CLAY, trace sand (CL)		
2A	16/18 *89%*	SS	*3-4 5* N=9	22		0.78 *BSh*	3–8	Brown-gray, clayey SILT, trace sand (ML)		
3A	16/18 *89%*	SS	*3-4 4* N=8	26						
4A	15/18 *83%*	SS	*3-4 5* N=9	26		1.94 *BSh*	8–13	Gray-brown, clayey SILT, trace sand (ML)		
5A	18/18 *100%*	SS	*2-3 4* N=7	33		1.32 *B*	13–17.5	Black, PEAT (PT)		
6A	18/18 *100%*	SS	*3-4 5* N=9	20		1.16 *BSh*	17.5–20	Gray, silty CLAY, trace sand and gravel (CL)		

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. Elevation scale: 610, 608, 606, 604, 602, 600, 598, 596, 594, 592.

End of Boring = 20.0 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Ameren Energy Resources Generating Co.
Site: Duck Creek Gypsum Managment Facility
Location: Canton, Fulton Co., Illinois
Project: 03S5010
DATES: Start: 1/17/2008
Finish: 1/17/2008
WEATHER: Overcast, windy, cold

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" hollow stem auger - blind drilled within 5 ft of BG60
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: ~~BG60b~~
Well ID: G60L
Surface Elev: 612.5 ft. MSL
Completion: 25.3 ft. BGS
Station: 15,474.74N
1,049.75E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Banner
Township: Banner
Section 18, **Tier** 6N; **Range** 5E

WATER LEVEL INFORMATION:
▼ = 30.60 - during drilling
▼ = 21.02 - 1/30/2008
▽ =

SAMPLE: Number	Recov / Total (in) % Recovery	Type	TESTING: Blows / 6 in N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							0–0.8	Dark yellow brown (10YR3/4), slightly moist, silty CLAY, trace sand		612	
							0.8–2	Light gray (10YR7/2) with 40% brown yellow (10YR6/8) mottles, moist, silty CLAY, trace sand			
							2–4.3	Brown yellow (10YR6/8) with 40% light gray (10YR7/2) mottles, moist, clayey SILT, trace sand		610	
							4.3–4.8	Yellow brown (10YR5/8), moist, clayey SILT, trace sand		608	
							4.8–8	Light yellow brown (10YR6/4) with 30% brown yellow (10YR6/8) mottles, moist, clayey SILT, trace sand		606	
							8–10	Yellow brown (10YR5/8) with 20% light yellow brown (10YR6/4) mottles, moist, clayey SILT, trace sand		604	
							10–12.2	Light brown gray (10YR6/2) with 10% brown yellow (10YR6/8) mottles, very moist, clayey SILT, trace sand		602	
							12.2–14	Gray brown (10YR5/2) with 30% very dark gray brown (10YR3/2) mottles, moist, clayey SILT, trace sand		600	
							14–14.7	Dark gray (10YR4/1), moist, clayey SILT, trace sand		598	
							14.7–16.4	Dark gray (10YR4/1) with 10% very dark gray (10YR3/1) mottles, moist, clayey SILT, trace sand		596	
							16.4–17.6	Black (10YR2/1), moist, very silty CLAY, trace sand			
							17.6–18.2	Dark gray (10YR4/1), moist, silty CLAY, trace sand			
							18.2–19	Dark green gray (10Y4/1) with 5% very dark gray (10YR3/1) mottles, moist, silty CLAY, trace sand, trace organics		594	
							19–20	Dark green gray (10Y4/1) moist, silty CLAY, trace sand and gravel			

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Ameren Energy Resources Generating Co.
Site: Duck Creek Gypsum Managment Facility
Location: Canton, Fulton Co., Illinois
Project: 03S5010
DATES: Start: 1/17/2008
Finish: 1/17/2008
WEATHER: Overcast, windy, cold

CONTRACTOR: Testing Service Corporation
Rig mfg/model: CME-650 Track Rig
Drilling Method: 4¼" hollow stem auger - blind drilled within 5 ft of BG60
FIELD STAFF: Driller: B. Williamson
Helper: R. Keedy
Eng/Geo: R. Hasenyager

BOREHOLE ID: BG60b
Well ID: G60L
Surface Elev: 612.5 ft. MSL
Completion: 25.3 ft. BGS
Station: 15,474.74N 1,049.75E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Banner
Township: Banner
Section 18, **Tier** 6N; **Range** 5E

WATER LEVEL INFORMATION:
▼ = 30.60 - during drilling
▼ = 21.02 - 1/30/2008
▽ =

SAMPLE: Number	Recov / Total (in) *% Recovery*	Type	TESTING: *Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Failure Type*	Depth ft. BGS	Lithologic Description	Borehole Detail	Elevation ft. MSL	Remarks
							▼ 22	Dark green gray (10Y4/1) moist, silty CLAY, trace sand and gravel *[Continued from previous page]*		592	
								Green gray (5GY5/1), very moist, silty CLAY, trace sand and gravel		590	
							24	Green gray (5GY5/1) with 5% yellow brown (10YR5/4) mottles, wet, very silty CLAY, trace sand and gravel		588	

End of Boring = 25.28 ft. BGS

NOTE(S):

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company, LLC
Site: Duck Creek Power Station - Ash Landfill
Location: 17751 N. CILCO Rd., Canton, IL 61520
Project: 17E0057
DATES: Start: 3/15/2017
Finish: 3/15/2017
WEATHER: Sunny, cold (lo-30s)

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: Diedrich D-50
Drilling Method: 4¼" Hollow Stem Auger, split spoon sampler
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: P60
Well ID: P60
Surface Elev: 620.12 ft. MSL
Completion: 34.62 ft. BGS
Station: 15,477.09N 992.24E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Banner, IL
Township: Banner
Section 18, **Tier** 6N; **Range** 5E

WATER LEVEL INFORMATION:
▼ = 16.80 - During drilling
▼ = Dry - At completion
▽ =

Number	Recov / Total (in) *% Recovery*	Type	*Blows / 6 in* N - Value **RQD**	Moisture (%)	Dry Den. (lb/ft^3)	Qu (tsf) *Qp (tsf)* Failure Type
1A	14/24 *58%*	SS	*2-3 3-4* N=6			
2A	18/24 *75%*	SS	*3-6 8-11* N=14	17.5		
3A	15/24 *63%*	SS	*3-4 6-7* N=10	19.6		
4A	20/24 *83%*	SS	*6-8 11-14* N=19	18.5		
5A	22/24 *92%*	SS	*3-5 6-7* N=11	26.8		
6A	21/24 *88%*	SS	*2-4 5-5* N=9	23.8		
7A	20/24 *83%*	SS	*4-4 6-7* N=10	22.8		
8A	21/24 *88%*	SS	*5-6 7-7* N=13	22.1		
9A	21/24 *88%*	SS	*5-5 6-6* N=11	21.0		
10A	24/24 *100%*	SS	*2-3 4-7* N=7	28.1		
10B				61.7		

Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
0–8.9	FILL - Yellowish brown (10YR5/6), moist, medium, CLAY with some silt and trace sand.	620 – 611.2	
8.9–10	Yellowish brown (10YR5/6), moist, medium, SILT with few clay and trace sand.		
10–12.3	Yellowish brown (10YR5/8) with 30% gray (10YR5/1) mottles, moist, medium, SILT with few clay and trace sand.		
12.3–17	Gray (10YR5/1) with 20% yellowish brown (10YR5/8) mottles, moist, medium, SILT with few clay and trace sand.		
17–19.1	Gray (10YR5/1) with 25% yellowish brown (10YR5/8) mottles, wet, medium, SILT with few clay and trace sand.		
19.1–19.6	Dark yellowish brown (10YR3/4), moist, medium, SILT with few clay and trace sand, trace organics.		
19.6–20	Dark brown (10YR3/3), moist, medium, PEAT.		

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20
Elevation scale: 620, 618, 616, 614, 612, 610, 608, 606, 604, 602

NOTE(S): P60 installed in boring.
Coordinates are on Plant (Local) grid.

FIELD BORING LOG

HANSON

CLIENT: Illinois Power Generating Company, LLC
Site: Duck Creek Power Station - Ash Landfill
Location: 17751 N. CILCO Rd., Canton, IL 61520
Project: 17E0057
DATES: Start: 3/15/2017
Finish: 3/15/2017
WEATHER: Sunny, cold (lo-30s)

CONTRACTOR: Ramsey Geotechnical Engineering, LLC
Rig mfg/model: Diedrich D-50
Drilling Method: 4¼" Hollow Stem Auger, split spoon sampler
FIELD STAFF: Driller: B. Williamson
Helper: D. Crump
Eng/Geo: R. Hasenyager

BOREHOLE ID: P60
Well ID: P60
Surface Elev: 620.12 ft. MSL
Completion: 34.62 ft. BGS
Station: 15,477.09N 992.24E

TOPOGRAPHIC MAP INFORMATION:
Quadrangle: Banner, IL
Township: Banner
Section 18, **Tier** 6N; **Range** 5E

WATER LEVEL INFORMATION:
▼ = 16.80 - During drilling
▼ = Dry - At completion
▽ =

SAMPLE Number	Recov / Total (in) % Recovery	Type	Blows / 6 in N - Value RQD	Moisture (%)	Dry Den. (lb/ft³)	Qu (tsf) Qp (tsf) Failure Type	Depth ft. BGS	Lithologic Description	Elevation ft. MSL	Remarks
								Dark brown (10YR3/3), moist, medium, PEAT. *[Continued from previous page]*	600	
11A	20/24 83%	SS	2-5 6-7 N=11	31.4			22	Very dark gray (10YR3/1), moist, medium, SILT with some clay and trace sand, trace organics.	598	
12A	24/24 100%	SS	9-8 7-6 N=15	33.7				Very dark gray (10YR3/1), wet, medium, SILT with some clay and trace sand, trace organics.		
							24	Dark brown (10YR3/3), moist, medium, PEAT.	596	
13A	20/24 83%	SS	4-3 4-4 N=7	23.0						
14A	22/24 92%	SS	4-5 6-6 N=11	20.6			26	Gray (10YR5/1), moist, medium, CLAY with some silt and trace sand and gravel.	594	
							28		592	
15A	24/24 100%	SS	3-3 4-5 N=7	17.5			30	Greenish gray (5G6/1), moist, medium, CLAY with some silt and trace sand and gravel.	590	
16A	24/24 100%	SS	1-3 3-3 N=6	20.2			32		588	
17A	24/24 100%	SS	5-6 6-7 N=12	15.9				Greenish gray (5G6/1), wet, soft, SILT with few clay, little sand, and trace gravel.		
	0/7 0%	BD					34		586	

End of Boring = 34.62 ft bgs

NOTE(S): P60 installed in boring.
Coordinates are on Plant (Local) grid.

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Golder Associates USA*
Project Number/ LIMS No.	*18502-01/MI7010-MAY21*
Batch:	*MNA Duck Creek Power Station (21454831 Phase 0001)*
Sample Receipt:	*May 25, 2021*
Sample Analysis:	*June 8, 2021*
Reporting Date:	*July 9, 2021*

Instrument:	Panalytical X'pert Pro Diffractometer
Test Conditions:	Co radiation, 40 kV, 45 mA Regular Scanning: Step: 0.033°, Step time:0.15s, 2θ range: 6-70°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Ben Eaton, B.Sc.
Junior Mineralogist

Tassos Grammatikopoulos, Ph.D, P.Geo.
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

SGS Minerals
a division of SGS Canada Inc.
3260 Production Way, Burnaby, British Columbia, Canada V5A 4W4
Tel: (604) 638-2349 Fax: (604) 444-5486 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

Golder Associates USA
18502-01/MI7010-MAY21
07/09/2021

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

Mineral/Compound	B-AP-1 MAY7010-01 (wt %)	B-G52S MAY7010-02 (wt %)	B-G54L MAY7010-03 (wt %)	B-G57L MAY7010-04 (wt %)	B-G57S MAY7010-05 (wt %)	B-G62L MAY7010-06 (wt %)	B-G53S MAY7010-07 (wt %)	B-G02S MAY7010-08 (wt %)
Quartz	0.3	48.4	57.6	51.2	59.9	61.7	51.1	61.1
Hornblende	0.6	3.7	1.4	2.4	-	-	-	-
Gypsum	99.0	-	-	-	-	-	-	-
Dolomite	-	23.7	11.7	2.5	12.8	-	23.8	-
Calcite	-	6.7	0.8	0.1	0.3	-	4.1	-
Albite	-	6.7	8.1	17.4	8.2	8.6	5.5	9.9
Chlorite	-	0.8	0.3	0.3	0.2	0.4	2.4	5.4
Muscovite	-	3.3	13.8	8.8	11.7	18.7	6.7	15.4
Rhodochrosite	-	3.2	-	-	-	-	-	0.4
Microcline	-	2.9	5.5	9.4	5.9	10.7	5.7	7.5
Pyrite	-	0.4	-	0.3	-	-	-	-
Halite	-	-	0.7	-	-	-	-	-
Montmorillonite	-	-	-	5.1	-	-	-	-
Goethite	-	-	-	1.1	-	-	-	-
Diaspore	-	-	-	0.3	-	-	-	-
Magnetite	-	-	-	0.4	-	-	-	-
Diopside	-	-	-	1.0	0.5	-	-	0.2
Actinolite	-	-	-	-	0.5	-	0.6	0.2
TOTAL	100	100	100	100	100	100	100	100

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Golder Associates USA
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Mineral/Compound	B-G02L MAY7010-09 (wt %)
Quartz	49.2
Hornblende	-
Gypsum	-
Dolomite	9.2
Calcite	-
Albite	12.2
Chlorite	6.0
Muscovite	12.3
Rhodochrosite	-
Microcline	9.3
Pyrite	0.3
Halite	-
Montmorillonite	-
Goethite	-
Diaspore	-
Magnetite	0.4
Diopside	1.0
Actinolite	0.3
TOTAL	100

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Mineral/Compound	Formula
Quartz	SiO_2
Hornblende	$(Ca,Na)_{2-3}(Mg,Fe,Al)_5Si_6(Si,Al)_2O_{22}(OH)_2$
Gypsum	$CaSO_4 \cdot 2H_2O$
Dolomite	$CaMg(CO_3)_2$
Calcite	$CaCO_3$
Albite	$NaAlSi_3O_8$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Rhodochrosite	$MnCO_3$
Microcline	$KAlSi_3O_8$
Pyrite	FeS_2
Halite	NaCl
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot nH_2O$
Goethite	αFeO·OH
Diaspore	αAlO.OH
Magnetite	Fe_3O_4
Diopside	$CaMgSi_2O_6$
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$

Golder Associates USA
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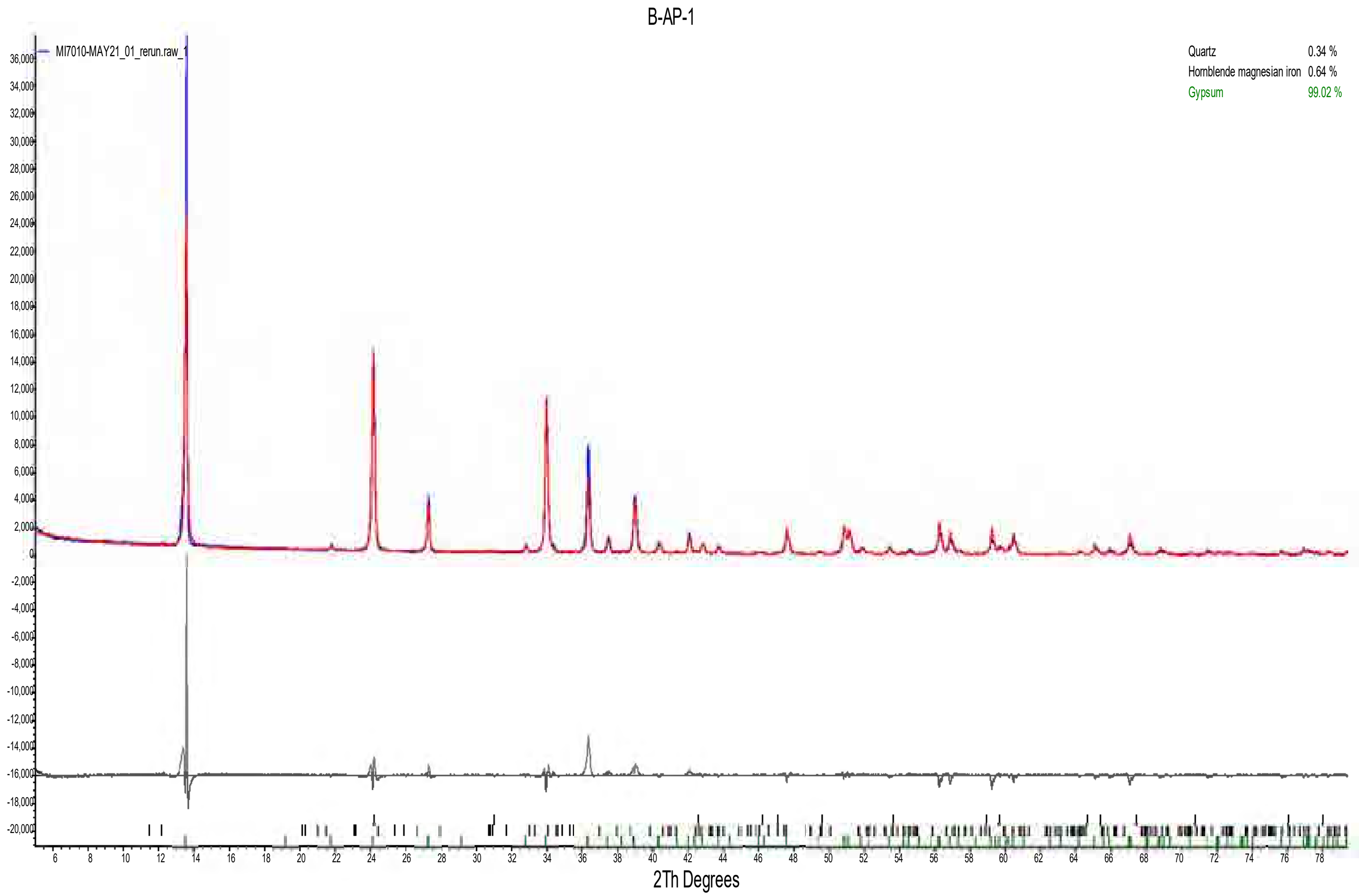

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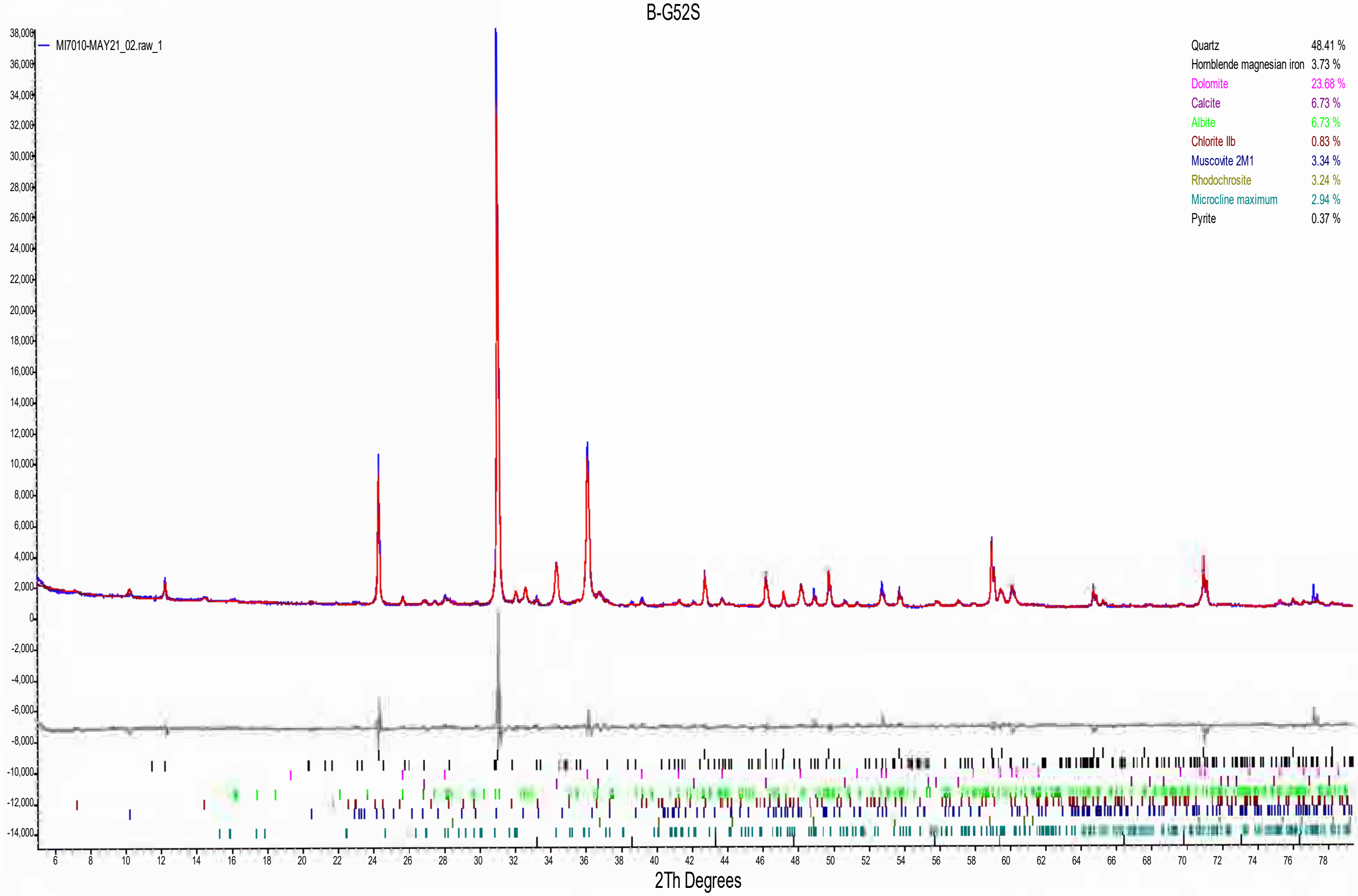
18502-01/MI7010-MAY21
07/09/2021



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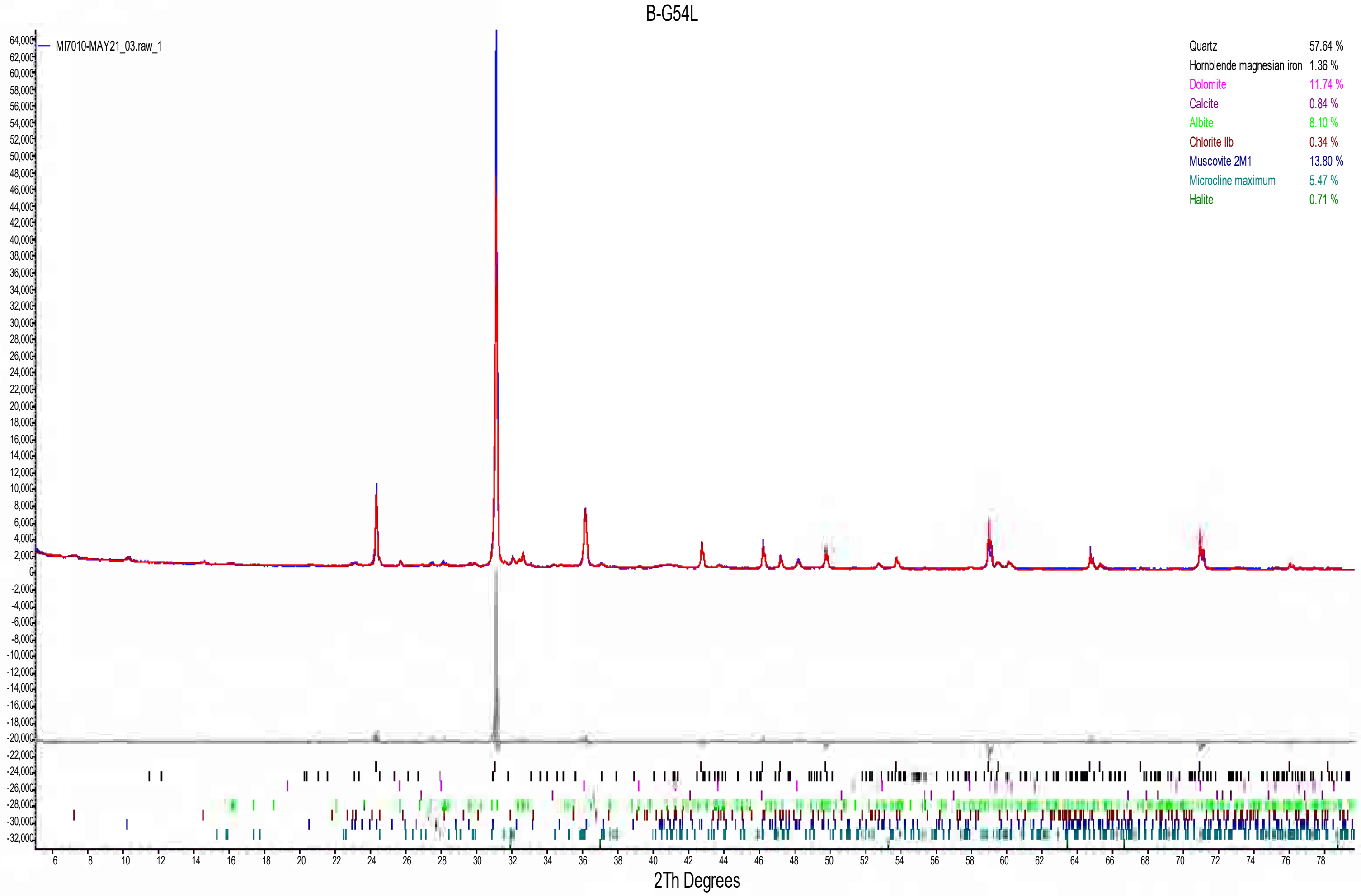
18502-01/MI7010-MAY21
07/09/2021



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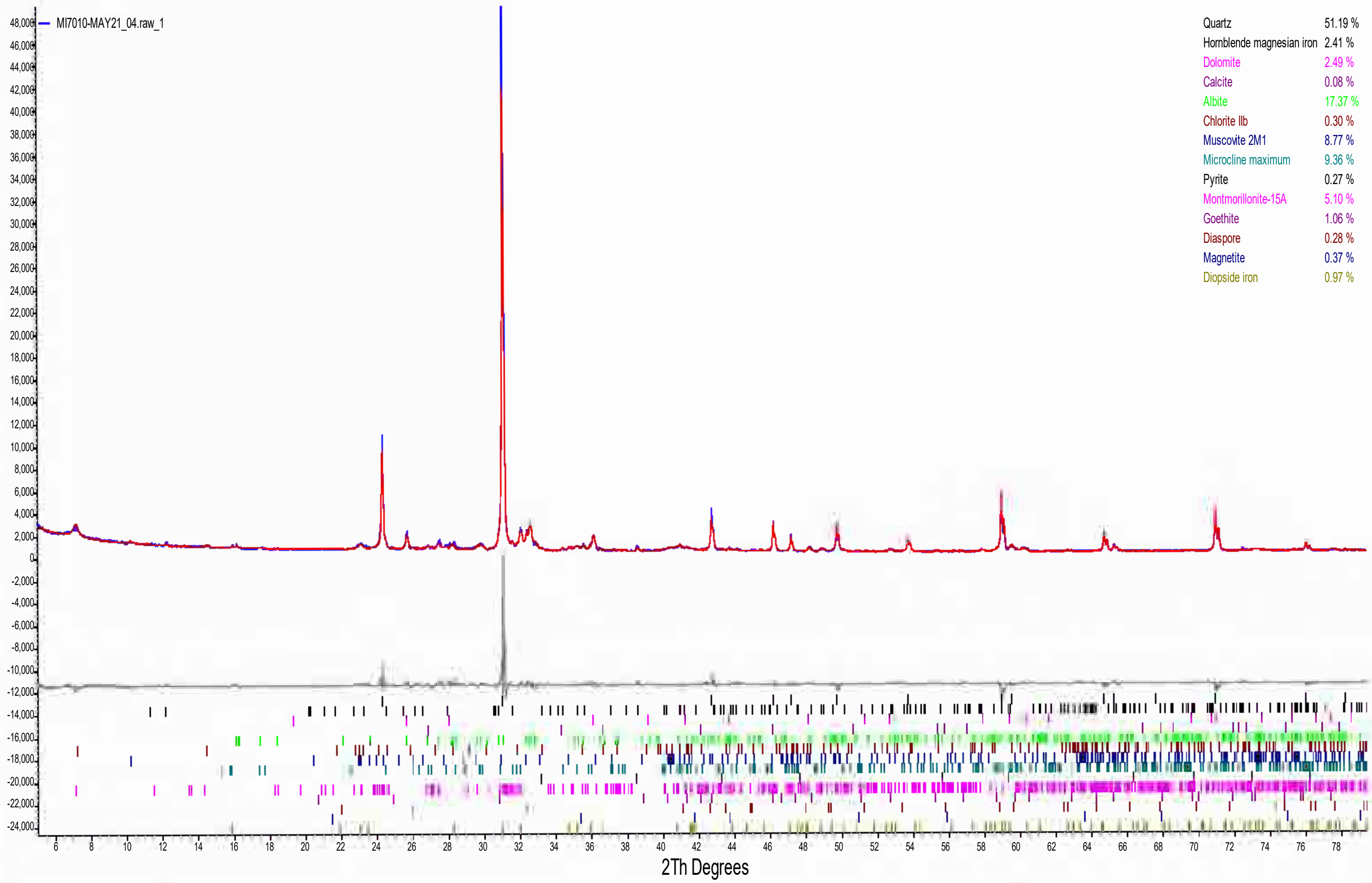
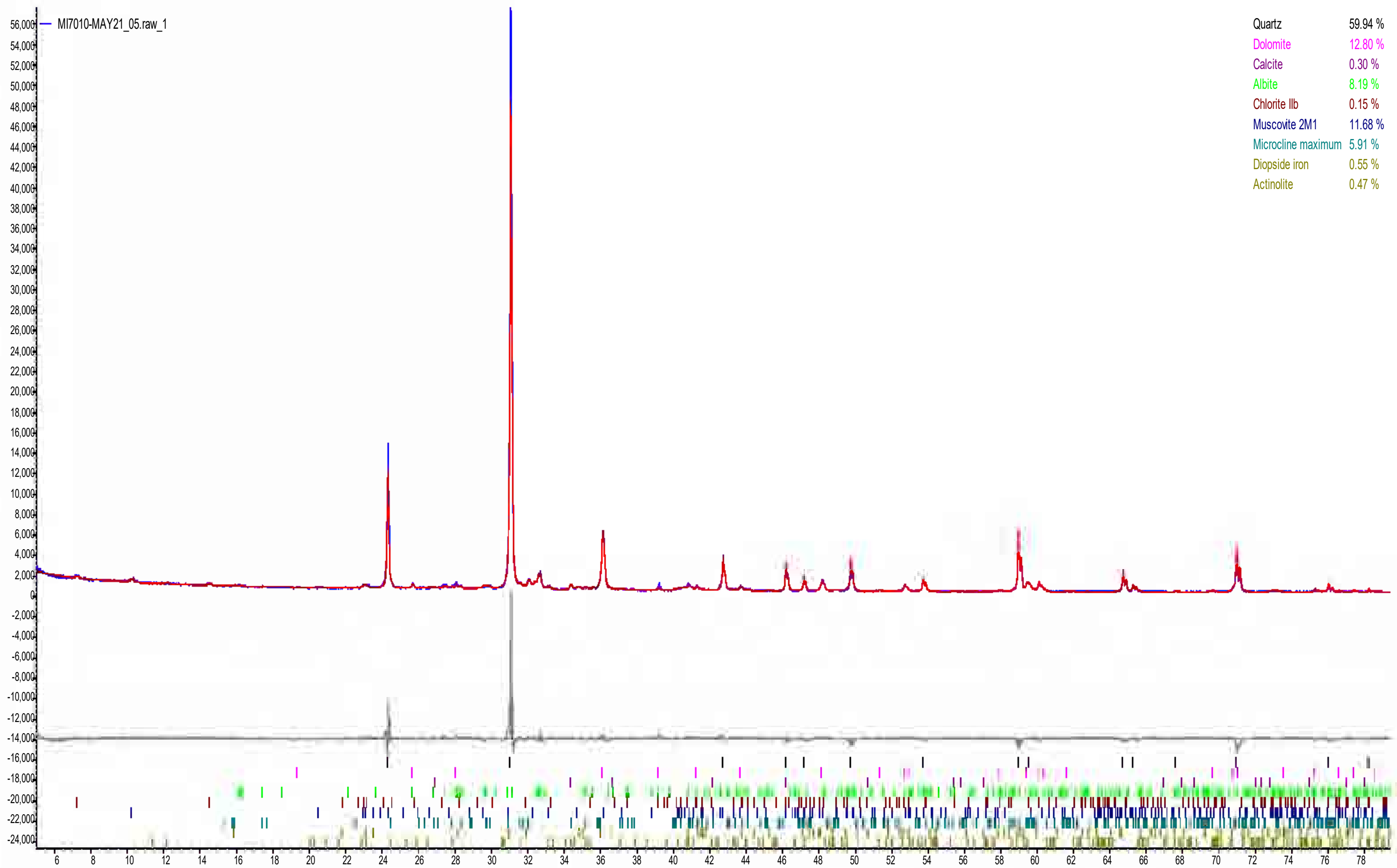
18502-01/MI7010-MAY21
07/09/2021

B-G57L

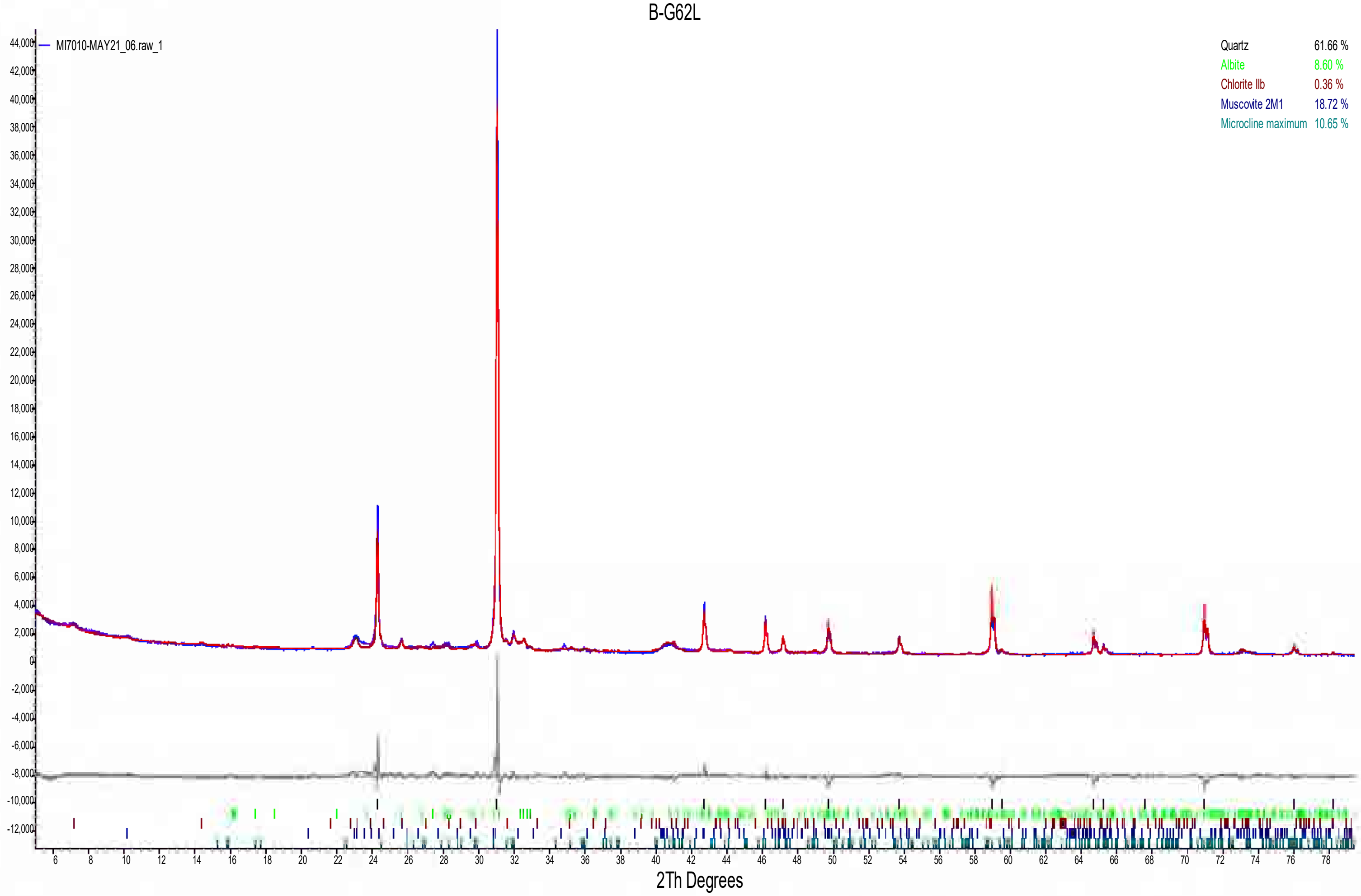


Golder Associates USA
18502-01/MI7010-MAY21
07/09/2021

B-G57S



Golder Associates USA
18502-01/MI7010-MAY21
07/09/2021



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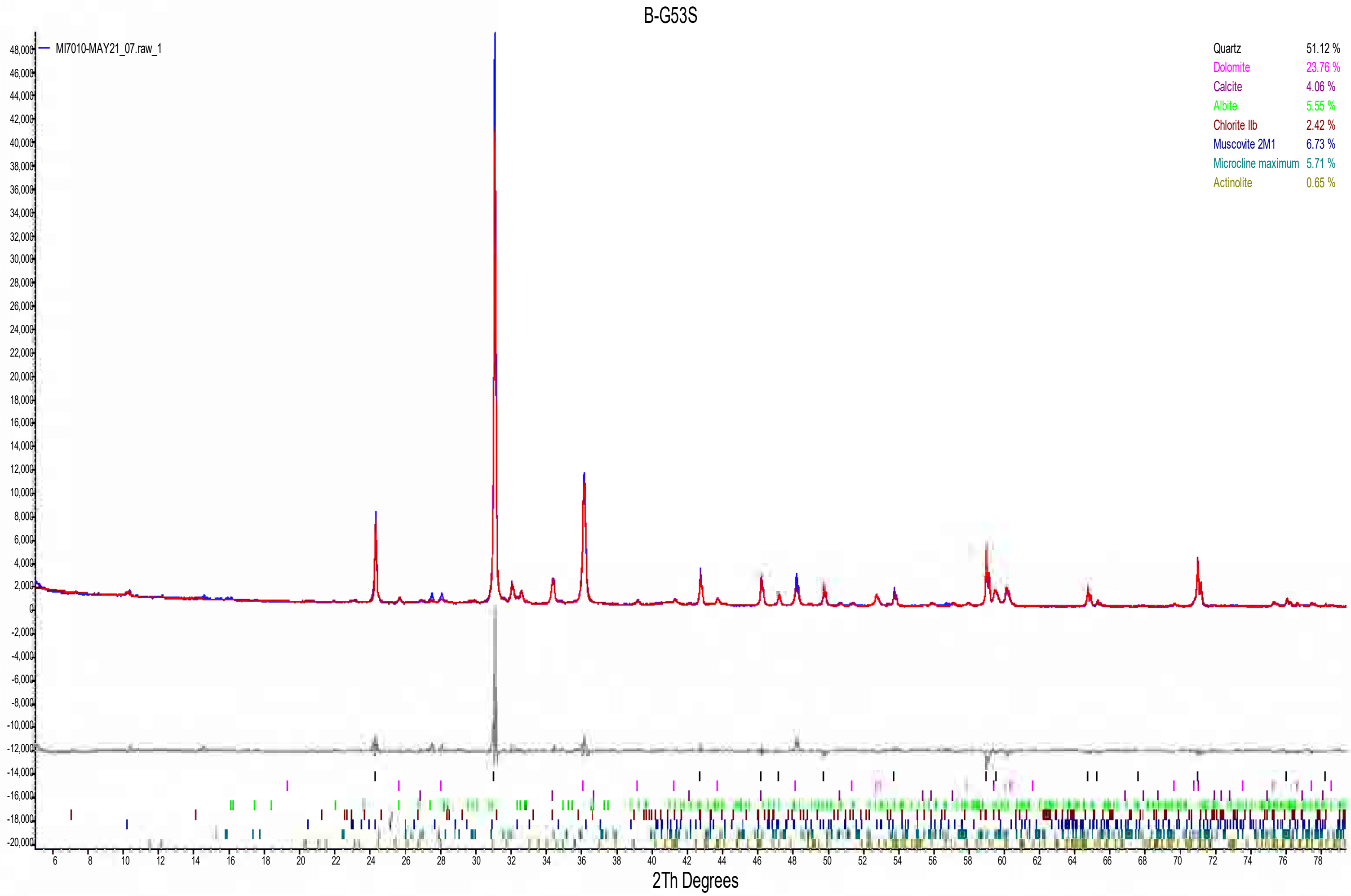
18502-01/MI7010-MAY21
07/09/2021



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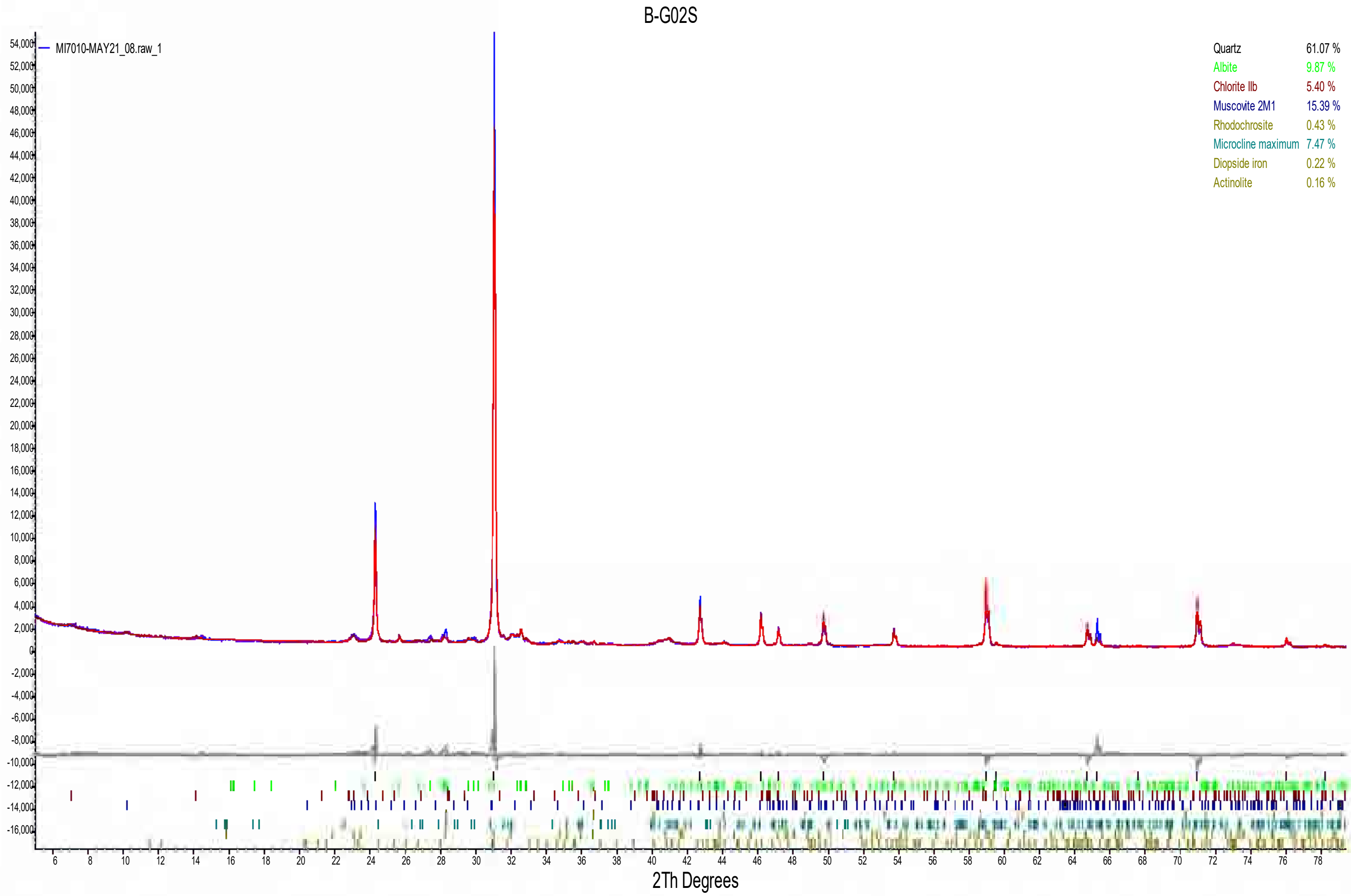
18502-01/MI7010-MAY21
07/09/2021



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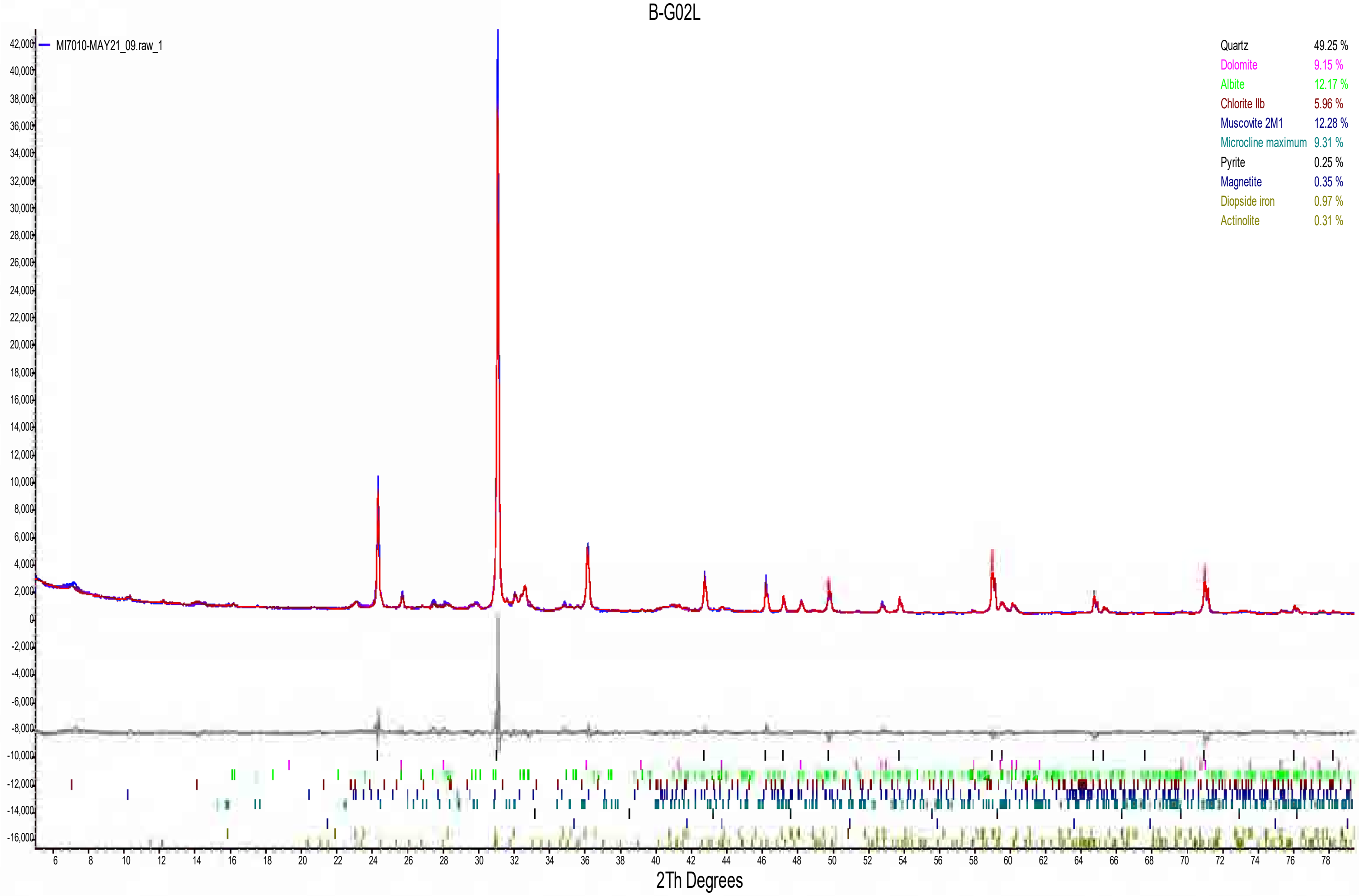
18502-01/MI7010-MAY21
07/09/2021



eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-23190-1
Client Project/Site: Duck Creek Power Station - Illinois

For:
Golder Associates Inc.
13515 Barrett Parkway Drive
Suite 260
Ballwin, Missouri 63021

Attn: Jeffrey Ingram

Ryan Henry

Authorized for release by:
7/20/2021 2:43:38 PM

Ryan Henry, Project Manager I
(865)291-3000
williamr.henry@eurofinset.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 140-23190-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-23190-1

Receipt
The samples were received on 5/21/2021 at 9:20am and arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.5º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

· Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO4), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO3-H2O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/mL
V = Final volume of digestate, mL
D = Instrument dilution factor
V1 = Total volume of leachate, mL
V2 = Volume of leachate digested, mL
W = Wet weight of sample, g
S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in

Job ID: 140-23190-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

A laboratory sample duplicate was prepared and analyzed with each batch of samples in order to provide information regarding the reproducibility of the procedure.

SEP Report Notes:

The final report lists the results for each step, the result for the total digestion of the sample, and a sum of the results of steps 1 through 7 by element.

Magnesium was not reported for step 1 because the extraction solution for this step (magnesium sulfate) contains high levels of magnesium. Sodium was not reported for steps 2 and 5 since the extraction solutions for these steps contain high levels of sodium. The sum of steps 1 through 7 is much higher than the total result for sodium and magnesium due to the magnesium and sodium introduced by the extraction solutions.

The digestates for steps 1, 2 and 5 were analyzed at a dilution due to instrument problems caused by the high solids content of the digestates. The reporting limits were adjusted accordingly.

Method 6010B: The following sample was diluted to bring the concentration of target analyte, calcium, within the calibration range: B-AP-1 (140-23190-1). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the nature of the sample matrix: B-AP-1 (140-23190-1), B-G52S (140-23190-2), B-G54L (140-23190-3), B-G57L (140-23190-4), B-G57S (140-23190-5), B-G62L (140-23190-6), B-G53S (140-23190-7), B-G02S (140-23190-8) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: B-G52S (140-23190-2), B-G54L (140-23190-3), B-G57S (140-23190-5), B-G62L (140-23190-6), B-G53S (140-23190-7), B-G02S (140-23190-8) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of silicon which interferes with Arsenic, Lead and Selenium: B-G52S (140-23190-2) and B-G53S (140-23190-7). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of titanium which interferes with Cobalt and Lead: B-G54L (140-23190-3), B-G62L (140-23190-6) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided.

Method 6010B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: B-G57L (140-23190-4).

Method 6010B SEP: The method blank for preparation batch 140-51550 and 140-51581 contained Iron above the reporting limit (RL). The following samples, 23190-1, 23190-3, 23190-4, 23190-5, 23190-6, 23190-7, 23190-8 and 23190-9 associated with this method blank did not contain the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Method 6010B SEP: The following sample was diluted to bring the concentration of target analyte, calcium, within the calibration range: B-AP-1 (140-23190-1). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, sodium, within the calibration range: B-AP-1 (140-23190-1), B-G52S (140-23190-2), B-G54L (140-23190-3), B-G57L (140-23190-4), B-G57S (140-23190-5), B-G62L (140-23190-6), B-G53S (140-23190-7), B-G02S (140-23190-8) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The method blank for preparation batch 140-51449 and 140-51455 and analytical batch 140-51720 contained Iron above the reporting limit (RL). Associated sample 23190-2 was not re-extracted and/or re-analyzed because results were greater than

Job ID: 140-23190-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

10X the value found in the method blank.

Method 6010B SEP: The method blank for preparation batch 140-51449 and 140-51455 contained Iron above the reporting limit (RL). The following samples, 23190-1, 23190-4, 23190-6, 23190-9 associated with this method blank did not contain the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, sodium, within the calibration range: B-G57L (140-23190-4) and B-G62L (140-23190-6). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: B-G52S (140-23190-2), B-G54L (140-23190-3), B-G57L (140-23190-4), B-G57S (140-23190-5), B-G62L (140-23190-6), B-G53S (140-23190-7), B-G02S (140-23190-8) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the presence of titanium which interferes with Cobalt and Lead: B-G54L (140-23190-3), B-G57L (140-23190-4), B-G57S (140-23190-5), B-G62L (140-23190-6) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the presence of silicon which interferes with Arsenic, Lead and Selenium: B-G54L (140-23190-3), B-G62L (140-23190-6), B-G53S (140-23190-7) and B-G02S (140-23190-8). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: B-AP-1 (140-23190-1), B-G52S (140-23190-2), B-G54L (140-23190-3), B-G57L (140-23190-4), B-G57S (140-23190-5), B-G62L (140-23190-6), B-G53S (140-23190-7), B-G02S (140-23190-8) and B-G02L (140-23190-9). Elevated reporting limits (RLs) are provided for aluminum and calcium.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-23190-1	B-AP-1	Solid	05/17/21 11:45	05/21/21 09:20	
140-23190-2	B-G52S	Solid	05/18/21 11:30	05/21/21 09:20	
140-23190-3	B-G54L	Solid	05/18/21 15:30	05/21/21 09:20	
140-23190-4	B-G57L	Solid	05/19/21 10:40	05/21/21 09:20	
140-23190-5	B-G57S	Solid	05/19/21 10:48	05/21/21 09:20	
140-23190-6	B-G62L	Solid	05/19/21 14:00	05/21/21 09:20	
140-23190-7	B-G53S	Solid	05/19/21 16:15	05/21/21 09:20	
140-23190-8	B-G02S	Solid	05/20/21 09:40	05/21/21 09:20	
140-23190-9	B-G02L	Solid	05/20/21 10:30	05/21/21 09:20	

Client Sample ID: B-AP-1 — Lab Sample ID: 140-23190-1

Date Collected: 05/17/21 11:45 — **Matrix: Solid**
Date Received: 05/21/21 09:20 — **Percent Solids: 58.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		68	11	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Arsenic	ND		3.4	0.88	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Calcium	**4600**	**B**	1700	13	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Cobalt	ND		17	0.31	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Iron	ND		34	20	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Lead	ND		3.4	0.75	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Lithium	ND		17	1.0	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Manganese	**0.40**	**J**	5.1	0.21	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Molybdenum	**0.64**	**J**	14	0.56	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Potassium	ND		1700	180	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Sodium	ND		1700	880	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4
Selenium	ND		3.4	1.2	mg/Kg	☼	07/02/21 08:00	07/13/21 11:26	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10**	**J**	51	8.2	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Arsenic	ND		2.5	0.66	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Calcium	**12000**		1300	11	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Cobalt	ND		13	0.32	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Iron	ND		25	15	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Lead	ND		2.5	0.56	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Lithium	ND		13	0.76	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Manganese	**7.7**		3.8	1.4	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Molybdenum	ND		10	0.42	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Potassium	ND		1300	130	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3
Selenium	ND		2.5	0.87	mg/Kg	☼	07/02/21 14:02	07/13/21 13:23	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28**		17	3.6	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Arsenic	ND		0.85	0.22	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Calcium	**4300**		420	2.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Cobalt	ND		4.2	0.076	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Iron	**240**		8.5	4.9	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Lead	ND		0.85	0.19	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Lithium	ND		4.2	0.25	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Manganese	**28**	**B**	1.3	0.046	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Molybdenum	**0.27**	**J**	3.4	0.14	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Potassium	ND		420	44	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Sodium	**9700**		420	220	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1
Selenium	**1.6**		0.85	0.29	mg/Kg	☼	07/07/21 08:00	07/14/21 12:01	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26**		17	2.7	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Arsenic	ND		0.85	0.37	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Calcium	**9200**		420	3.7	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Cobalt	ND		4.2	0.090	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Iron	**110**		8.5	4.9	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Lead	ND		0.85	0.19	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1

Client Sample Results

Client Sample ID: B-AP-1

Lab Sample ID: 140-23190-1
Date Collected: 05/17/21 11:45
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 58.9

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	ND		4.2	0.25	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Manganese	22		1.3	0.22	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Molybdenum	0.22	J	3.4	0.14	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Potassium	ND		420	44	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Sodium	1300		420	220	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1
Selenium	ND		0.85	0.80	mg/Kg	☼	07/08/21 08:00	07/14/21 13:59	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	64	J	250	40	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Arsenic	ND		13	3.2	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Calcium	58000	B	6400	19	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Cobalt	ND		64	1.0	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Iron	ND		130	75	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Lead	ND		13	2.8	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Lithium	5.3	J	64	3.7	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Manganese	10	J	19	3.1	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Molybdenum	ND		51	2.1	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Potassium	4300	J B	6400	720	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5
Selenium	ND		13	4.4	mg/Kg	☼	07/08/21 15:21	07/15/21 13:50	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	61		17	2.7	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Arsenic	0.28	J	0.85	0.25	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Calcium	89000		2100	18	mg/Kg	☼	07/09/21 08:00	07/15/21 18:07	5
Cobalt	ND		4.2	0.078	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Iron	280		8.5	4.9	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Lead	0.72	J	0.85	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Lithium	0.99	J	4.2	0.25	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Manganese	21		1.3	0.42	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Molybdenum	0.24	J	3.4	0.17	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Potassium	140	J	420	44	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1
Sodium	39000		2100	1100	mg/Kg	☼	07/09/21 08:00	07/15/21 18:07	5
Selenium	3.0		0.85	0.29	mg/Kg	☼	07/09/21 08:00	07/15/21 15:49	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37		17	2.7	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Arsenic	0.34	J B	0.85	0.22	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Calcium	26000		4200	44	mg/Kg	☼	07/12/21 08:00	07/17/21 13:02	10
Cobalt	ND		4.2	0.044	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Iron	43		8.5	7.0	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Lead	ND		0.85	0.19	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Lithium	ND		4.2	0.25	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Manganese	3.0		1.3	0.19	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Molybdenum	ND		3.4	0.14	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Potassium	150	J	420	17	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Sodium	5700		420	73	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1
Selenium	ND		0.85	0.29	mg/Kg	☼	07/12/21 08:00	07/17/21 14:56	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-AP-1 **Lab Sample ID: 140-23190-1**
Date Collected: 05/17/21 11:45 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 58.9**

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	230		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	0.61		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	200000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	ND		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	680		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	0.72		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	6.3		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	93		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	1.4	J	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	4500		250	26	mg/Kg			07/19/21 15:03	1
Sodium	56000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	4.6		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	300		66	8.3	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Arsenic	ND		3.3	0.48	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Calcium	290000		1700	290	mg/Kg	☼	06/28/21 08:00	07/07/21 16:53	2
Cobalt	0.17	J	8.3	0.079	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Iron	710		33	13	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Lead	1.7	J	2.5	0.36	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Lithium	2.9	J	8.3	0.50	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Manganese	90		2.5	1.0	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Molybdenum	1.4	J	6.6	0.18	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Potassium	160	J	830	40	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Sodium	280	J	830	59	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1
Selenium	8.0		2.5	0.73	mg/Kg	☼	06/28/21 08:00	07/07/21 14:44	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.0	J	17	2.7	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Arsenic	0.66	J B	0.85	0.22	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Calcium	37000		4200	44	mg/Kg	☼	07/02/21 08:00	07/18/21 11:05	10
Cobalt	0.11	J	4.2	0.044	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Iron	590		8.5	7.0	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Lead	0.81	J	0.85	0.19	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Lithium	0.46	J	4.2	0.25	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Manganese	82		1.3	0.19	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Molybdenum	1.5	J	3.4	0.14	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Potassium	190	J	420	17	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Sodium	140	J	420	73	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1
Selenium	8.6		0.85	0.29	mg/Kg	☼	07/02/21 08:00	07/18/21 12:53	1

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G52S **Lab Sample ID: 140-23190-2**
Date Collected: 05/18/21 11:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 85.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28**	**J**	47	7.5	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Arsenic	ND		2.3	0.61	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Calcium	**780**	**J B**	1200	8.9	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Cobalt	ND		12	0.21	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Iron	ND		23	14	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Lead	ND		2.3	0.51	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Lithium	ND		12	0.70	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Manganese	**7.3**		3.5	0.14	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Molybdenum	ND		9.3	0.38	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Potassium	ND		1200	120	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Sodium	ND		1200	610	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4
Selenium	ND		2.3	0.79	mg/Kg	☼	07/02/21 08:00	07/13/21 11:31	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6.3**	**J**	35	5.6	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Arsenic	ND		1.7	0.45	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Calcium	**18000**		870	7.7	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Cobalt	**0.55**	**J**	8.7	0.22	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Iron	**500**	**B**	17	10	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Lead	**11**		1.7	0.38	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Lithium	ND		8.7	0.52	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Manganese	**100**		2.6	0.98	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Molybdenum	ND		7.0	0.29	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Potassium	ND		870	91	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3
Selenium	ND		1.7	0.59	mg/Kg	☼	07/02/21 14:02	07/13/21 13:28	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**55**		12	2.4	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Arsenic	**2.1**		0.58	0.15	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Calcium	**6.7**	**J**	290	1.7	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Cobalt	**1.1**	**J**	2.9	0.052	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Iron	**11000**		5.8	3.4	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Lead	ND		0.58	0.13	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Lithium	**0.20**	**J**	2.9	0.17	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Manganese	**98**	**B**	0.87	0.031	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Potassium	ND		290	30	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Sodium	**6500**		290	150	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1
Selenium	**0.41**	**J**	0.58	0.20	mg/Kg	☼	07/07/21 08:00	07/14/21 12:06	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**120**		12	1.9	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Arsenic	**0.56**	**J**	0.58	0.26	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Calcium	**37000**		290	2.6	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Cobalt	**1.4**	**J**	2.9	0.062	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Iron	**7400**		5.8	3.4	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Lead	**14**		0.58	0.13	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Client Sample ID: B-G52S
Date Collected: 05/18/21 11:30
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-2
Matrix: Solid
Percent Solids: 85.9

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.92	J	2.9	0.17	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Manganese	340		0.87	0.15	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Potassium	ND		290	30	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Sodium	580		290	150	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1
Selenium	ND		0.58	0.55	mg/Kg	☼	07/08/21 08:00	07/14/21 14:04	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	140	J	170	27	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Arsenic	7.5	J	8.7	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Calcium	11000	B	4400	13	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Cobalt	ND		44	0.70	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Iron	270		87	51	mg/Kg	☼	07/08/21 15:21	07/17/21 12:08	5
Lead	ND		8.7	1.9	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Lithium	2.7	J	44	2.6	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Manganese	40		13	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Molybdenum	ND		35	1.5	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Potassium	3000	J B	4400	500	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5
Selenium	ND		8.7	3.0	mg/Kg	☼	07/08/21 15:21	07/15/21 13:55	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1300		12	1.9	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Arsenic	4.4		0.58	0.17	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Calcium	18000		290	2.4	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Cobalt	2.0	J	2.9	0.054	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Iron	4900		5.8	3.4	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Lead	3.9		0.58	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Lithium	3.0		2.9	0.17	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Manganese	58		0.87	0.29	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Molybdenum	ND		2.3	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Potassium	250	J	290	30	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1
Sodium	21000		1500	760	mg/Kg	☼	07/09/21 08:00	07/15/21 18:12	5
Selenium	ND		0.58	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 15:55	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23000		120	19	mg/Kg	☼	07/12/21 08:00	07/17/21 13:07	10
Arsenic	1.7	B	0.58	0.15	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Calcium	5800		2900	30	mg/Kg	☼	07/12/21 08:00	07/17/21 13:07	10
Cobalt	2.2	J	2.9	0.030	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Iron	5500		5.8	4.8	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Lead	2.6		0.58	0.13	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Lithium	8.0		2.9	0.17	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Manganese	100		0.87	0.13	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Potassium	8900		580	23	mg/Kg	☼	07/12/21 08:00	07/17/21 16:45	2
Sodium	7900		290	50	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1
Selenium	ND		0.58	0.20	mg/Kg	☼	07/12/21 08:00	07/17/21 15:01	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Client Sample ID: B-G52S

Date Collected: 05/18/21 11:30
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-2
Matrix: Solid
Percent Solids: 85.9

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	25000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	16		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	90000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	7.3		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	29000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	31		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	15		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	750		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	12000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	36000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	0.41	J	0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2500		43	5.4	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Arsenic	14		2.2	0.31	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Calcium	40000		540	95	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Cobalt	5.0	J	5.4	0.052	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Iron	20000		22	8.5	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Lead	28		1.6	0.24	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Lithium	4.7	J	5.4	0.32	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Manganese	460		1.6	0.67	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Molybdenum	0.45	J	4.3	0.12	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Potassium	620		540	26	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Sodium	72	J	540	39	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1
Selenium	ND		1.6	0.47	mg/Kg	☼	06/28/21 08:00	07/07/21 14:49	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000		120	19	mg/Kg	☼	07/02/21 08:00	07/18/21 11:10	10
Arsenic	20	B	1.2	0.30	mg/Kg	☼	07/02/21 08:00	07/18/21 15:06	2
Calcium	83000		2900	30	mg/Kg	☼	07/02/21 08:00	07/18/21 11:10	10
Cobalt	5.3		2.9	0.030	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Iron	24000		5.8	4.8	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Lead	27		1.2	0.26	mg/Kg	☼	07/02/21 08:00	07/18/21 15:06	2
Lithium	11		2.9	0.17	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Manganese	530		0.87	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Molybdenum	0.54	J	2.3	0.096	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Potassium	7600		580	23	mg/Kg	☼	07/02/21 08:00	07/18/21 15:06	2
Sodium	4000		290	50	mg/Kg	☼	07/02/21 08:00	07/18/21 12:58	1
Selenium	ND		1.2	0.40	mg/Kg	☼	07/02/21 08:00	07/18/21 15:06	2

Client Sample Results

Client: Golder Associates Inc. | Job ID: 140-23190-1

Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G54L | **Lab Sample ID: 140-23190-3**

Date Collected: 05/18/21 15:30 | **Matrix: Solid**

Date Received: 05/21/21 09:20 | **Percent Solids: 83.3**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.7	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Calcium	**1400**	**B**	1200	9.1	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Iron	ND		24	14	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Lead	ND		2.4	0.53	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Lithium	ND		12	0.72	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Manganese	**16**		3.6	0.15	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Molybdenum	ND		9.6	0.39	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Potassium	ND		1200	120	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Sodium	ND		1200	620	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4
Selenium	ND		2.4	0.82	mg/Kg	☼	07/02/21 08:00	07/13/21 11:36	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10**	**J**	36	5.8	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Arsenic	ND		1.8	0.47	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Calcium	**2300**		900	7.9	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Cobalt	**0.72**	**J**	9.0	0.23	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Iron	**170**		18	10	mg/Kg	☼	07/02/21 14:02	07/17/21 11:04	3
Lead	**2.6**		1.8	0.40	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Lithium	ND		9.0	0.54	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Manganese	**63**		2.7	1.0	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Molybdenum	ND		7.2	0.30	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Potassium	ND		900	94	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3
Selenium	ND		1.8	0.61	mg/Kg	☼	07/02/21 14:02	07/13/21 13:33	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**190**		12	2.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Arsenic	**0.85**		0.60	0.16	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Calcium	**9.1**	**J**	300	1.8	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Cobalt	**0.51**	**J**	3.0	0.054	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Iron	**4000**		6.0	3.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Lead	ND		0.60	0.13	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Lithium	**0.25**	**J**	3.0	0.18	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Manganese	**68**	**B**	0.90	0.032	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Molybdenum	**0.13**	**J**	2.4	0.098	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Potassium	ND		300	31	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Sodium	**10000**		300	160	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1
Selenium	**0.22**	**J**	0.60	0.20	mg/Kg	☼	07/07/21 08:00	07/14/21 12:10	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1700**		12	1.9	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Arsenic	**0.85**		0.60	0.26	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Calcium	**5700**		300	2.6	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Cobalt	**2.4**	**J**	3.0	0.064	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Iron	**5500**		6.0	3.5	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Lead	**7.8**		0.60	0.13	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G54L Lab Sample ID: 140-23190-3

Date Collected: 05/18/21 15:30 Matrix: Solid
Date Received: 05/21/21 09:20 Percent Solids: 83.3

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**2.9**	**J**	3.0	0.18	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Manganese	**140**		0.90	0.16	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Molybdenum	**0.19**	**J**	2.4	0.098	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Potassium	ND		300	31	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Sodium	**1600**		300	160	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1
Selenium	ND		0.60	0.56	mg/Kg	☼	07/08/21 08:00	07/14/21 14:09	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**160**	**J**	180	28	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Calcium	**8000**	**B**	4500	13	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Cobalt	ND		45	0.72	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Iron	ND		90	53	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Lead	ND		9.0	2.0	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Lithium	**3.1**	**J**	45	2.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Manganese	**12**	**J**	13	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Molybdenum	ND		36	1.5	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Potassium	**2800**	**J B**	4500	510	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5
Selenium	ND		9.0	3.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:01	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5300**		12	1.9	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Arsenic	**1.4**		0.60	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Calcium	**3900**		300	2.5	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Cobalt	**2.2**	**J**	3.0	0.055	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Iron	**6700**		6.0	3.5	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Lead	**3.8**		0.60	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Lithium	**5.0**		3.0	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Manganese	**66**		0.90	0.30	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Potassium	**750**		300	31	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1
Sodium	**38000**		1500	780	mg/Kg	☼	07/09/21 08:00	07/15/21 18:17	5
Selenium	ND		0.60	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 16:00	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30000**		120	19	mg/Kg	☼	07/12/21 08:00	07/17/21 13:12	10
Arsenic	**2.2**	**B**	1.2	0.31	mg/Kg	☼	07/12/21 08:00	07/17/21 16:50	2
Calcium	**1500**		300	3.1	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Cobalt	**1.2**	**J**	6.0	0.062	mg/Kg	☼	07/12/21 08:00	07/17/21 16:50	2
Iron	**4900**		6.0	4.9	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Lead	**3.0**		1.2	0.26	mg/Kg	☼	07/12/21 08:00	07/17/21 16:50	2
Lithium	**15**		3.0	0.18	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Manganese	**41**		0.90	0.13	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Potassium	**15000**		1500	60	mg/Kg	☼	07/12/21 08:00	07/17/21 16:55	5
Sodium	**7600**		300	52	mg/Kg	☼	07/12/21 08:00	07/17/21 15:06	1
Selenium	ND		1.2	0.41	mg/Kg	☼	07/12/21 08:00	07/17/21 16:50	2

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G54L **Lab Sample ID: 140-23190-3**
Date Collected: 05/18/21 15:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	5.4		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	23000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	7.0		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	21000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	17		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	26		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	400		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	0.31	J	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	19000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	57000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	0.22	J	0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8500		44	5.5	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Arsenic	3.4		2.2	0.32	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Calcium	45000		550	96	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Cobalt	5.9		5.5	0.052	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Iron	16000		22	8.6	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Lead	13		1.6	0.24	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Lithium	11		5.5	0.33	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Manganese	550		1.6	0.68	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Molybdenum	0.23	J	4.4	0.12	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Potassium	1500		550	26	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Sodium	77	J	550	39	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1
Selenium	ND		1.6	0.48	mg/Kg	☼	06/28/21 08:00	07/07/21 14:54	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	35000		120	19	mg/Kg	☼	07/02/21 08:00	07/18/21 11:15	10
Arsenic	5.3	B	0.60	0.16	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Calcium	21000		3000	31	mg/Kg	☼	07/02/21 08:00	07/18/21 11:15	10
Cobalt	8.0		6.0	0.062	mg/Kg	☼	07/02/21 08:00	07/18/21 15:12	2
Iron	20000		6.0	4.9	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Lead	23		1.2	0.26	mg/Kg	☼	07/02/21 08:00	07/18/21 15:12	2
Lithium	25		3.0	0.18	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Manganese	320		0.90	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Molybdenum	0.46	J	2.4	0.098	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Potassium	20000		1500	60	mg/Kg	☼	07/02/21 08:00	07/18/21 15:17	5
Sodium	4900		300	52	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/02/21 08:00	07/18/21 13:03	1

Client Sample Results

Client: Golder Associates Inc.	Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

## Client Sample ID: B-G57L	Lab Sample ID: 140-23190-4

Date Collected: 05/19/21 10:40	**Matrix: Solid**
Date Received: 05/21/21 09:20	**Percent Solids: 79.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	8.0	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Calcium	**1600**	**B**	1300	9.5	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Cobalt	ND		13	0.23	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Iron	ND		25	15	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Lead	ND		2.5	0.55	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Lithium	ND		13	0.75	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Manganese	**0.25**	**J**	3.8	0.16	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Molybdenum	ND		10	0.41	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Potassium	ND		1300	130	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Sodium	ND		1300	650	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4
Selenium	ND		2.5	0.85	mg/Kg	☼	07/02/21 08:00	07/13/21 11:41	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**12**	**J**	38	6.0	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Calcium	**730**	**J**	940	8.3	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Cobalt	ND		9.4	0.24	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Iron	ND		19	11	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Lead	ND		1.9	0.41	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Lithium	ND		9.4	0.56	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Manganese	**3.8**		2.8	1.1	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Molybdenum	ND		7.5	0.31	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Potassium	ND		940	98	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3
Selenium	ND		1.9	0.64	mg/Kg	☼	07/02/21 14:02	07/13/21 13:38	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**340**		13	2.6	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Arsenic	**1.0**		0.63	0.16	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Calcium	**8.8**	**J**	310	1.9	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Cobalt	**2.3**	**J**	3.1	0.056	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Iron	**750**		6.3	3.6	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Lead	**0.15**	**J**	0.63	0.14	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Lithium	**0.23**	**J**	3.1	0.19	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Manganese	**67**	**B**	0.94	0.034	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Potassium	ND		310	33	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1
Sodium	**13000**		630	330	mg/Kg	☼	07/07/21 08:00	07/14/21 15:47	2
Selenium	ND		0.63	0.21	mg/Kg	☼	07/07/21 08:00	07/14/21 12:15	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2600**		13	2.0	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Arsenic	**2.2**		0.63	0.28	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Calcium	**2900**		310	2.8	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Cobalt	**1.5**	**J**	3.1	0.066	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Iron	**4600**		6.3	3.6	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Lead	**4.5**		0.63	0.14	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1

Client Sample ID: B-G57L
Date Collected: 05/19/21 10:40
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-4
Matrix: Solid
Percent Solids: 79.9

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	2.4	J	3.1	0.19	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Manganese	50		0.94	0.16	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Molybdenum	0.16	J	2.5	0.10	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Potassium	ND		310	33	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Sodium	1800		310	160	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1
Selenium	ND		0.63	0.59	mg/Kg	☼	07/08/21 08:00	07/14/21 14:14	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	120	J	190	29	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Arsenic	ND		9.4	2.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Calcium	1900	J B	4700	14	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Cobalt	ND		47	0.75	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Iron	ND		94	55	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Lead	ND		9.4	2.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Lithium	3.7	J	47	2.8	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Manganese	4.6	J	14	2.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Molybdenum	ND		38	1.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Potassium	2900	J B	4700	530	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5
Selenium	ND		9.4	3.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:06	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7400		13	2.0	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Arsenic	2.1		0.63	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Calcium	580		310	2.6	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Cobalt	1.9	J	3.1	0.058	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Iron	6900		6.3	3.6	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Lead	2.7		0.63	0.14	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Lithium	6.4		3.1	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Manganese	46		0.94	0.31	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Potassium	630		310	33	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1
Sodium	44000		1600	810	mg/Kg	☼	07/09/21 08:00	07/15/21 18:22	5
Selenium	ND		0.63	0.21	mg/Kg	☼	07/09/21 08:00	07/15/21 16:04	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		130	20	mg/Kg	☼	07/12/21 08:00	07/17/21 13:17	10
Arsenic	2.1	B	0.63	0.16	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Calcium	3800		3100	33	mg/Kg	☼	07/12/21 08:00	07/17/21 13:17	10
Cobalt	1.3	J	6.3	0.065	mg/Kg	☼	07/12/21 08:00	07/17/21 17:00	2
Iron	4800		6.3	5.1	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Lead	3.7		1.3	0.28	mg/Kg	☼	07/12/21 08:00	07/17/21 17:00	2
Lithium	10		3.1	0.19	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Manganese	76		0.94	0.14	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Potassium	14000		1600	63	mg/Kg	☼	07/12/21 08:00	07/17/21 17:05	5
Sodium	12000		310	54	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1
Selenium	ND		0.63	0.21	mg/Kg	☼	07/12/21 08:00	07/17/21 15:11	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G57L **Lab Sample ID: 140-23190-4**
Date Collected: 05/19/21 10:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 79.9**

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	43000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	7.4		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	11000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	6.9		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	17000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	11		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	23		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	250		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	0.16	J	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	17000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	70000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	ND		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	18000		49	6.1	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Arsenic	5.7		2.4	0.35	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Calcium	4700		610	110	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Cobalt	5.6	J	6.1	0.058	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Iron	14000		24	9.6	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Lead	8.9		1.8	0.27	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Lithium	13		6.1	0.36	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Manganese	140		1.8	0.75	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Molybdenum	0.20	J	4.9	0.13	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Potassium	910		610	29	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Sodium	80	J	610	44	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1
Selenium	ND		1.8	0.53	mg/Kg	☼	06/28/21 08:00	07/07/21 14:59	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	71000		130	20	mg/Kg	☼	07/02/21 08:00	07/18/21 11:20	10
Arsenic	9.5	B	1.3	0.33	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Calcium	18000		3100	33	mg/Kg	☼	07/02/21 08:00	07/18/21 11:20	10
Cobalt	8.5		6.3	0.065	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Iron	22000		13	10	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Lead	17		1.3	0.28	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Lithium	26		6.3	0.38	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Manganese	290		1.9	0.28	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Molybdenum	0.41	J	5.0	0.21	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Potassium	24000		1600	63	mg/Kg	☼	07/02/21 08:00	07/18/21 15:22	5
Sodium	12000		630	110	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2
Selenium	ND		1.3	0.43	mg/Kg	☼	07/02/21 08:00	07/18/21 16:22	2

Client Sample Results

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G57S
Lab Sample ID: 140-23190-5

Date Collected: 05/19/21 10:48
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 84.2

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.6	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Calcium	**800**	**J B**	1200	9.0	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Cobalt	ND		12	0.21	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Iron	ND		24	14	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Lead	ND		2.4	0.52	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Lithium	ND		12	0.71	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Manganese	**16**		3.6	0.15	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Molybdenum	ND		9.5	0.39	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Potassium	ND		1200	120	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Sodium	ND		1200	620	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4
Selenium	ND		2.4	0.81	mg/Kg	☼	07/02/21 08:00	07/13/21 11:45	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.4**	**J**	36	5.7	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Calcium	**3600**		890	7.8	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Cobalt	ND		8.9	0.22	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Iron	**26**		18	10	mg/Kg	☼	07/02/21 14:02	07/17/21 11:09	3
Lead	**0.95**	**J**	1.8	0.39	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Lithium	**0.57**	**J**	8.9	0.53	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Manganese	**88**		2.7	1.0	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Molybdenum	ND		7.1	0.29	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Potassium	ND		890	93	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3
Selenium	ND		1.8	0.61	mg/Kg	☼	07/02/21 14:02	07/13/21 14:21	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**76**		12	2.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Arsenic	ND		0.59	0.15	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Calcium	**10**	**J**	300	1.8	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Cobalt	**1.7**	**J**	3.0	0.053	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Iron	**1000**		5.9	3.4	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Lead	ND		0.59	0.13	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Lithium	**0.18**	**J**	3.0	0.18	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Manganese	**200**	**B**	0.89	0.032	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Molybdenum	ND		2.4	0.097	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Potassium	ND		300	31	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Sodium	**9400**		300	150	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1
Selenium	**0.21**	**J**	0.59	0.20	mg/Kg	☼	07/07/21 08:00	07/14/21 12:20	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**440**		12	1.9	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Arsenic	**0.63**		0.59	0.26	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Calcium	**14000**		300	2.6	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Cobalt	**1.2**	**J**	3.0	0.063	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Iron	**6300**		5.9	3.4	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Lead	**6.0**		0.59	0.13	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1

Client Sample Results

Client: Golder Associates Inc. — Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G57S — **Lab Sample ID: 140-23190-5**
Date Collected: 05/19/21 10:48 — **Matrix: Solid**
Date Received: 05/21/21 09:20 — **Percent Solids: 84.2**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**0.89**	**J**	3.0	0.18	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Manganese	**240**		0.89	0.15	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Molybdenum	ND		2.4	0.097	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Potassium	ND		300	31	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Sodium	**1200**		300	150	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1
Selenium	ND		0.59	0.56	mg/Kg	☼	07/08/21 08:00	07/14/21 14:18	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**330**		180	28	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Calcium	**13000**	**B**	4500	13	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Cobalt	ND		45	0.71	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Iron	ND		89	52	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Lead	ND		8.9	2.0	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Lithium	ND		45	2.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Manganese	**17**		13	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Molybdenum	ND		36	1.5	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Potassium	**3000**	**J B**	4500	500	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5
Selenium	ND		8.9	3.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:11	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3500**		12	1.9	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Arsenic	**2.4**		0.59	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Calcium	**5500**		300	2.5	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Cobalt	**2.2**	**J**	3.0	0.055	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Iron	**8000**		5.9	3.4	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Lead	**3.5**		0.59	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Lithium	**5.3**		3.0	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Manganese	**100**		0.89	0.30	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Potassium	**540**		300	31	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1
Sodium	**28000**		1500	770	mg/Kg	☼	07/09/21 08:00	07/15/21 18:27	5
Selenium	ND		0.59	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 16:09	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**33000**		120	19	mg/Kg	☼	07/12/21 08:00	07/17/21 13:22	10
Arsenic	**2.2**	**B**	0.59	0.15	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Calcium	**2100**		300	3.1	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Cobalt	**0.93**	**J**	5.9	0.062	mg/Kg	☼	07/12/21 08:00	07/17/21 17:09	2
Iron	**4500**		5.9	4.9	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Lead	**3.2**		1.2	0.26	mg/Kg	☼	07/12/21 08:00	07/17/21 17:09	2
Lithium	**13**		3.0	0.18	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Manganese	**46**		0.89	0.13	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Molybdenum	ND		2.4	0.097	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Potassium	**18000**		1500	59	mg/Kg	☼	07/12/21 08:00	07/17/21 17:14	5
Sodium	**7400**		300	51	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/12/21 08:00	07/17/21 15:16	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Client Sample ID: B-G57S
Date Collected: 05/19/21 10:48
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-5
Matrix: Solid
Percent Solids: 84.2

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	5.2		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	39000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	6.0		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	20000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	14		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	20		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	700		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	21000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	46000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	0.21	J	0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	7700		45	5.6	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Arsenic	3.2		2.2	0.33	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Calcium	28000		560	99	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Cobalt	5.8		5.6	0.054	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Iron	25000		22	8.9	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Lead	12		1.7	0.25	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Lithium	11		5.6	0.34	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Manganese	570		1.7	0.70	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Molybdenum	ND		4.5	0.12	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Potassium	1800		560	27	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Sodium	77	J	560	40	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1
Selenium	ND		1.7	0.49	mg/Kg	☼	06/28/21 08:00	07/07/21 15:04	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	25000		120	19	mg/Kg	☼	07/02/21 08:00	07/18/21 11:24	10
Arsenic	5.7	B	0.59	0.15	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Calcium	41000		3000	31	mg/Kg	☼	07/02/21 08:00	07/18/21 11:24	10
Cobalt	5.8		3.0	0.031	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Iron	17000		5.9	4.9	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Lead	14		0.59	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Lithium	17		3.0	0.18	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Manganese	520		0.89	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Molybdenum	0.29	J	2.4	0.097	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Potassium	20000		1500	59	mg/Kg	☼	07/02/21 08:00	07/18/21 15:26	5
Sodium	5700		300	51	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/02/21 08:00	07/18/21 13:14	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G62L **Lab Sample ID: 140-23190-6**
Date Collected: 05/19/21 14:00 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 76.4**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.4	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Arsenic	ND		2.6	0.68	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Calcium	**1800**	**B**	1300	10	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Cobalt	ND		13	0.24	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Iron	ND		26	15	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Lead	ND		2.6	0.58	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Lithium	ND		13	0.79	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Manganese	ND		3.9	0.16	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Molybdenum	ND		10	0.43	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Potassium	ND		1300	140	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Sodium	ND		1300	680	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4
Selenium	ND		2.6	0.89	mg/Kg	☼	07/02/21 08:00	07/13/21 11:50	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14**	**J**	39	6.3	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Arsenic	ND		2.0	0.51	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Calcium	**600**	**J**	980	8.6	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Cobalt	ND		9.8	0.25	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Iron	ND		20	11	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Lead	**1.6**	**J**	2.0	0.43	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Lithium	ND		9.8	0.59	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Manganese	ND		2.9	1.1	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Molybdenum	ND		7.9	0.32	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Potassium	ND		980	100	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3
Selenium	ND		2.0	0.67	mg/Kg	☼	07/02/21 14:02	07/13/21 14:26	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**400**		13	2.8	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Arsenic	**0.79**		0.65	0.17	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Calcium	**8.8**	**J**	330	2.0	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Cobalt	**1.4**	**J**	3.3	0.059	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Iron	**1000**		6.5	3.8	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Lead	**5.0**		0.65	0.14	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Lithium	**0.20**	**J**	3.3	0.20	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Manganese	**4.7**	**B**	0.98	0.035	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Molybdenum	ND		2.6	0.11	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Potassium	**34**	**J**	330	34	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1
Sodium	**14000**		650	340	mg/Kg	☼	07/07/21 08:00	07/14/21 15:52	2
Selenium	ND		0.65	0.22	mg/Kg	☼	07/07/21 08:00	07/14/21 12:25	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3100**		13	2.1	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Arsenic	**1.0**		0.65	0.29	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Calcium	**140**	**J**	330	2.9	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Cobalt	**3.9**		3.3	0.069	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Iron	**4900**		6.5	3.8	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Lead	**8.5**		0.65	0.14	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1

Client Sample ID: B-G62L
Lab Sample ID: 140-23190-6
Date Collected: 05/19/21 14:00
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 76.4

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	3.4		3.3	0.20	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Manganese	21		0.98	0.17	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Molybdenum	0.20	J	2.6	0.11	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Potassium	68	J	330	34	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Sodium	2300		330	170	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1
Selenium	ND		0.65	0.62	mg/Kg	☼	07/08/21 08:00	07/14/21 14:23	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	84	J	200	31	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Arsenic	ND		9.8	2.5	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Calcium	55	J B	4900	14	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Cobalt	ND		49	0.79	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Iron	67	J B	98	58	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Lead	ND		9.8	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Lithium	3.5	J	49	2.9	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Manganese	3.5	J	15	2.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Molybdenum	ND		39	1.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Potassium	2800	J B	4900	560	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5
Selenium	ND		9.8	3.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:16	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	10000		13	2.1	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Arsenic	1.2		0.65	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Calcium	73	J	330	2.8	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Cobalt	2.3	J	3.3	0.060	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Iron	7300		6.5	3.8	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Lead	2.6		0.65	0.14	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Lithium	6.7		3.3	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Manganese	26		0.98	0.33	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Molybdenum	ND		2.6	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Potassium	1300		330	34	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1
Sodium	49000		1600	850	mg/Kg	☼	07/09/21 08:00	07/15/21 18:31	5
Selenium	ND		0.65	0.22	mg/Kg	☼	07/09/21 08:00	07/15/21 16:14	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		130	21	mg/Kg	☼	07/12/21 08:00	07/17/21 13:26	10
Arsenic	2.0	B	1.3	0.34	mg/Kg	☼	07/12/21 08:00	07/17/21 17:19	2
Calcium	580		330	3.4	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Cobalt	0.95	J	6.5	0.068	mg/Kg	☼	07/12/21 08:00	07/17/21 17:19	2
Iron	5200		6.5	5.4	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Lead	2.1		1.3	0.29	mg/Kg	☼	07/12/21 08:00	07/17/21 17:19	2
Lithium	20		3.3	0.20	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Manganese	35		0.98	0.14	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Molybdenum	ND		2.6	0.11	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Potassium	12000		650	26	mg/Kg	☼	07/12/21 08:00	07/17/21 17:19	2
Sodium	8200		330	56	mg/Kg	☼	07/12/21 08:00	07/17/21 15:21	1
Selenium	ND		1.3	0.45	mg/Kg	☼	07/12/21 08:00	07/17/21 17:19	2

Client Sample Results

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G62L

Lab Sample ID: 140-23190-6

Date Collected: 05/19/21 14:00
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 76.4

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	44000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	5.0		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	3200		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	8.5		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	19000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	20		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	34		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	91		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	0.20	J	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	16000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	74000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	ND		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		51	6.4	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Arsenic	3.3		2.6	0.37	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Calcium	1800		640	110	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Cobalt	7.9		6.4	0.062	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Iron	14000		26	10	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Lead	14		1.9	0.28	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Lithium	14		6.4	0.39	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Manganese	59		1.9	0.80	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Molybdenum	0.32	J	5.1	0.14	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Potassium	1800		640	31	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Sodium	56	J	640	46	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1
Selenium	ND		1.9	0.56	mg/Kg	☼	06/28/21 08:00	07/07/21 15:09	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	48000		130	21	mg/Kg	☼	07/02/21 08:00	07/18/21 11:29	10
Arsenic	4.9	B	0.65	0.17	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Calcium	3400		3300	34	mg/Kg	☼	07/02/21 08:00	07/18/21 11:29	10
Cobalt	9.2		6.5	0.068	mg/Kg	☼	07/02/21 08:00	07/18/21 15:31	2
Iron	16000		6.5	5.4	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Lead	22		1.3	0.29	mg/Kg	☼	07/02/21 08:00	07/18/21 15:31	2
Lithium	34		3.3	0.20	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Manganese	87		0.98	0.14	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Molybdenum	0.39	J	2.6	0.11	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Potassium	19000		1600	65	mg/Kg	☼	07/02/21 08:00	07/18/21 15:36	5
Sodium	3700		330	56	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1
Selenium	ND		0.65	0.22	mg/Kg	☼	07/02/21 08:00	07/18/21 13:19	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G53S
Lab Sample ID: 140-23190-7
Date Collected: 05/19/21 16:15
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 88.0

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		45	7.3	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Calcium	**620**	**J B**	1100	8.6	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Cobalt	ND		11	0.20	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Iron	ND		23	13	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Lead	ND		2.3	0.50	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Lithium	ND		11	0.68	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Manganese	**11**		3.4	0.14	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Molybdenum	ND		9.1	0.37	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Potassium	ND		1100	120	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Sodium	ND		1100	590	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4
Selenium	ND		2.3	0.77	mg/Kg	☼	07/02/21 08:00	07/13/21 11:55	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10**	**J**	34	5.5	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Arsenic	ND		1.7	0.44	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Calcium	**13000**		850	7.5	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Cobalt	ND		8.5	0.21	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Iron	**310**		17	9.9	mg/Kg	☼	07/02/21 14:02	07/17/21 11:14	3
Lead	**1.9**		1.7	0.37	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Lithium	ND		8.5	0.51	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Manganese	**150**		2.6	0.95	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Molybdenum	ND		6.8	0.28	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Potassium	ND		850	89	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3
Selenium	ND		1.7	0.58	mg/Kg	☼	07/02/21 14:02	07/13/21 14:31	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**48**		11	2.4	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Arsenic	**0.26**	**J**	0.57	0.15	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Calcium	**7.2**	**J**	280	1.7	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Cobalt	**0.25**	**J**	2.8	0.051	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Iron	**2200**		5.7	3.3	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Lead	ND		0.57	0.12	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Lithium	ND		2.8	0.17	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Manganese	**40**	**B**	0.85	0.031	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Molybdenum	ND		2.3	0.093	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Potassium	ND		280	30	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Sodium	**6200**		280	150	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1
Selenium	ND		0.57	0.19	mg/Kg	☼	07/07/21 08:00	07/14/21 12:30	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**190**		11	1.8	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Arsenic	**0.25**	**J**	0.57	0.25	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Calcium	**44000**		280	2.5	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Cobalt	**1.2**	**J**	2.8	0.060	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Iron	**2200**		5.7	3.3	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Lead	**5.3**		0.57	0.12	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1

Client Sample ID: B-G53S **Lab Sample ID: 140-23190-7**
Date Collected: 05/19/21 16:15 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 88.0**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**1.2**	**J**	2.8	0.17	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Manganese	**200**		0.85	0.15	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Molybdenum	**0.11**	**J**	2.3	0.093	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Potassium	ND		280	30	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Sodium	**770**		280	150	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1
Selenium	ND		0.57	0.53	mg/Kg	☼	07/08/21 08:00	07/14/21 14:28	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**92**	**J**	170	27	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Arsenic	ND		8.5	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Calcium	**12000**	**B**	4300	12	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Cobalt	ND		43	0.68	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Iron	ND		85	50	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Lead	ND		8.5	1.9	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Lithium	ND		43	2.5	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Manganese	**12**	**J**	13	2.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Molybdenum	ND		34	1.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Potassium	**2800**	**J B**	4300	480	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5
Selenium	ND		8.5	3.0	mg/Kg	☼	07/08/21 15:21	07/15/21 14:21	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1700**		11	1.8	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Arsenic	**2.6**		0.57	0.17	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Calcium	**8900**		280	2.4	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Cobalt	**1.6**	**J**	2.8	0.052	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Iron	**5700**		5.7	3.3	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Lead	**2.0**		0.57	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Lithium	**3.6**		2.8	0.17	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Manganese	**63**		0.85	0.28	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Molybdenum	**0.37**	**J**	2.3	0.11	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Potassium	**380**		280	30	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1
Sodium	**19000**		1400	740	mg/Kg	☼	07/09/21 08:00	07/15/21 18:47	5
Selenium	ND		0.57	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 16:19	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26000**		110	18	mg/Kg	☼	07/12/21 08:00	07/17/21 13:53	10
Arsenic	**2.1**	**B**	1.1	0.30	mg/Kg	☼	07/12/21 08:00	07/17/21 17:29	2
Calcium	**2000**		280	3.0	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Cobalt	**0.28**	**J**	2.8	0.030	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Iron	**3200**		5.7	4.7	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Lead	**2.6**		1.1	0.25	mg/Kg	☼	07/12/21 08:00	07/17/21 17:29	2
Lithium	**10**		2.8	0.17	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Manganese	**27**		0.85	0.12	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Molybdenum	ND		2.3	0.093	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Potassium	**16000**		1400	57	mg/Kg	☼	07/12/21 08:00	07/17/21 17:43	5
Sodium	**5200**		280	49	mg/Kg	☼	07/12/21 08:00	07/17/21 15:26	1
Selenium	ND		1.1	0.39	mg/Kg	☼	07/12/21 08:00	07/17/21 17:29	2

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G53S **Lab Sample ID: 140-23190-7**
Date Collected: 05/19/21 16:15 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 88.0**

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28000**		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	**5.2**		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	**80000**		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	**3.2**		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	**14000**		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	**12**		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	**15**		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	**500**		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	**0.48**	**J**	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	**19000**		250	26	mg/Kg			07/19/21 15:03	1
Sodium	**31000**		250	130	mg/Kg			07/19/21 15:03	1
Selenium	ND		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3800**		44	5.5	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Arsenic	**3.5**		2.2	0.32	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Calcium	**63000**		550	97	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Cobalt	**3.6**	**J**	5.5	0.053	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Iron	**11000**		22	8.7	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Lead	**7.8**		1.7	0.24	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Lithium	**6.6**		5.5	0.33	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Manganese	**420**		1.7	0.68	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Molybdenum	**0.46**	**J**	4.4	0.12	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Potassium	**1100**		550	26	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Sodium	**79**	**J**	550	40	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1
Selenium	ND		1.7	0.49	mg/Kg	☼	06/28/21 08:00	07/07/21 15:14	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7500**		110	18	mg/Kg	☼	07/02/21 08:00	07/18/21 11:43	10
Arsenic	**4.1**	**B**	1.1	0.30	mg/Kg	☼	07/02/21 08:00	07/18/21 15:57	2
Calcium	**64000**		2800	30	mg/Kg	☼	07/02/21 08:00	07/18/21 11:43	10
Cobalt	**3.0**		2.8	0.030	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Iron	**11000**		5.7	4.7	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Lead	**11**		1.1	0.25	mg/Kg	☼	07/02/21 08:00	07/18/21 15:57	2
Lithium	**10**		2.8	0.17	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Manganese	**400**		0.85	0.12	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Molybdenum	**0.55**	**J**	2.3	0.093	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Potassium	**13000**		1400	57	mg/Kg	☼	07/02/21 08:00	07/18/21 16:02	5
Sodium	**3400**		280	49	mg/Kg	☼	07/02/21 08:00	07/18/21 13:24	1
Selenium	ND		1.1	0.39	mg/Kg	☼	07/02/21 08:00	07/18/21 15:57	2

Client Sample ID: B-G02S **Lab Sample ID: 140-23190-8**
Date Collected: 05/20/21 09:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.7	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Calcium	**960**	**J B**	1200	9.1	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Iron	ND		24	14	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Lead	ND		2.4	0.53	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Lithium	ND		12	0.72	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Manganese	**3.5**	**J**	3.6	0.15	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Molybdenum	ND		9.6	0.39	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Potassium	ND		1200	120	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Sodium	ND		1200	620	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4
Selenium	ND		2.4	0.82	mg/Kg	☼	07/02/21 08:00	07/13/21 12:10	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**23**	**J**	36	5.8	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Arsenic	ND		1.8	0.47	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Calcium	**210**	**J**	900	7.9	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Cobalt	ND		9.0	0.23	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Iron	**210**		18	10	mg/Kg	☼	07/02/21 14:02	07/17/21 11:19	3
Lead	**5.6**		1.8	0.40	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Lithium	ND		9.0	0.54	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Manganese	**3.2**		2.7	1.0	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Molybdenum	ND		7.2	0.30	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Potassium	ND		900	94	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3
Selenium	ND		1.8	0.61	mg/Kg	☼	07/02/21 14:02	07/13/21 14:46	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**300**		12	2.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Arsenic	**0.63**		0.60	0.16	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Calcium	**6.5**	**J**	300	1.8	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Cobalt	**0.37**	**J**	3.0	0.054	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Iron	**1700**		6.0	3.5	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Lead	**0.20**	**J**	0.60	0.13	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Lithium	**0.19**	**J**	3.0	0.18	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Manganese	**15**	**B**	0.90	0.032	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Potassium	ND		300	31	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Sodium	**9600**		300	160	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/07/21 08:00	07/14/21 12:45	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2700**		12	1.9	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Arsenic	**0.83**		0.60	0.26	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Calcium	**2000**		300	2.6	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Cobalt	**2.9**	**J**	3.0	0.064	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Iron	**4200**		6.0	3.5	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Lead	**9.8**		0.60	0.13	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G02S Lab Sample ID: 140-23190-8

Date Collected: 05/20/21 09:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	**3.9**		3.0	0.18	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Manganese	**36**		0.90	0.16	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Potassium	**63**	**J**	300	31	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Sodium	**1100**		300	160	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1
Selenium	ND		0.60	0.56	mg/Kg	☼	07/08/21 08:00	07/14/21 14:43	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**100**	**J**	180	28	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Calcium	**370**	**J B**	4500	13	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Cobalt	ND		45	0.72	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Iron	ND		90	53	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Lead	ND		9.0	2.0	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Lithium	**2.8**	**J**	45	2.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Manganese	ND		14	2.2	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Molybdenum	ND		36	1.5	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Potassium	**2600**	**J B**	4500	510	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5
Selenium	ND		9.0	3.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:35	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**4100**		12	1.9	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Arsenic	**0.94**		0.60	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Calcium	**140**	**J**	300	2.5	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Cobalt	**1.4**	**J**	3.0	0.055	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Iron	**4100**		6.0	3.5	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Lead	**1.8**		0.60	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Lithium	**3.4**		3.0	0.18	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Manganese	**20**		0.90	0.30	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Potassium	**680**		300	31	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1
Sodium	**30000**		1500	780	mg/Kg	☼	07/09/21 08:00	07/15/21 18:52	5
Selenium	ND		0.60	0.20	mg/Kg	☼	07/09/21 08:00	07/15/21 16:34	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30000**		120	19	mg/Kg	☼	07/12/21 08:00	07/17/21 13:58	10
Arsenic	**2.0**	**B**	1.2	0.31	mg/Kg	☼	07/12/21 08:00	07/17/21 17:48	2
Calcium	**1300**		300	3.1	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Cobalt	**0.98**	**J**	3.0	0.031	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Iron	**3800**		6.0	4.9	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Lead	**3.1**		1.2	0.26	mg/Kg	☼	07/12/21 08:00	07/17/21 17:48	2
Lithium	**14**		3.0	0.18	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Manganese	**30**		0.90	0.13	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Potassium	**16000**		1500	60	mg/Kg	☼	07/12/21 08:00	07/17/21 17:53	5
Sodium	**6600**		300	52	mg/Kg	☼	07/12/21 08:00	07/17/21 15:31	1
Selenium	ND		1.2	0.41	mg/Kg	☼	07/12/21 08:00	07/17/21 17:48	2

Client Sample Results

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G02S
Lab Sample ID: 140-23190-8

Date Collected: 05/20/21 09:40
Matrix: Solid

Date Received: 05/21/21 09:20
Percent Solids: 83.3

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**38000**		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	**4.4**		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	**4900**		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	**5.6**		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	**14000**		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	**21**		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	**24**		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	**110**		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	**20000**		250	26	mg/Kg			07/19/21 15:03	1
Sodium	**47000**		250	130	mg/Kg			07/19/21 15:03	1
Selenium	ND		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9700**		45	5.6	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Arsenic	**2.3**		2.2	0.33	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Calcium	**3200**		560	99	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Cobalt	**4.5**	**J**	5.6	0.054	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Iron	**10000**		22	8.9	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Lead	**15**		1.7	0.25	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Lithium	**9.9**		5.6	0.34	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Manganese	**67**		1.7	0.70	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Molybdenum	**0.18**	**J**	4.5	0.12	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Potassium	**1300**		560	27	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Sodium	**51**	**J**	560	40	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1
Selenium	ND		1.7	0.49	mg/Kg	☼	06/28/21 08:00	07/07/21 15:19	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**39000**		120	19	mg/Kg	☼	07/02/21 08:00	07/18/21 11:48	10
Arsenic	**3.8**	**B**	0.60	0.16	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Calcium	**5500**		3000	31	mg/Kg	☼	07/02/21 08:00	07/18/21 11:48	10
Cobalt	**5.1**		3.0	0.031	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Iron	**12000**		6.0	4.9	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Lead	**19**		0.60	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Lithium	**19**		3.0	0.18	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Manganese	**100**		0.90	0.13	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Molybdenum	**0.27**	**J**	2.4	0.098	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Potassium	**17000**		1500	60	mg/Kg	☼	07/02/21 08:00	07/18/21 16:07	5
Sodium	**4600**		300	52	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/02/21 08:00	07/18/21 13:30	1

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Client Sample ID: B-G02L
Date Collected: 05/20/21 10:30
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-9
Matrix: Solid
Percent Solids: 78.1

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		51	8.2	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Arsenic	ND		2.6	0.67	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Calcium	**1400**	**B**	1300	9.7	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Cobalt	ND		13	0.23	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Iron	ND		26	15	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Lead	ND		2.6	0.56	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Lithium	ND		13	0.77	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Manganese	ND		3.8	0.16	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Molybdenum	ND		10	0.42	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Potassium	ND		1300	130	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Sodium	ND		1300	670	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4
Selenium	ND		2.6	0.87	mg/Kg	☼	07/02/21 08:00	07/13/21 12:15	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**12**	**J**	38	6.1	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Arsenic	ND		1.9	0.50	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Calcium	**2400**		960	8.5	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Cobalt	ND		9.6	0.24	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Iron	ND		19	11	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Lead	ND		1.9	0.42	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Lithium	ND		9.6	0.58	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Manganese	**4.0**		2.9	1.1	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Molybdenum	ND		7.7	0.32	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Potassium	ND		960	100	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3
Selenium	ND		1.9	0.65	mg/Kg	☼	07/02/21 14:02	07/13/21 14:51	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**210**		13	2.7	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Arsenic	**0.46**	**J**	0.64	0.17	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Calcium	**10**	**J**	320	1.9	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Cobalt	**3.4**		3.2	0.058	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Iron	**530**		6.4	3.7	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Lead	ND		0.64	0.14	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Lithium	**0.24**	**J**	3.2	0.19	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Manganese	**360**	**B**	0.96	0.035	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Molybdenum	**0.22**	**J**	2.6	0.11	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Potassium	ND		320	33	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Sodium	**12000**		320	170	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1
Selenium	ND		0.64	0.22	mg/Kg	☼	07/07/21 08:00	07/14/21 12:50	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1800**		13	2.0	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Arsenic	**2.7**		0.64	0.28	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Calcium	**5700**		320	2.8	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Cobalt	**1.7**	**J**	3.2	0.068	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Iron	**8400**		6.4	3.7	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Lead	**5.8**		0.64	0.14	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1

Client Sample ID: B-G02L **Lab Sample ID: 140-23190-9**
Date Collected: 05/20/21 10:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 78.1**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	2.1	J	3.2	0.19	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Manganese	140		0.96	0.17	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Molybdenum	0.53	J	2.6	0.11	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Potassium	ND		320	33	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Sodium	1900		320	170	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1
Selenium	ND		0.64	0.60	mg/Kg	☼	07/08/21 08:00	07/14/21 14:48	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	140	J	190	30	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Arsenic	ND		9.6	2.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Calcium	7500	B	4800	14	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Cobalt	ND		48	0.77	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Iron	ND		96	56	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Lead	ND		9.6	2.1	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Lithium	ND		48	2.8	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Manganese	22		14	2.4	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Molybdenum	ND		38	1.6	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Potassium	2800	J B	4800	540	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5
Selenium	ND		9.6	3.3	mg/Kg	☼	07/08/21 15:21	07/15/21 14:40	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5000		13	2.0	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Arsenic	1.9		0.64	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Calcium	3400		320	2.7	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Cobalt	1.7	J	3.2	0.059	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Iron	7400		6.4	3.7	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Lead	2.7		0.64	0.14	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Lithium	4.6		3.2	0.19	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Manganese	78		0.96	0.32	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Molybdenum	ND		2.6	0.13	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Potassium	730		320	33	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1
Sodium	35000		1600	830	mg/Kg	☼	07/09/21 08:00	07/15/21 18:57	5
Selenium	ND		0.64	0.22	mg/Kg	☼	07/09/21 08:00	07/15/21 16:39	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38000		130	20	mg/Kg	☼	07/12/21 08:00	07/17/21 14:03	10
Arsenic	2.2	B	0.64	0.17	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Calcium	3700		3200	33	mg/Kg	☼	07/12/21 08:00	07/17/21 14:03	10
Cobalt	1.1	J	6.4	0.067	mg/Kg	☼	07/12/21 08:00	07/17/21 17:58	2
Iron	5900		6.4	5.3	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Lead	3.9		1.3	0.28	mg/Kg	☼	07/12/21 08:00	07/17/21 17:58	2
Lithium	11		3.2	0.19	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Manganese	71		0.96	0.14	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Molybdenum	0.15	J	2.6	0.11	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Potassium	17000		1600	64	mg/Kg	☼	07/12/21 08:00	07/17/21 18:02	5
Sodium	10000		320	55	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1
Selenium	ND		0.64	0.22	mg/Kg	☼	07/12/21 08:00	07/17/21 15:36	1

Client Sample Results

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G02L

Lab Sample ID: 140-23190-9
Date Collected: 05/20/21 10:30
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 78.1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	45000		10	1.6	mg/Kg			07/19/21 15:03	1
Arsenic	7.2		0.50	0.13	mg/Kg			07/19/21 15:03	1
Calcium	24000		250	0.74	mg/Kg			07/19/21 15:03	1
Cobalt	7.9		2.5	0.023	mg/Kg			07/19/21 15:03	1
Iron	22000		5.0	4.1	mg/Kg			07/19/21 15:03	1
Lead	12		0.50	0.11	mg/Kg			07/19/21 15:03	1
Lithium	18		2.5	0.15	mg/Kg			07/19/21 15:03	1
Manganese	670		0.75	0.052	mg/Kg			07/19/21 15:03	1
Molybdenum	0.90	J	2.0	0.082	mg/Kg			07/19/21 15:03	1
Potassium	20000		250	26	mg/Kg			07/19/21 15:03	1
Sodium	59000		250	130	mg/Kg			07/19/21 15:03	1
Selenium	ND		0.50	0.17	mg/Kg			07/19/21 15:03	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		49	6.2	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Arsenic	5.6		2.5	0.36	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Calcium	21000		620	110	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Cobalt	6.3		6.2	0.059	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Iron	16000		25	9.7	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Lead	11		1.9	0.27	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Lithium	10		6.2	0.37	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Manganese	600		1.9	0.77	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Molybdenum	0.60	J	4.9	0.14	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Potassium	1300		620	30	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Sodium	92	J	620	44	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1
Selenium	ND		1.9	0.54	mg/Kg	☼	06/28/21 08:00	07/07/21 15:24	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	56000		130	20	mg/Kg	☼	07/02/21 08:00	07/18/21 11:53	10
Arsenic	8.4	B	0.64	0.17	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Calcium	38000		3200	33	mg/Kg	☼	07/02/21 08:00	07/18/21 11:53	10
Cobalt	9.9		6.4	0.067	mg/Kg	☼	07/02/21 08:00	07/18/21 16:11	2
Iron	22000		6.4	5.3	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Lead	18		1.3	0.28	mg/Kg	☼	07/02/21 08:00	07/18/21 16:11	2
Lithium	19		3.2	0.19	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Manganese	700		0.96	0.14	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Molybdenum	1.0	J	2.6	0.11	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Potassium	24000		1600	64	mg/Kg	☼	07/02/21 08:00	07/18/21 16:17	5
Sodium	8200		320	55	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1
Selenium	ND		0.64	0.22	mg/Kg	☼	07/02/21 08:00	07/18/21 13:35	1

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Prep: 3010A
SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	1.9	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.031	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A
SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.28	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Prep: 3010A
SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	1.5	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.027	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A
SEP: Metal Hydroxide

Default Detection Limits

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A
SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.22	mg/Kg
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.13	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.47	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Prep: 3010A
SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Calcium	750	2.2	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Iron	15	8.8	mg/Kg
Lead	1.5	0.33	mg/Kg
Lithium	7.5	0.44	mg/Kg
Manganese	2.3	0.37	mg/Kg
Molybdenum	6.0	0.25	mg/Kg
Potassium	750	85	mg/Kg
Selenium	1.5	0.52	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Calcium	250	2.1	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.25	mg/Kg
Molybdenum	2.0	0.099	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.13	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)
Prep: Residual

Analyte	RL	MDL	Units
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.11	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	0.74	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B - Metals (ICP)
Prep: 3050B

Analyte	RL	MDL	Units
Aluminum	40	5.0	mg/Kg
Arsenic	2.0	0.29	mg/Kg
Calcium	500	88	mg/Kg
Cobalt	5.0	0.048	mg/Kg
Iron	20	7.9	mg/Kg
Lead	1.5	0.22	mg/Kg
Lithium	5.0	0.30	mg/Kg
Manganese	1.5	0.62	mg/Kg
Molybdenum	4.0	0.11	mg/Kg
Potassium	500	24	mg/Kg
Selenium	1.5	0.44	mg/Kg
Sodium	500	36	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total
Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg

Default Detection Limits

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Prep: Total

Analyte	RL	MDL	Units
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.11	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

QC Sample Results

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-51236/21-A
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 51553
Prep Batch: 51236

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	5.0	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Arsenic	ND		2.0	0.29	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Calcium	ND		500	88	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Cobalt	ND		5.0	0.048	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Iron	ND		20	7.9	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Lead	ND		1.5	0.22	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Lithium	ND		5.0	0.30	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Manganese	ND		1.5	0.62	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Molybdenum	ND		4.0	0.11	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Potassium	ND		500	24	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Sodium	ND		500	36	mg/Kg		06/28/21 08:00	07/07/21 11:36	1
Selenium	ND		1.5	0.44	mg/Kg		06/28/21 08:00	07/07/21 11:36	1

Lab Sample ID: LCS 140-51236/22-A
Client Sample ID: Lab Control Sample
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 51553
Prep Batch: 51236

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	200	200		mg/Kg		100	90 - 110
Arsenic	10.0	9.56		mg/Kg		96	90 - 110
Calcium	5000	5040		mg/Kg		101	90 - 110
Cobalt	10.0	10.2		mg/Kg		102	90 - 110
Iron	100	103		mg/Kg		103	90 - 113
Lead	10.0	10.2		mg/Kg		102	90 - 110
Lithium	10.0	9.79		mg/Kg		98	80 - 120
Manganese	10.0	10.3		mg/Kg		103	90 - 110
Molybdenum	50.0	51.8		mg/Kg		104	90 - 110
Potassium	5000	4970		mg/Kg		99	90 - 110
Sodium	5000	5050		mg/Kg		101	87 - 116
Selenium	15.0	14.8		mg/Kg		99	90 - 110

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-51423/17-A
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 51841
Prep Batch: 51423

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Arsenic	0.155	J	0.50	0.13	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Calcium	ND		250	2.6	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Cobalt	ND		2.5	0.026	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Iron	ND		5.0	4.1	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Lead	ND		0.50	0.11	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Lithium	ND		2.5	0.15	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Manganese	ND		0.75	0.11	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Potassium	ND		250	10	mg/Kg		07/02/21 08:00	07/18/21 10:46	1
Sodium	ND		250	43	mg/Kg		07/02/21 08:00	07/18/21 10:46	1

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: MB 140-51423/17-A
Matrix: Solid
Analysis Batch: 51841

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51423

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.50	0.17	mg/Kg		07/02/21 08:00	07/18/21 10:46	1

Lab Sample ID: LCS 140-51423/18-A
Matrix: Solid
Analysis Batch: 51841

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51423

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	101		mg/Kg		101	80 - 120
Arsenic	5.00	5.14		mg/Kg		103	80 - 120
Calcium	2500	2520		mg/Kg		101	80 - 120
Cobalt	5.00	5.18		mg/Kg		104	80 - 125
Iron	50.0	52.2		mg/Kg		104	80 - 120
Lead	5.00	5.33		mg/Kg		107	80 - 120
Lithium	5.00	5.00		mg/Kg		100	80 - 120
Manganese	5.00	5.36		mg/Kg		107	80 - 120
Molybdenum	25.0	26.2		mg/Kg		105	80 - 125
Potassium	2500	2530		mg/Kg		101	80 - 120
Sodium	2500	2570		mg/Kg		103	80 - 120
Selenium	7.50	7.44		mg/Kg		99	80 - 120

Lab Sample ID: LCSD 140-51423/19-A
Matrix: Solid
Analysis Batch: 51841

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51423

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	101		mg/Kg		101	80 - 120	0	30
Arsenic	5.00	5.15		mg/Kg		103	80 - 120	0	30
Calcium	2500	2540		mg/Kg		101	80 - 120	1	30
Cobalt	5.00	5.22		mg/Kg		104	80 - 125	1	30
Iron	50.0	51.9		mg/Kg		104	80 - 120	1	30
Lead	5.00	5.37		mg/Kg		107	80 - 120	1	30
Lithium	5.00	4.98		mg/Kg		100	80 - 120	0	30
Manganese	5.00	5.31		mg/Kg		106	80 - 120	1	30
Molybdenum	25.0	26.5		mg/Kg		106	80 - 125	1	30
Potassium	2500	2550		mg/Kg		102	80 - 120	0	30
Sodium	2500	2570		mg/Kg		103	80 - 120	0	30
Selenium	7.50	7.45		mg/Kg		99	80 - 120	0	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-51421/17-B ^4
Matrix: Solid
Analysis Batch: 51720

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 51438

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Arsenic	ND		2.0	0.52	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Calcium	22.6	J	1000	7.6	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Cobalt	ND		10	0.18	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Iron	ND		20	12	mg/Kg		07/02/21 08:00	07/13/21 11:12	4

1 2 3 4 5 6 7 8 9 10 11 12 13

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-51421/17-B ^4
Matrix: Solid
Analysis Batch: 51720

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 51438

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		2.0	0.44	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Lithium	ND		10	0.60	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Manganese	ND		3.0	0.12	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Molybdenum	ND		8.0	0.33	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Potassium	ND		1000	100	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Sodium	ND		1000	520	mg/Kg		07/02/21 08:00	07/13/21 11:12	4
Selenium	ND		2.0	0.68	mg/Kg		07/02/21 08:00	07/13/21 11:12	4

Lab Sample ID: LCS 140-51421/18-B ^5
Matrix: Solid
Analysis Batch: 51720

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 51438

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	97.7		mg/Kg		98	80 - 120
Arsenic	5.00	4.83		mg/Kg		97	80 - 120
Calcium	2500	2550		mg/Kg		102	80 - 120
Cobalt	5.00	5.14	J	mg/Kg		103	80 - 120
Iron	50.0	52.3		mg/Kg		105	80 - 120
Lead	5.00	5.20		mg/Kg		104	80 - 120
Lithium	5.00	5.59	J	mg/Kg		112	80 - 120
Manganese	5.00	5.48		mg/Kg		110	80 - 120
Molybdenum	25.0	25.8		mg/Kg		103	80 - 120
Potassium	2500	2670		mg/Kg		107	80 - 120
Sodium	2500	2640		mg/Kg		106	80 - 120
Selenium	7.50	7.37		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 140-51421/19-B ^5
Matrix: Solid
Analysis Batch: 51720

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 51438

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	102		mg/Kg		102	80 - 120	5	30
Arsenic	5.00	4.88		mg/Kg		98	80 - 120	1	30
Calcium	2500	2510		mg/Kg		101	80 - 120	1	30
Cobalt	5.00	5.06	J	mg/Kg		101	80 - 120	1	30
Iron	50.0	51.1		mg/Kg		102	80 - 120	2	30
Lead	5.00	5.25		mg/Kg		105	80 - 120	1	30
Lithium	5.00	5.31	J	mg/Kg		106	80 - 120	5	30
Manganese	5.00	5.34		mg/Kg		107	80 - 120	3	30
Molybdenum	25.0	25.4		mg/Kg		102	80 - 120	1	30
Potassium	2500	2620		mg/Kg		105	80 - 120	2	30
Sodium	2500	2600		mg/Kg		104	80 - 120	2	30
Selenium	7.50	7.27		mg/Kg		97	80 - 120	1	30

1 2 3 4 5 6 7 8 9 10 11 12 13

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-51449/17-B ^3
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Step 2
Analysis Batch: 51720
Prep Batch: 51455

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Arsenic	ND		1.5	0.39	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Calcium	ND		750	6.6	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Cobalt	ND		7.5	0.19	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Iron	28.7		15	8.7	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Lead	ND		1.5	0.33	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Lithium	ND		7.5	0.45	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Manganese	ND		2.3	0.84	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Molybdenum	ND		6.0	0.25	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Potassium	ND		750	78	mg/Kg		07/02/21 14:02	07/13/21 13:08	3
Selenium	ND		1.5	0.51	mg/Kg		07/02/21 14:02	07/13/21 13:08	3

Lab Sample ID: MB 140-51449/17-B ^3
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Step 2
Analysis Batch: 51840
Prep Batch: 51455

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		15	8.7	mg/Kg		07/02/21 14:02	07/17/21 10:54	3

Lab Sample ID: LCS 140-51449/18-B ^5
Client Sample ID: Lab Control Sample
Matrix: Solid
Prep Type: Step 2
Analysis Batch: 51720
Prep Batch: 51455

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	ND		mg/Kg		2	
Arsenic	5.00	3.60		mg/Kg		72	60 - 120
Calcium	2500	672	J	mg/Kg		27	10 - 40
Cobalt	5.00	4.76	J	mg/Kg		95	80 - 120
Iron	50.0	ND		mg/Kg		3	
Lead	5.00	4.53		mg/Kg		91	70 - 120
Lithium	5.00	4.93	J	mg/Kg		99	80 - 120
Manganese	5.00	4.88		mg/Kg		98	80 - 120
Molybdenum	25.0	21.1		mg/Kg		85	70 - 120
Potassium	2500	2440		mg/Kg		98	80 - 120
Selenium	7.50	6.26		mg/Kg		84	70 - 120

Lab Sample ID: LCSD 140-51449/19-B ^5
Client Sample ID: Lab Control Sample Dup
Matrix: Solid
Prep Type: Step 2
Analysis Batch: 51720
Prep Batch: 51455

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	ND		mg/Kg		-0.6		374	
Arsenic	5.00	3.80		mg/Kg		76	60 - 120	5	30
Calcium	2500	654	J	mg/Kg		26	10 - 40	3	30
Cobalt	5.00	4.64	J	mg/Kg		93	80 - 120	3	30
Iron	50.0	ND		mg/Kg		15		139	
Lead	5.00	4.11		mg/Kg		82	70 - 120	10	30
Lithium	5.00	4.67	J	mg/Kg		93	80 - 120	5	30
Manganese	5.00	4.89		mg/Kg		98	80 - 120	0	30

QC Sample Results

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-51449/19-B ^5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 2**
Analysis Batch: 51720 — **Prep Batch: 51455**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Molybdenum	25.0	20.5		mg/Kg		82	70 - 120	3	30
Potassium	2500	2400		mg/Kg		96	80 - 120	2	30
Selenium	7.50	6.03		mg/Kg		80	70 - 120	4	30

Lab Sample ID: MB 140-51456/17-B — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Step 3**
Analysis Batch: 51768 — **Prep Batch: 51501**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Arsenic	ND		0.50	0.13	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Calcium	ND		250	1.5	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Cobalt	ND		2.5	0.045	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Iron	ND		5.0	2.9	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Lead	ND		0.50	0.11	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Lithium	ND		2.5	0.15	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Manganese	0.0870	J	0.75	0.027	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Potassium	ND		250	26	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Sodium	ND		250	130	mg/Kg		07/07/21 08:00	07/14/21 11:46	1
Selenium	ND		0.50	0.17	mg/Kg		07/07/21 08:00	07/14/21 11:46	1

Lab Sample ID: LCS 140-51456/18-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 3**
Analysis Batch: 51768 — **Prep Batch: 51501**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.1		mg/Kg		96	80 - 120
Arsenic	5.00	4.64		mg/Kg		93	80 - 120
Calcium	2500	49.8	J	mg/Kg		2	
Cobalt	5.00	5.02		mg/Kg		100	80 - 120
Iron	50.0	49.7		mg/Kg		99	80 - 120
Lead	5.00	0.113	J	mg/Kg		2	
Lithium	5.00	4.81		mg/Kg		96	80 - 120
Manganese	5.00	5.04		mg/Kg		101	80 - 120
Molybdenum	25.0	24.3		mg/Kg		97	80 - 120
Potassium	2500	2380		mg/Kg		95	80 - 120
Sodium	2500	2370		mg/Kg		95	80 - 120
Selenium	7.50	7.27		mg/Kg		97	80 - 120

Lab Sample ID: LCSD 140-51456/19-B — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 3**
Analysis Batch: 51768 — **Prep Batch: 51501**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	95.9		mg/Kg		96	80 - 120	0	30
Arsenic	5.00	4.68		mg/Kg		94	80 - 120	1	30
Calcium	2500	51.1	J	mg/Kg		2		3	
Cobalt	5.00	5.01		mg/Kg		100	80 - 120	0	30

QC Sample Results

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-51456/19-B **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 3**
Analysis Batch: 51768 **Prep Batch: 51501**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	50.0	50.2		mg/Kg		100	80 - 120	1	30
Lead	5.00	ND		mg/Kg		2		25	
Lithium	5.00	4.86		mg/Kg		97	80 - 120	1	30
Manganese	5.00	5.02		mg/Kg		100	80 - 120	0	30
Molybdenum	25.0	24.2		mg/Kg		97	80 - 120	0	30
Potassium	2500	2390		mg/Kg		95	80 - 120	0	30
Sodium	2500	2370		mg/Kg		95	80 - 120	0	30
Selenium	7.50	7.20		mg/Kg		96	80 - 120	1	30

Lab Sample ID: MB 140-51499/17-B **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 51768 **Prep Batch: 51551**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Arsenic	ND		0.50	0.22	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Calcium	ND		250	2.2	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Cobalt	ND		2.5	0.053	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Iron	ND		5.0	2.9	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Lead	ND		0.50	0.11	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Lithium	ND		2.5	0.15	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Manganese	ND		0.75	0.13	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Potassium	ND		250	26	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Sodium	ND		250	130	mg/Kg		07/08/21 08:00	07/14/21 13:44	1
Selenium	ND		0.50	0.47	mg/Kg		07/08/21 08:00	07/14/21 13:44	1

Lab Sample ID: LCS 140-51499/18-B **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 51768 **Prep Batch: 51551**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	98.3		mg/Kg		98	80 - 120
Arsenic	5.00	5.06		mg/Kg		101	80 - 130
Calcium	2500	2470		mg/Kg		99	80 - 120
Cobalt	5.00	5.18		mg/Kg		104	80 - 120
Iron	50.0	51.1		mg/Kg		102	80 - 120
Lead	5.00	4.99		mg/Kg		100	80 - 120
Lithium	5.00	4.98		mg/Kg		100	80 - 120
Manganese	5.00	5.09		mg/Kg		102	80 - 120
Molybdenum	25.0	25.9		mg/Kg		104	80 - 120
Potassium	2500	2480		mg/Kg		99	80 - 120
Sodium	2500	2490		mg/Kg		100	80 - 120
Selenium	7.50	ND		mg/Kg		5	

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-51499/19-B **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 51768 **Prep Batch: 51551**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	103		mg/Kg		103	80 - 120	4	30
Arsenic	5.00	5.38		mg/Kg		108	80 - 130	6	30
Calcium	2500	2590		mg/Kg		103	80 - 120	5	30
Cobalt	5.00	5.44		mg/Kg		109	80 - 120	5	30
Iron	50.0	55.3		mg/Kg		111	80 - 120	8	30
Lead	5.00	5.25		mg/Kg		105	80 - 120	5	30
Lithium	5.00	5.16		mg/Kg		103	80 - 120	4	30
Manganese	5.00	5.35		mg/Kg		107	80 - 120	5	30
Molybdenum	25.0	27.2		mg/Kg		109	80 - 120	5	30
Potassium	2500	2580		mg/Kg		103	80 - 120	4	30
Sodium	2500	2600		mg/Kg		104	80 - 120	4	30
Selenium	7.50	ND		mg/Kg		5		13	

Lab Sample ID: MB 140-51550/17-B ^5 **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 51806 **Prep Batch: 51581**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Arsenic	ND		7.5	1.9	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Calcium	12.5	J	3800	11	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Cobalt	ND		38	0.60	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Iron	178		75	44	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Lead	ND		7.5	1.7	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Lithium	ND		38	2.2	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Manganese	ND		11	1.9	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Molybdenum	ND		30	1.3	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Potassium	2390	J	3800	430	mg/Kg		07/08/21 15:21	07/15/21 13:36	5
Selenium	ND		7.5	2.6	mg/Kg		07/08/21 15:21	07/15/21 13:36	5

Lab Sample ID: MB 140-51550/17-B ^5 **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 51840 **Prep Batch: 51581**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		75	44	mg/Kg		07/08/21 15:21	07/17/21 11:58	5

Lab Sample ID: LCS 140-51550/18-B ^5 **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 51806 **Prep Batch: 51581**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	ND		mg/Kg		4	
Arsenic	15.0	12.2		mg/Kg		81	60 - 100
Calcium	7500	2070	J	mg/Kg		28	20 - 50
Cobalt	15.0	0.630	J	mg/Kg		4	1 - 60
Iron	150	ND		mg/Kg		11	
Lead	15.0	9.67		mg/Kg		64	40 - 80
Lithium	15.0	17.5	J	mg/Kg		116	80 - 150

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-51550/18-B ^5 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 51806 — **Prep Batch: 51581**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	15.0	3.95	J	mg/Kg		26	1 - 60
Molybdenum	75.0	57.4		mg/Kg		77	60 - 100
Potassium	7500	10300		mg/Kg		137	80 - 180
Selenium	22.5	25.3		mg/Kg		113	80 - 140

Lab Sample ID: LCSD 140-51550/19-B ^5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 51806 — **Prep Batch: 51581**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	300	ND		mg/Kg		-0.5		261	
Arsenic	15.0	11.1		mg/Kg		74	60 - 100	10	30
Calcium	7500	2040	J	mg/Kg		27	20 - 50	1	30
Cobalt	15.0	0.630	J	mg/Kg		4	1 - 60	0	30
Iron	150	ND		mg/Kg		3		112	
Lead	15.0	9.67		mg/Kg		64	40 - 80	0	30
Lithium	15.0	16.9	J	mg/Kg		113	80 - 150	3	30
Manganese	15.0	4.01	J	mg/Kg		27	1 - 60	2	30
Molybdenum	75.0	57.5		mg/Kg		77	60 - 100	0	30
Potassium	7500	10200		mg/Kg		136	80 - 180	0	30
Selenium	22.5	23.5		mg/Kg		104	80 - 140	8	30

Lab Sample ID: MB 140-51583/17-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Step 6**
Analysis Batch: 51806 — **Prep Batch: 51583**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Arsenic	ND		0.50	0.15	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Calcium	ND		250	2.1	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Cobalt	ND		2.5	0.046	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Iron	ND		5.0	2.9	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Lead	ND		0.50	0.11	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Lithium	ND		2.5	0.15	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Manganese	ND		0.75	0.25	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Molybdenum	ND		2.0	0.099	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Potassium	ND		250	26	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Sodium	ND		250	130	mg/Kg		07/09/21 08:00	07/15/21 15:35	1
Selenium	ND		0.50	0.17	mg/Kg		07/09/21 08:00	07/15/21 15:35	1

Lab Sample ID: LCS 140-51583/18-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 6**
Analysis Batch: 51806 — **Prep Batch: 51583**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	102		mg/Kg		102	80 - 120
Arsenic	5.00	4.95		mg/Kg		99	80 - 120
Calcium	2500	2500		mg/Kg		100	80 - 120
Cobalt	5.00	5.23		mg/Kg		105	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-51583/18-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 6**
Analysis Batch: 51806 **Prep Batch: 51583**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	50.0	51.9		mg/Kg		104	80 - 120
Lead	5.00	5.07		mg/Kg		101	80 - 120
Lithium	5.00	4.92		mg/Kg		98	80 - 120
Manganese	5.00	5.12		mg/Kg		102	80 - 120
Molybdenum	25.0	25.4		mg/Kg		102	80 - 120
Potassium	2500	2520		mg/Kg		101	80 - 120
Sodium	2500	2550		mg/Kg		102	80 - 120
Selenium	7.50	7.68		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 140-51583/19-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 6**
Analysis Batch: 51806 **Prep Batch: 51583**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	94.4		mg/Kg		94	80 - 120	7	30
Arsenic	5.00	4.72		mg/Kg		94	80 - 120	5	30
Calcium	2500	2350		mg/Kg		94	80 - 120	6	30
Cobalt	5.00	5.01		mg/Kg		100	80 - 120	4	30
Iron	50.0	48.3		mg/Kg		97	80 - 120	7	30
Lead	5.00	4.88		mg/Kg		98	80 - 120	4	30
Lithium	5.00	4.58		mg/Kg		92	80 - 120	7	30
Manganese	5.00	4.89		mg/Kg		98	80 - 120	5	30
Molybdenum	25.0	24.4		mg/Kg		98	80 - 120	4	30
Potassium	2500	2370		mg/Kg		95	80 - 120	6	30
Sodium	2500	2390		mg/Kg		96	80 - 120	7	30
Selenium	7.50	7.34		mg/Kg		98	80 - 120	5	30

Lab Sample ID: MB 140-51609/17-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 7**
Analysis Batch: 51840 **Prep Batch: 51609**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Arsenic	0.198	J	0.50	0.13	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Calcium	ND		250	2.6	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Cobalt	ND		2.5	0.026	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Iron	ND		5.0	4.1	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Lead	ND		0.50	0.11	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Lithium	ND		2.5	0.15	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Manganese	ND		0.75	0.11	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Potassium	ND		250	10	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Sodium	ND		250	43	mg/Kg		07/12/21 08:00	07/17/21 12:43	1
Selenium	ND		0.50	0.17	mg/Kg		07/12/21 08:00	07/17/21 12:43	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-51609/18-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 7**
Analysis Batch: 51840 **Prep Batch: 51609**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	99.8		mg/Kg		100	80 - 120
Arsenic	5.00	5.15		mg/Kg		103	80 - 120
Calcium	2500	2570		mg/Kg		103	80 - 120
Cobalt	5.00	5.16		mg/Kg		103	80 - 125
Iron	50.0	52.7		mg/Kg		105	80 - 120
Lead	5.00	5.26		mg/Kg		105	80 - 120
Lithium	5.00	5.04		mg/Kg		101	80 - 120
Manganese	5.00	5.28		mg/Kg		106	80 - 120
Molybdenum	25.0	26.1		mg/Kg		104	80 - 125
Potassium	2500	2580		mg/Kg		103	80 - 120
Sodium	2500	2630		mg/Kg		105	80 - 120
Selenium	7.50	7.27		mg/Kg		97	80 - 120

Lab Sample ID: LCSD 140-51609/19-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 7**
Analysis Batch: 51840 **Prep Batch: 51609**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	102		mg/Kg		102	80 - 120	2	30
Arsenic	5.00	5.21		mg/Kg		104	80 - 120	1	30
Calcium	2500	2570		mg/Kg		103	80 - 120	0	30
Cobalt	5.00	5.22		mg/Kg		104	80 - 125	1	30
Iron	50.0	53.4		mg/Kg		107	80 - 120	1	30
Lead	5.00	5.29		mg/Kg		106	80 - 120	1	30
Lithium	5.00	5.09		mg/Kg		102	80 - 120	1	30
Manganese	5.00	5.60		mg/Kg		112	80 - 120	6	30
Molybdenum	25.0	26.5		mg/Kg		106	80 - 125	2	30
Potassium	2500	2590		mg/Kg		103	80 - 120	0	30
Sodium	2500	2640		mg/Kg		106	80 - 120	0	30
Selenium	7.50	7.38		mg/Kg		98	80 - 120	1	30

Metals

Prep Batch: 51236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	3050B	
140-23190-2	B-G52S	Total/NA	Solid	3050B	
140-23190-3	B-G54L	Total/NA	Solid	3050B	
140-23190-4	B-G57L	Total/NA	Solid	3050B	
140-23190-5	B-G57S	Total/NA	Solid	3050B	
140-23190-6	B-G62L	Total/NA	Solid	3050B	
140-23190-7	B-G53S	Total/NA	Solid	3050B	
140-23190-8	B-G02S	Total/NA	Solid	3050B	
140-23190-9	B-G02L	Total/NA	Solid	3050B	
MB 140-51236/21-A	Method Blank	Total/NA	Solid	3050B	
LCS 140-51236/22-A	Lab Control Sample	Total/NA	Solid	3050B	

SEP Batch: 51421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 1	Solid	Exchangeable	
140-23190-2	B-G52S	Step 1	Solid	Exchangeable	
140-23190-3	B-G54L	Step 1	Solid	Exchangeable	
140-23190-4	B-G57L	Step 1	Solid	Exchangeable	
140-23190-5	B-G57S	Step 1	Solid	Exchangeable	
140-23190-6	B-G62L	Step 1	Solid	Exchangeable	
140-23190-7	B-G53S	Step 1	Solid	Exchangeable	
140-23190-8	B-G02S	Step 1	Solid	Exchangeable	
140-23190-9	B-G02L	Step 1	Solid	Exchangeable	
MB 140-51421/17-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-51421/18-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-51421/19-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	

Prep Batch: 51423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	Total	
140-23190-2	B-G52S	Total/NA	Solid	Total	
140-23190-3	B-G54L	Total/NA	Solid	Total	
140-23190-4	B-G57L	Total/NA	Solid	Total	
140-23190-5	B-G57S	Total/NA	Solid	Total	
140-23190-6	B-G62L	Total/NA	Solid	Total	
140-23190-7	B-G53S	Total/NA	Solid	Total	
140-23190-8	B-G02S	Total/NA	Solid	Total	
140-23190-9	B-G02L	Total/NA	Solid	Total	
MB 140-51423/17-A	Method Blank	Total/NA	Solid	Total	
LCS 140-51423/18-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-51423/19-A	Lab Control Sample Dup	Total/NA	Solid	Total	

Prep Batch: 51438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 1	Solid	3010A	51421
140-23190-2	B-G52S	Step 1	Solid	3010A	51421
140-23190-3	B-G54L	Step 1	Solid	3010A	51421
140-23190-4	B-G57L	Step 1	Solid	3010A	51421
140-23190-5	B-G57S	Step 1	Solid	3010A	51421
140-23190-6	B-G62L	Step 1	Solid	3010A	51421
140-23190-7	B-G53S	Step 1	Solid	3010A	51421

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Metals (Continued)

Prep Batch: 51438 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-8	B-G02S	Step 1	Solid	3010A	51421
140-23190-9	B-G02L	Step 1	Solid	3010A	51421
MB 140-51421/17-B ^4	Method Blank	Step 1	Solid	3010A	51421
LCS 140-51421/18-B ^5	Lab Control Sample	Step 1	Solid	3010A	51421
LCSD 140-51421/19-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	51421

SEP Batch: 51449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 2	Solid	Carbonate	
140-23190-2	B-G52S	Step 2	Solid	Carbonate	
140-23190-3	B-G54L	Step 2	Solid	Carbonate	
140-23190-4	B-G57L	Step 2	Solid	Carbonate	
140-23190-5	B-G57S	Step 2	Solid	Carbonate	
140-23190-6	B-G62L	Step 2	Solid	Carbonate	
140-23190-7	B-G53S	Step 2	Solid	Carbonate	
140-23190-8	B-G02S	Step 2	Solid	Carbonate	
140-23190-9	B-G02L	Step 2	Solid	Carbonate	
MB 140-51449/17-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-51449/18-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-51449/19-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Prep Batch: 51455

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 2	Solid	3010A	51449
140-23190-2	B-G52S	Step 2	Solid	3010A	51449
140-23190-3	B-G54L	Step 2	Solid	3010A	51449
140-23190-4	B-G57L	Step 2	Solid	3010A	51449
140-23190-5	B-G57S	Step 2	Solid	3010A	51449
140-23190-6	B-G62L	Step 2	Solid	3010A	51449
140-23190-7	B-G53S	Step 2	Solid	3010A	51449
140-23190-8	B-G02S	Step 2	Solid	3010A	51449
140-23190-9	B-G02L	Step 2	Solid	3010A	51449
MB 140-51449/17-B ^3	Method Blank	Step 2	Solid	3010A	51449
LCS 140-51449/18-B ^5	Lab Control Sample	Step 2	Solid	3010A	51449
LCSD 140-51449/19-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	51449

SEP Batch: 51456

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 3	Solid	Non-Crystalline	
140-23190-2	B-G52S	Step 3	Solid	Non-Crystalline	
140-23190-3	B-G54L	Step 3	Solid	Non-Crystalline	
140-23190-4	B-G57L	Step 3	Solid	Non-Crystalline	
140-23190-5	B-G57S	Step 3	Solid	Non-Crystalline	
140-23190-6	B-G62L	Step 3	Solid	Non-Crystalline	
140-23190-7	B-G53S	Step 3	Solid	Non-Crystalline	
140-23190-8	B-G02S	Step 3	Solid	Non-Crystalline	
140-23190-9	B-G02L	Step 3	Solid	Non-Crystalline	
MB 140-51456/17-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-51456/18-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-51456/19-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	

QC Association Summary

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Metals

SEP Batch: 51499

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 4	Solid	Metal Hydroxide	
140-23190-2	B-G52S	Step 4	Solid	Metal Hydroxide	
140-23190-3	B-G54L	Step 4	Solid	Metal Hydroxide	
140-23190-4	B-G57L	Step 4	Solid	Metal Hydroxide	
140-23190-5	B-G57S	Step 4	Solid	Metal Hydroxide	
140-23190-6	B-G62L	Step 4	Solid	Metal Hydroxide	
140-23190-7	B-G53S	Step 4	Solid	Metal Hydroxide	
140-23190-8	B-G02S	Step 4	Solid	Metal Hydroxide	
140-23190-9	B-G02L	Step 4	Solid	Metal Hydroxide	
MB 140-51499/17-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-51499/18-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-51499/19-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	

Prep Batch: 51501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 3	Solid	3010A	51456
140-23190-2	B-G52S	Step 3	Solid	3010A	51456
140-23190-3	B-G54L	Step 3	Solid	3010A	51456
140-23190-4	B-G57L	Step 3	Solid	3010A	51456
140-23190-5	B-G57S	Step 3	Solid	3010A	51456
140-23190-6	B-G62L	Step 3	Solid	3010A	51456
140-23190-7	B-G53S	Step 3	Solid	3010A	51456
140-23190-8	B-G02S	Step 3	Solid	3010A	51456
140-23190-9	B-G02L	Step 3	Solid	3010A	51456
MB 140-51456/17-B	Method Blank	Step 3	Solid	3010A	51456
LCS 140-51456/18-B	Lab Control Sample	Step 3	Solid	3010A	51456
LCSD 140-51456/19-B	Lab Control Sample Dup	Step 3	Solid	3010A	51456

SEP Batch: 51550

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 5	Solid	Organic-Bound	
140-23190-2	B-G52S	Step 5	Solid	Organic-Bound	
140-23190-3	B-G54L	Step 5	Solid	Organic-Bound	
140-23190-4	B-G57L	Step 5	Solid	Organic-Bound	
140-23190-5	B-G57S	Step 5	Solid	Organic-Bound	
140-23190-6	B-G62L	Step 5	Solid	Organic-Bound	
140-23190-7	B-G53S	Step 5	Solid	Organic-Bound	
140-23190-8	B-G02S	Step 5	Solid	Organic-Bound	
140-23190-9	B-G02L	Step 5	Solid	Organic-Bound	
MB 140-51550/17-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-51550/18-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-51550/19-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	

Prep Batch: 51551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 4	Solid	3010A	51499
140-23190-2	B-G52S	Step 4	Solid	3010A	51499
140-23190-3	B-G54L	Step 4	Solid	3010A	51499
140-23190-4	B-G57L	Step 4	Solid	3010A	51499
140-23190-5	B-G57S	Step 4	Solid	3010A	51499
140-23190-6	B-G62L	Step 4	Solid	3010A	51499

Metals (Continued)

Prep Batch: 51551 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-7	B-G53S	Step 4	Solid	3010A	51499
140-23190-8	B-G02S	Step 4	Solid	3010A	51499
140-23190-9	B-G02L	Step 4	Solid	3010A	51499
MB 140-51499/17-B	Method Blank	Step 4	Solid	3010A	51499
LCS 140-51499/18-B	Lab Control Sample	Step 4	Solid	3010A	51499
LCSD 140-51499/19-B	Lab Control Sample Dup	Step 4	Solid	3010A	51499

Analysis Batch: 51553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	6010B	51236
140-23190-1	B-AP-1	Total/NA	Solid	6010B	51236
140-23190-2	B-G52S	Total/NA	Solid	6010B	51236
140-23190-3	B-G54L	Total/NA	Solid	6010B	51236
140-23190-4	B-G57L	Total/NA	Solid	6010B	51236
140-23190-5	B-G57S	Total/NA	Solid	6010B	51236
140-23190-6	B-G62L	Total/NA	Solid	6010B	51236
140-23190-7	B-G53S	Total/NA	Solid	6010B	51236
140-23190-8	B-G02S	Total/NA	Solid	6010B	51236
140-23190-9	B-G02L	Total/NA	Solid	6010B	51236
MB 140-51236/21-A	Method Blank	Total/NA	Solid	6010B	51236
LCS 140-51236/22-A	Lab Control Sample	Total/NA	Solid	6010B	51236

Prep Batch: 51581

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 5	Solid	3010A	51550
140-23190-2	B-G52S	Step 5	Solid	3010A	51550
140-23190-3	B-G54L	Step 5	Solid	3010A	51550
140-23190-4	B-G57L	Step 5	Solid	3010A	51550
140-23190-5	B-G57S	Step 5	Solid	3010A	51550
140-23190-6	B-G62L	Step 5	Solid	3010A	51550
140-23190-7	B-G53S	Step 5	Solid	3010A	51550
140-23190-8	B-G02S	Step 5	Solid	3010A	51550
140-23190-9	B-G02L	Step 5	Solid	3010A	51550
MB 140-51550/17-B ^5	Method Blank	Step 5	Solid	3010A	51550
LCS 140-51550/18-B ^5	Lab Control Sample	Step 5	Solid	3010A	51550
LCSD 140-51550/19-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	51550

SEP Batch: 51583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 6	Solid	Acid/Sulfide	
140-23190-2	B-G52S	Step 6	Solid	Acid/Sulfide	
140-23190-3	B-G54L	Step 6	Solid	Acid/Sulfide	
140-23190-4	B-G57L	Step 6	Solid	Acid/Sulfide	
140-23190-5	B-G57S	Step 6	Solid	Acid/Sulfide	
140-23190-6	B-G62L	Step 6	Solid	Acid/Sulfide	
140-23190-7	B-G53S	Step 6	Solid	Acid/Sulfide	
140-23190-8	B-G02S	Step 6	Solid	Acid/Sulfide	
140-23190-9	B-G02L	Step 6	Solid	Acid/Sulfide	
MB 140-51583/17-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-51583/18-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-51583/19-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	

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Metals

Prep Batch: 51609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 7	Solid	Residual	
140-23190-2	B-G52S	Step 7	Solid	Residual	
140-23190-3	B-G54L	Step 7	Solid	Residual	
140-23190-4	B-G57L	Step 7	Solid	Residual	
140-23190-5	B-G57S	Step 7	Solid	Residual	
140-23190-6	B-G62L	Step 7	Solid	Residual	
140-23190-7	B-G53S	Step 7	Solid	Residual	
140-23190-8	B-G02S	Step 7	Solid	Residual	
140-23190-9	B-G02L	Step 7	Solid	Residual	
MB 140-51609/17-A	Method Blank	Step 7	Solid	Residual	
LCS 140-51609/18-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-51609/19-A	Lab Control Sample Dup	Step 7	Solid	Residual	

Analysis Batch: 51720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 1	Solid	6010B SEP	51438
140-23190-1	B-AP-1	Step 2	Solid	6010B SEP	51455
140-23190-2	B-G52S	Step 1	Solid	6010B SEP	51438
140-23190-2	B-G52S	Step 2	Solid	6010B SEP	51455
140-23190-3	B-G54L	Step 1	Solid	6010B SEP	51438
140-23190-3	B-G54L	Step 2	Solid	6010B SEP	51455
140-23190-4	B-G57L	Step 1	Solid	6010B SEP	51438
140-23190-4	B-G57L	Step 2	Solid	6010B SEP	51455
140-23190-5	B-G57S	Step 1	Solid	6010B SEP	51438
140-23190-5	B-G57S	Step 2	Solid	6010B SEP	51455
140-23190-6	B-G62L	Step 1	Solid	6010B SEP	51438
140-23190-6	B-G62L	Step 2	Solid	6010B SEP	51455
140-23190-7	B-G53S	Step 1	Solid	6010B SEP	51438
140-23190-7	B-G53S	Step 2	Solid	6010B SEP	51455
140-23190-8	B-G02S	Step 1	Solid	6010B SEP	51438
140-23190-8	B-G02S	Step 2	Solid	6010B SEP	51455
140-23190-9	B-G02L	Step 1	Solid	6010B SEP	51438
140-23190-9	B-G02L	Step 2	Solid	6010B SEP	51455
MB 140-51421/17-B ^4	Method Blank	Step 1	Solid	6010B SEP	51438
MB 140-51449/17-B ^3	Method Blank	Step 2	Solid	6010B SEP	51455
LCS 140-51421/18-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	51438
LCS 140-51449/18-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	51455
LCSD 140-51421/19-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	51438
LCSD 140-51449/19-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	51455

Analysis Batch: 51768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 3	Solid	6010B SEP	51501
140-23190-1	B-AP-1	Step 4	Solid	6010B SEP	51551
140-23190-2	B-G52S	Step 3	Solid	6010B SEP	51501
140-23190-2	B-G52S	Step 4	Solid	6010B SEP	51551
140-23190-3	B-G54L	Step 3	Solid	6010B SEP	51501
140-23190-3	B-G54L	Step 4	Solid	6010B SEP	51551
140-23190-4	B-G57L	Step 3	Solid	6010B SEP	51501
140-23190-4	B-G57L	Step 3	Solid	6010B SEP	51501
140-23190-4	B-G57L	Step 4	Solid	6010B SEP	51551

Metals (Continued)

Analysis Batch: 51768 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-5	B-G57S	Step 3	Solid	6010B SEP	51501
140-23190-5	B-G57S	Step 4	Solid	6010B SEP	51551
140-23190-6	B-G62L	Step 3	Solid	6010B SEP	51501
140-23190-6	B-G62L	Step 3	Solid	6010B SEP	51501
140-23190-6	B-G62L	Step 4	Solid	6010B SEP	51551
140-23190-7	B-G53S	Step 3	Solid	6010B SEP	51501
140-23190-7	B-G53S	Step 4	Solid	6010B SEP	51551
140-23190-8	B-G02S	Step 3	Solid	6010B SEP	51501
140-23190-8	B-G02S	Step 4	Solid	6010B SEP	51551
140-23190-9	B-G02L	Step 3	Solid	6010B SEP	51501
140-23190-9	B-G02L	Step 4	Solid	6010B SEP	51551
MB 140-51456/17-B	Method Blank	Step 3	Solid	6010B SEP	51501
MB 140-51499/17-B	Method Blank	Step 4	Solid	6010B SEP	51551
LCS 140-51456/18-B	Lab Control Sample	Step 3	Solid	6010B SEP	51501
LCS 140-51499/18-B	Lab Control Sample	Step 4	Solid	6010B SEP	51551
LCSD 140-51456/19-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	51501
LCSD 140-51499/19-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	51551

Analysis Batch: 51806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 5	Solid	6010B SEP	51581
140-23190-1	B-AP-1	Step 6	Solid	6010B SEP	51583
140-23190-1	B-AP-1	Step 6	Solid	6010B SEP	51583
140-23190-2	B-G52S	Step 5	Solid	6010B SEP	51581
140-23190-2	B-G52S	Step 6	Solid	6010B SEP	51583
140-23190-2	B-G52S	Step 6	Solid	6010B SEP	51583
140-23190-3	B-G54L	Step 5	Solid	6010B SEP	51581
140-23190-3	B-G54L	Step 6	Solid	6010B SEP	51583
140-23190-3	B-G54L	Step 6	Solid	6010B SEP	51583
140-23190-4	B-G57L	Step 5	Solid	6010B SEP	51581
140-23190-4	B-G57L	Step 6	Solid	6010B SEP	51583
140-23190-4	B-G57L	Step 6	Solid	6010B SEP	51583
140-23190-5	B-G57S	Step 5	Solid	6010B SEP	51581
140-23190-5	B-G57S	Step 6	Solid	6010B SEP	51583
140-23190-5	B-G57S	Step 6	Solid	6010B SEP	51583
140-23190-6	B-G62L	Step 5	Solid	6010B SEP	51581
140-23190-6	B-G62L	Step 6	Solid	6010B SEP	51583
140-23190-6	B-G62L	Step 6	Solid	6010B SEP	51583
140-23190-7	B-G53S	Step 5	Solid	6010B SEP	51581
140-23190-7	B-G53S	Step 6	Solid	6010B SEP	51583
140-23190-7	B-G53S	Step 6	Solid	6010B SEP	51583
140-23190-8	B-G02S	Step 5	Solid	6010B SEP	51581
140-23190-8	B-G02S	Step 6	Solid	6010B SEP	51583
140-23190-8	B-G02S	Step 6	Solid	6010B SEP	51583
140-23190-9	B-G02L	Step 5	Solid	6010B SEP	51581
140-23190-9	B-G02L	Step 6	Solid	6010B SEP	51583
140-23190-9	B-G02L	Step 6	Solid	6010B SEP	51583
MB 140-51550/17-B ^5	Method Blank	Step 5	Solid	6010B SEP	51581
MB 140-51583/17-A	Method Blank	Step 6	Solid	6010B SEP	51583
LCS 140-51550/18-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	51581
LCS 140-51583/18-A	Lab Control Sample	Step 6	Solid	6010B SEP	51583

QC Association Summary

Metals (Continued)

Analysis Batch: 51806 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 140-51550/19-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	51581
LCSD 140-51583/19-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	51583

Analysis Batch: 51840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Step 7	Solid	6010B SEP	51609
140-23190-1	B-AP-1	Step 7	Solid	6010B SEP	51609
140-23190-2	B-G52S	Step 5	Solid	6010B SEP	51581
140-23190-2	B-G52S	Step 7	Solid	6010B SEP	51609
140-23190-2	B-G52S	Step 7	Solid	6010B SEP	51609
140-23190-2	B-G52S	Step 7	Solid	6010B SEP	51609
140-23190-3	B-G54L	Step 2	Solid	6010B SEP	51455
140-23190-3	B-G54L	Step 7	Solid	6010B SEP	51609
140-23190-3	B-G54L	Step 7	Solid	6010B SEP	51609
140-23190-3	B-G54L	Step 7	Solid	6010B SEP	51609
140-23190-3	B-G54L	Step 7	Solid	6010B SEP	51609
140-23190-4	B-G57L	Step 7	Solid	6010B SEP	51609
140-23190-4	B-G57L	Step 7	Solid	6010B SEP	51609
140-23190-4	B-G57L	Step 7	Solid	6010B SEP	51609
140-23190-4	B-G57L	Step 7	Solid	6010B SEP	51609
140-23190-5	B-G57S	Step 2	Solid	6010B SEP	51455
140-23190-5	B-G57S	Step 7	Solid	6010B SEP	51609
140-23190-5	B-G57S	Step 7	Solid	6010B SEP	51609
140-23190-5	B-G57S	Step 7	Solid	6010B SEP	51609
140-23190-5	B-G57S	Step 7	Solid	6010B SEP	51609
140-23190-6	B-G62L	Step 7	Solid	6010B SEP	51609
140-23190-6	B-G62L	Step 7	Solid	6010B SEP	51609
140-23190-6	B-G62L	Step 7	Solid	6010B SEP	51609
140-23190-7	B-G53S	Step 2	Solid	6010B SEP	51455
140-23190-7	B-G53S	Step 7	Solid	6010B SEP	51609
140-23190-7	B-G53S	Step 7	Solid	6010B SEP	51609
140-23190-7	B-G53S	Step 7	Solid	6010B SEP	51609
140-23190-7	B-G53S	Step 7	Solid	6010B SEP	51609
140-23190-8	B-G02S	Step 2	Solid	6010B SEP	51455
140-23190-8	B-G02S	Step 7	Solid	6010B SEP	51609
140-23190-8	B-G02S	Step 7	Solid	6010B SEP	51609
140-23190-8	B-G02S	Step 7	Solid	6010B SEP	51609
140-23190-8	B-G02S	Step 7	Solid	6010B SEP	51609
140-23190-9	B-G02L	Step 7	Solid	6010B SEP	51609
140-23190-9	B-G02L	Step 7	Solid	6010B SEP	51609
140-23190-9	B-G02L	Step 7	Solid	6010B SEP	51609
140-23190-9	B-G02L	Step 7	Solid	6010B SEP	51609
MB 140-51449/17-B ^3	Method Blank	Step 2	Solid	6010B SEP	51455
MB 140-51550/17-B ^5	Method Blank	Step 5	Solid	6010B SEP	51581
MB 140-51609/17-A	Method Blank	Step 7	Solid	6010B SEP	51609
LCS 140-51609/18-A	Lab Control Sample	Step 7	Solid	6010B SEP	51609
LCSD 140-51609/19-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	51609

Analysis Batch: 51841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	6010B	51423

Metals (Continued)

Analysis Batch: 51841 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	6010B	51423
140-23190-2	B-G52S	Total/NA	Solid	6010B	51423
140-23190-2	B-G52S	Total/NA	Solid	6010B	51423
140-23190-2	B-G52S	Total/NA	Solid	6010B	51423
140-23190-3	B-G54L	Total/NA	Solid	6010B	51423
140-23190-3	B-G54L	Total/NA	Solid	6010B	51423
140-23190-3	B-G54L	Total/NA	Solid	6010B	51423
140-23190-3	B-G54L	Total/NA	Solid	6010B	51423
140-23190-4	B-G57L	Total/NA	Solid	6010B	51423
140-23190-4	B-G57L	Total/NA	Solid	6010B	51423
140-23190-4	B-G57L	Total/NA	Solid	6010B	51423
140-23190-5	B-G57S	Total/NA	Solid	6010B	51423
140-23190-5	B-G57S	Total/NA	Solid	6010B	51423
140-23190-5	B-G57S	Total/NA	Solid	6010B	51423
140-23190-6	B-G62L	Total/NA	Solid	6010B	51423
140-23190-6	B-G62L	Total/NA	Solid	6010B	51423
140-23190-6	B-G62L	Total/NA	Solid	6010B	51423
140-23190-6	B-G62L	Total/NA	Solid	6010B	51423
140-23190-7	B-G53S	Total/NA	Solid	6010B	51423
140-23190-7	B-G53S	Total/NA	Solid	6010B	51423
140-23190-7	B-G53S	Total/NA	Solid	6010B	51423
140-23190-7	B-G53S	Total/NA	Solid	6010B	51423
140-23190-8	B-G02S	Total/NA	Solid	6010B	51423
140-23190-8	B-G02S	Total/NA	Solid	6010B	51423
140-23190-8	B-G02S	Total/NA	Solid	6010B	51423
140-23190-9	B-G02L	Total/NA	Solid	6010B	51423
140-23190-9	B-G02L	Total/NA	Solid	6010B	51423
140-23190-9	B-G02L	Total/NA	Solid	6010B	51423
140-23190-9	B-G02L	Total/NA	Solid	6010B	51423
MB 140-51423/17-A	Method Blank	Total/NA	Solid	6010B	51423
LCS 140-51423/18-A	Lab Control Sample	Total/NA	Solid	6010B	51423
LCSD 140-51423/19-A	Lab Control Sample Dup	Total/NA	Solid	6010B	51423

Analysis Batch: 51877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-2	B-G52S	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-3	B-G54L	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-4	B-G57L	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-5	B-G57S	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-6	B-G62L	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-7	B-G53S	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-8	B-G02S	Sum of Steps 1-7	Solid	6010B SEP	
140-23190-9	B-G02L	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 50473

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-1	B-AP-1	Total/NA	Solid	Moisture	
140-23190-2	B-G52S	Total/NA	Solid	Moisture	

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

General Chemistry (Continued)

Analysis Batch: 50473 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23190-3	B-G54L	Total/NA	Solid	Moisture	
140-23190-4	B-G57L	Total/NA	Solid	Moisture	
140-23190-5	B-G57S	Total/NA	Solid	Moisture	
140-23190-6	B-G62L	Total/NA	Solid	Moisture	
140-23190-7	B-G53S	Total/NA	Solid	Moisture	
140-23190-8	B-G02S	Total/NA	Solid	Moisture	
140-23190-9	B-G02L	Total/NA	Solid	Moisture	
140-23190-3 DU	B-G54L	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-AP-1
Lab Sample ID: 140-23190-1
Date Collected: 05/17/21 11:45
Matrix: Solid
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-AP-1
Lab Sample ID: 140-23190-1
Date Collected: 05/17/21 11:45
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 58.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.514 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 14:44	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.514 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51553	07/07/21 16:53	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:05	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 12:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 13:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 13:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 13:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 15:49	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-AP-1 **Lab Sample ID: 140-23190-1**
Date Collected: 05/17/21 11:45 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 58.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:02	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 14:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G52S **Lab Sample ID: 140-23190-2**
Date Collected: 05/18/21 11:30 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G52S **Lab Sample ID: 140-23190-2**
Date Collected: 05/18/21 11:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 85.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.541 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 14:49	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:10	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 12:58	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 15:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 13:28	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. | Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G52S

Lab Sample ID: 140-23190-2
Date Collected: 05/18/21 11:30
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 85.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 13:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51840	07/17/21 12:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 15:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:12	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 16:45	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G54L

Lab Sample ID: 140-23190-3
Date Collected: 05/18/21 15:30
Matrix: Solid
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G54L **Lab Sample ID: 140-23190-3**
Date Collected: 05/18/21 15:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.549 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 14:54	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:15	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:03	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 15:12	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 15:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 13:33	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51840	07/17/21 11:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:00	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:17	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G54L **Lab Sample ID: 140-23190-3**
Date Collected: 05/18/21 15:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:12	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 16:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 16:55	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G57L **Lab Sample ID: 140-23190-4**
Date Collected: 05/19/21 10:40 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G57L **Lab Sample ID: 140-23190-4**
Date Collected: 05/19/21 10:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 79.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.515 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 14:59	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:20	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 15:22	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 16:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:41	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client Sample ID: B-G57L **Lab Sample ID: 140-23190-4**
Date Collected: 05/19/21 10:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 79.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 13:38	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		2			51768	07/14/21 15:47	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:00	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 17:05	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G57S **Lab Sample ID: 140-23190-5**
Date Collected: 05/19/21 10:48 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G57S **Lab Sample ID: 140-23190-5**
Date Collected: 05/19/21 10:48 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX

Client Sample ID: B-G57S **Lab Sample ID: 140-23190-5**
Date Collected: 05/19/21 10:48 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.528 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 15:04	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:24	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:14	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 15:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 14:21	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51840	07/17/21 11:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:20	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:09	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G57S
Lab Sample ID: 140-23190-5
Date Collected: 05/19/21 10:48 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:27	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 17:14	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G62L
Lab Sample ID: 140-23190-6
Date Collected: 05/19/21 14:00 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G62L
Lab Sample ID: 140-23190-6
Date Collected: 05/19/21 14:00 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 76.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.510 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 15:09	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:29	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:19	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 15:31	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 15:36	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. — Job ID: 140-23190-1

Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G62L — **Lab Sample ID: 140-23190-6**

Date Collected: 05/19/21 14:00 — **Matrix: Solid**

Date Received: 05/21/21 09:20 — **Percent Solids: 76.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 14:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		2			51768	07/14/21 15:52	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:21	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:19	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G53S **Lab Sample ID: 140-23190-7**
Date Collected: 05/19/21 16:15 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G53S **Lab Sample ID: 140-23190-7**
Date Collected: 05/19/21 16:15 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 88.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.515 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 15:14	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:43	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:24	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 15:57	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 16:02	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 14:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51840	07/17/21 11:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:28	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Duck Creek Power Station - Illinois

Job ID: 140-23190-1

Client Sample ID: B-G53S
Date Collected: 05/19/21 16:15
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-7
Matrix: Solid
Percent Solids: 88.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:21	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:47	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 17:43	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G02S
Date Collected: 05/20/21 09:40
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-8
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G02S
Date Collected: 05/20/21 09:40
Date Received: 05/21/21 09:20

Lab Sample ID: 140-23190-8
Matrix: Solid
Percent Solids: 83.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.534 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 15:19	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:48	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G02S **Lab Sample ID: 140-23190-8**
Date Collected: 05/20/21 09:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:30	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 16:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 12:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 14:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51840	07/17/21 11:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:43	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:35	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:34	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:52	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 13:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:48	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G02S **Lab Sample ID: 140-23190-8**
Date Collected: 05/20/21 09:40 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 83.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 17:53	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: B-G02L **Lab Sample ID: 140-23190-9**
Date Collected: 05/20/21 10:30 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			51877	07/19/21 15:03	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: B-G02L **Lab Sample ID: 140-23190-9**
Date Collected: 05/20/21 10:30 **Matrix: Solid**
Date Received: 05/21/21 09:20 **Percent Solids: 78.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.519 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 15:24	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			51841	07/18/21 11:53	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 13:35	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			51841	07/18/21 16:11	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			51841	07/18/21 16:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 12:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 14:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 12:50	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G02L
Lab Sample ID: 140-23190-9
Date Collected: 05/20/21 10:30
Matrix: Solid
Date Received: 05/21/21 09:20
Percent Solids: 78.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 14:48	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 14:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 16:39	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			51806	07/15/21 18:57	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			51840	07/17/21 14:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 15:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			51840	07/17/21 17:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			51840	07/17/21 18:02	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51236/21-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	51236	06/28/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 11:36	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51421/17-B ^4
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51720	07/13/21 11:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-51423/17-A
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 10:46	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-51449/17-B ^3
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51720	07/13/21 13:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51840	07/17/21 10:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-51456/17-B
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 11:46	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-51499/17-B
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 13:44	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-51550/17-B ^5
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 13:36	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51550/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51840	07/17/21 11:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51583/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 15:35	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51609/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 12:43	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51236/22-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	51236	06/25/21 10:16	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51553	07/07/21 11:40	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51421/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		5			51720	07/13/21 11:16	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 140-51423/18-A
Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 10:51	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 140-51449/18-B ^5
Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		5			51720	07/13/21 13:13	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 140-51456/18-B
Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 11:51	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 140-51499/18-B
Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 13:49	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Lab Sample ID: LCS 140-51550/18-B ^5
Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 13:41	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-51583/18-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 15:40	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-51609/18-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 12:48	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51421/19-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51421	07/01/21 09:06	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51438	07/02/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		5			51720	07/13/21 11:21	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51423/19-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.00 g	50 mL	51423	07/02/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			51841	07/18/21 10:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51449/19-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51449	07/02/21 09:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51455	07/02/21 14:02	JTB	TAL KNX
Step 2	Analysis	6010B SEP		5			51720	07/13/21 13:18	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51456/19-B

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51456	07/06/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51501	07/07/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51768	07/14/21 11:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51499/19-B

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51499	07/07/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51551	07/08/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			51768	07/14/21 13:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51550/19-B ^5

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51550	07/08/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51581	07/08/21 15:21	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			51806	07/15/21 13:45	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51583/19-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	51583	07/09/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			51806	07/15/21 15:45	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-51609/19-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	51609	07/12/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			51840	07/17/21 12:53	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Client Sample ID: B-G54L **Lab Sample ID: 140-23190-3 DU**
Date Collected: 05/18/21 15:30 **Matrix: Solid**
Date Received: 05/21/21 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			50473	06/04/21 08:31	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
Arkansas DEQ	State	88-0688	06-17-21 *
California	State	2423	06-30-22
Colorado	State	TN00009	02-28-22
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	06-30-22
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	10-31-21
Kentucky (DW)	State	90101	12-31-21
Louisiana	NELAP	83979	06-30-22
Louisiana (DW)	State	LA019	12-31-21
Maryland	State	277	03-31-22
Michigan	State	9933	12-11-22
Nevada	State	TN00009	08-01-21
New Hampshire	NELAP	299919	01-17-22
New Jersey	NELAP	TN001	06-30-22
New York	NELAP	10781	03-31-22
North Carolina (DW)	State	21705	07-31-21
North Carolina (WW/SW)	State	64	12-31-21
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-21
Oregon	NELAP	TNI0189	01-01-22
Pennsylvania	NELAP	68-00576	12-31-21
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-21
Virginia	NELAP	460176	09-14-21
Washington	State	C593	01-19-22
West Virginia (DW)	State	9955C	01-02-22
West Virginia DEP	State	345	04-30-22
Wisconsin	State	998044300	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Golder Associates Inc. Job ID: 140-23190-1
Project/Site: Duck Creek Power Station - Illinois

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

1 2 3 4 5 6 7 8 9 10 11 12 13

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone: 865-291-3000 Fax: 865-584-4315

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Eric Schneider	Lab PM: Henry, Ryan	Carrier Tracking No(s):	COC No: 140-9342-2809.1
Client Contact: Jeffrey Ingram	Phone: 314-494-8192	E-Mail: williamr.henry@eurofinset.com	State of Origin:	Page: Page 1 of ~~2~~ 1
Company: Golder Associates Inc.	PWSID:	Analysis Requested		Job #:
Address: 13515 Barrett Parkway Drive Suite 260	Due Date Requested:			Preservation Codes:
City: Ballwin	TAT Requested (days):			
State, Zip: MO, 63021	Compliance Project: Δ Yes Δ No			
Phone: 314-984-8800(Tel) 636-724-9323(Fax)	PO #: Purchase Order not required			
Email: Jeffrey_Ingram@golder.com	WO #:			
Project Name: Duck Creek Power Station - Illinois	Project #: 14006315			
Site: Duck Creek Power Station	SSOW#:			Other:

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - SEP Metals	6010B - Total Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
B-AP-1	5/17/21	1145	G	S	N	N	X	X		CUSTODY SEALS INTACT
B-652S	5/18/21	1130	G	S			X	X		RECEIVED AT RS 0.4/CTO.5C
B-654L	5/19/21	1530	G	S			X	X		GRD 5-21-21
B-657L	5/19/21	1040	G	S			X	X		FEDEX ABX#
B-657S	5/19/21	1048	G	S			X	X		7874 0752 9455 SD
B-662L	5/19/21	1400	G	S			X	X		
B-653S	5/19/21	1615	G	S			X	X		
B-607S	5/20/21	0940	G	S			X	X		
B-602L	5/20/21	1030	G	S			X	X		

140-23190 Chain of Custody

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Eric Schneider	5/20/21 1630	Golder Associates			
Eric Schneider	5/20/21 1630	Golder Associates			
Eric Schneider	5/20/21 1630	Golder Associates	[signature]	5-21-21 ~~TD:~~ 09:20	ETA KNOX

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 5-21-21

Ver: 11/01/2020

Electronic Filing: Received, Clerk's Office 1/12/2024 **PCB 2024-048**

7/20/2021

13 12 11 10 9 8 7 6 5 4 3 2 1

Loc: 140
23190

. EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?	Comments/Actions Taken
1. Are the shipping containers intact?	/			☐ Containers, Broken	
2. Were ambient air containers received intact?			/	☐ Checked in lab	
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6°C, VOST: 10°C) Thermometer ID : SC71 Correction factor: +0.1°C	/			☐ Cooler Out of Temp, Client Contacted, Proceed/Cancel ☐ Cooler Out of Temp, Same Day Receipt	
5. Were all of the sample containers received intact?	/			☐ Containers, Broken	
6. Were samples received in appropriate containers?	/			☐ Containers, Improper; Client Contacted; Proceed/Cancel	
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ COC & Samples Do Not Match ☐ COC Incorrect/Incomplete ☐ COC Not Received	
8. Were all of the samples listed on the COC received?	/			☐ Sample Received, Not on COC ☐ Sample on COC, Not Received	
9. Is the date/time of sample collection noted?	/			☐ COC; No Date/Time; Client Contacted	Labeling Verified by: Date:
10. Was the sampler identified on the COC?	/			☐ Sampler Not Listed on COC	
11. Is the client and project name/# identified?	/			☐ COC Incorrect/Incomplete	pH test strip lot number:
12. Are tests/parameters listed for each sample?	/			☐ COC No tests on COC	
13. Is the matrix of the samples noted?	/			☐ COC Incorrect/Incomplete	
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ COC Incorrect/Incomplete	
15. Were samples received within holding time?	/			☐ Holding Time - Receipt	
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ pH Adjusted, pH Included (See box 16A) ☐ Incorrect Preservative	
17. Were VOA samples received without headspace?			/	☐ Headspace (VOA only)	
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			/	☐ Residual Chlorine	
19. For 1613B water samples is pH<9?			/	☐ If no, notify lab to adjust	
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info	

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: PM Instructions:

Sample Receiving Associate: [signature] Date: 5·21·21

QA026R32.doc, 062719

Electronic Filing: Received, Clerk's Office 1/12/2024 **PCB 2024-048**

13 12 11 10 9 8 7 6 5 4 3 2 1

Exhibit C

DECLARATION OF MELINDA W. HAHN, PhD

In support of Illinois Power Resources Generating, LLC's (IPRG's) Petition for Review of IEPA's Non-concurrence with the Duck Creek Alternative Source Demonstration and Request for Stay

I, Dr. Melinda W. Hahn, declare and state as follows:

1) I am an Environmental Engineer and Senior Managing Consultant with Ramboll Americas Engineering Solutions, Inc. Attachment A is a true and accurate copy of my Curriculum Vitae.

2) I hold a PhD in Environmental Engineering from Johns Hopkins University. The focus of my research for my PhD dissertation was contaminant transport in porous media (e.g., groundwater).

3) My practice over my 25-year career includes site investigation and remediation in multiple state and federal programs, such as voluntary remediation, Resource Conservation and Recovery Act (RCRA) corrective action, and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response action. My work in these programs includes contaminant fate and transport modelling, site investigation and remediation, and statistics and forensic

analysis of environmental contamination data. I have evaluated sites from many different industrial sectors with many different contaminants of concern, including volatile organic compounds (VOCs), which includes chlorinated volatile organic compounds (CVOCs), semivolatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and dioxins/furans.

4) To prepare this Declaration, I reviewed the IPRG November 11, 2023 Alternative Source Demonstration (ASD) Report for pH observed in groundwater from well G60L at the Duck Creek Power Plant (DCPP) Gypsum Management Facility Pond (GMF Pond), the December 6, 2023 IEPA denial of the ASD, and supporting information for the ASD. I reviewed the documents submitted by IPRG independently and was not personally involved in their preparation.

5) The ASD report addresses pH observed in groundwater in well G60L outside the range the Groundwater Protection Standards (GPS) of 6.5 to 9 S.U. in the 2nd quarter of 2023. No other exceedances were identified for this monitoring event.[1] The ASD report relies on a multiple lines of evidence (MLE) approach that is standard practice in causal determinations in environmental forensic analysis, risk

[1] Ramboll, Groundwater Monitoring Data and Exceedances Report, 2nd Quarter 2023, Duck Creek GMF Pond, September 12, 2023, Table 2.

assessment, and site investigation.[2,3,4,5,6] The MLE approach involves analysis of multiple independent sets of data to test whether an identified source can explain observed data. Information to consider can be site-specific, regional, or from the literature.[7,8] These independent lines of evidence are developed until sufficient confidence is achieved to either confirm or rule out a source.[9] For the Duck Creek ASD, the independent lines of evidence include hydrogeological data to establish the direction of groundwater flow (groundwater flows generally from northwest to southeast at the DCPP), chemical porewater from a well set at the base of the GMF Pond, and leachate data to characterize source concentrations, chemical groundwater data from upgradient and compliance wells, empirical observations of geologic layers from boring logs, and multivariate analysis of chemical data to identify the geochemical conditions that led to the pH exceedance at G60L. The lines of evidence

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[2] Miller, J. Methods and Advances in the Forensic Analysis of Contaminated Rivers, E3S Web of Conferences Vol. 125, 2019, p. 3.

[3] U.S. EPA, U.S. Navy SPAWAR Systems Center, GeoChem Metrix Inc., and Battelle Memorial Institute, A Handbook for Determining the Sources of PCB Contamination in Sediments, Technical Report, TR-NAVFAC EXWC-EV-1302, October 2012, p. 13.

[4] U.S. EPA, Office of the Science Advisor, Risk Assessment Forum, Weight of Evidence in Ecological Assessment, EPA/100/R-16/001, December 2016.

[5] U.S. EPA, Office of Solid Waste and Emergency Response, OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor in Indoor Air, June 2015, pp. xv-xvii, 17-18, 38-40, 60-61, 117-123.

[6] EPRI, Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites, 2017 Technical Report, p. viii.

[7] U.S. EPA, Office of the Science Advisor, Risk Assessment Forum, Weight of Evidence in Ecological Assessment, EPA/100/R-16/001, December 2016, p. 20 et seq.

[8] U.S. EPA, U.S. Navy SPAWAR Systems Center, GeoChem Metrix Inc., and Battelle Memorial Institute, A Handbook for Determining the Sources of PCB Contamination in Sediments, Technical Report, TR-NAVFAC EXWC-EV-1302, October 2012, p. 30.

[9] Miller, J. Methods and Advances in the Forensic Analysis of Contaminated Rivers, E3S Web of Conferences Vol. 125, 2019, p. 3.

also rely on the principles of geochemistry and the fundamental concept of contaminant migration: that contaminant concentrations decrease in the downgradient direction due to the successive dilution of dispersion and diffusion (i.e., downgradient concentrations cannot be higher than source concentrations). In a coal combustion residual (CCR) surface impoundment release scenario, leachate is subject to physical processes that dilute solute concentrations including mixing, dispersion and dilution.[10]

6) The porewater well source concentrations in the GMF Pond have been characterized through the collection of porewater and leachate samples. The source porewater data for the GMF Pond are consistent with literature values for CCR leachate,[11,12,13] and define the maximum concentrations for groundwater impact outside of the GMF Pond. GMF Pond source water is characterized by elevated levels of boron, chloride, and sulfate relative to background groundwater concentrations.[14]

[10] U.S. EPA Office of Solid Waste and Emergency Response, Solid Waste Disposal Criteria, Technical Manual, EPA530-R-93-017, p. 126.

[11] U.S. EPA, Industrial Environmental Research Laboratory, Chemical and Biological Characterization of Leachates from Coal Solid Wastes, EPA-600/7-80-039, March 1980.

[12] U.S. EPA and TVA, Effects of Coal-ash Leachate on Ground Water Quality, EPA-600/7-80-066, March 1980.

[13] U.S. EPA, Office of Research and Development, Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data, EPA-600/R-09/151, December 2009.

[14] Ramboll, Hydrogeological Site Characterization Report, GMF Pond Duck Creek Power Plant, October 21, 2021,

pH in G60L

7) The three lines of evidence (LOEs) presented in the November 11, 2023 ASD report for pH are as follows:

a) LOE 1: The GMF Pond has a double geomembrane liner designed to prevent CCR contact with groundwater;

b) LOE 2: Boron concentrations in compliance groundwater monitoring wells do not exceed background groundwater limits; and

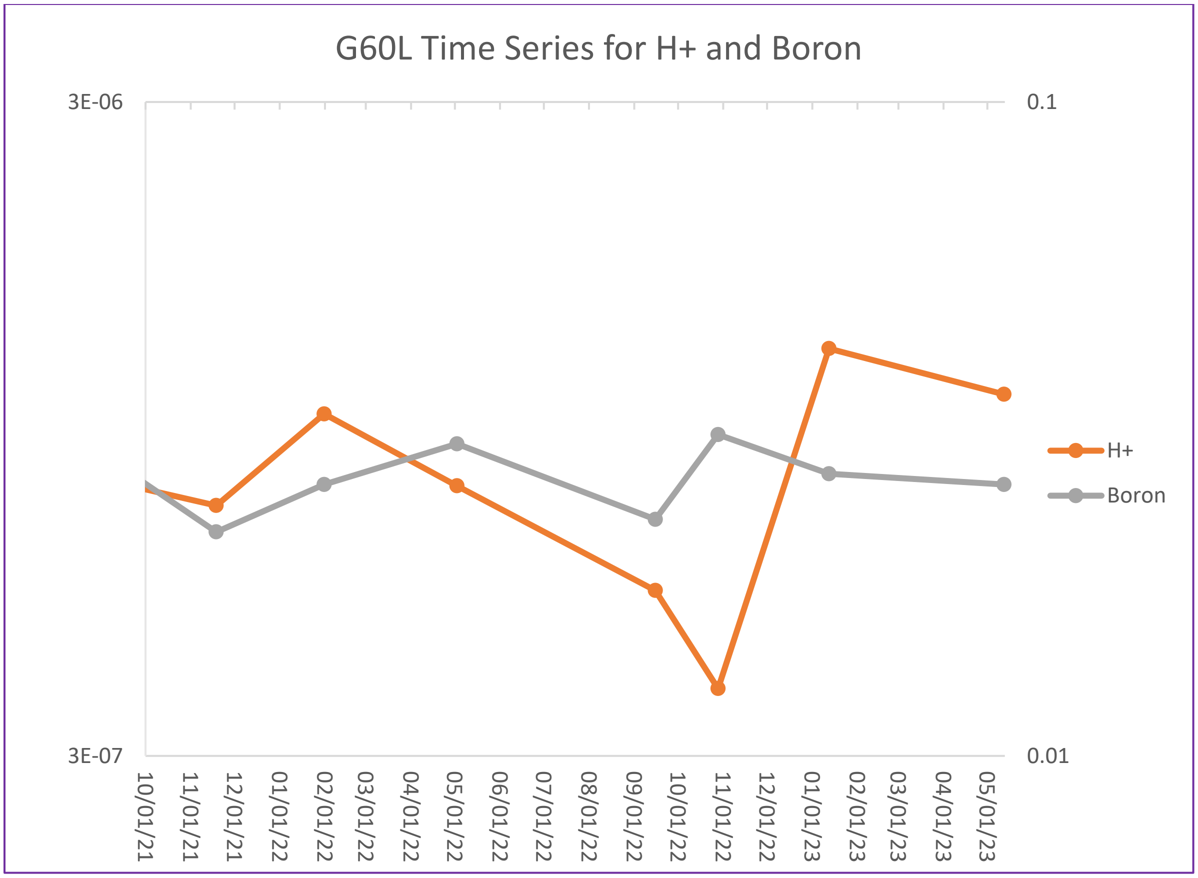
c) LOE 3: Geochemical analysis and empirical observations at and near G60L demonstrate that a localized pocket of native peat is an alternative source of the pH exceedance.

8) The pH in monitoring well G60L was the only exceedance noted in the first quarterly sampling event at the GMF Pond at the Duck Creek Power Plant. Groundwater impacts caused by CCR are unlikely at the GMF Pond due to its liner system that includes a high-density polyethylene geomembrane liner, a geosynthetic clay liner, and a 36-inch compacted clay layer and physically separates the CCR from the groundwater.

9) Boron did not exceed its statistically-derived background level at G60L, or at any other compliance monitoring well in 2023 quarter 2. Boron is considered by U.S. EPA to be the CCR indicator analyte with the fastest travel time

and likely the first indicator analyte to be detected.[15] As such, it is unlikely than an exceedance could be caused by CCR if boron is not also elevated. Sulfate and chloride are also site-specific indicator analytes of CCR impact based on the porewater data from X301 and XTPW02. The time series plots below show that pH has decreased over time (indicated by an increase in hydrogen ion concentrations), whereas boron and sulfate concentrations have remained relatively constant in G60L. Chloride, on the other hand, has decreased in recent monitoring events in G60L. The lack of synchronous increases in CCR indicator analytes at G60L indicates that the GMF Pond is not the source of the pH exceedance in G60L. The fact that these analytes have remained steady or decreased over time in G60L indicates that the GMF Pond is also not contributing to the exceedance.

[15] EPA Proposed Rule: Amendments to the National Minimum Criteria (Phase One for Disposal of Coal Combustion Residuals from Electric Utilities, FR Vol. 83, No. 51, March 15, 2018, p. 11588.


G60L Time Series for H+ and Boron
3E-06
3E-07
0.1
0.01
10/01/21
11/01/21
12/01/21
01/01/22
02/01/22
03/01/22
04/01/22
05/01/22
06/01/22
07/01/22
08/01/22
09/01/22
10/01/22
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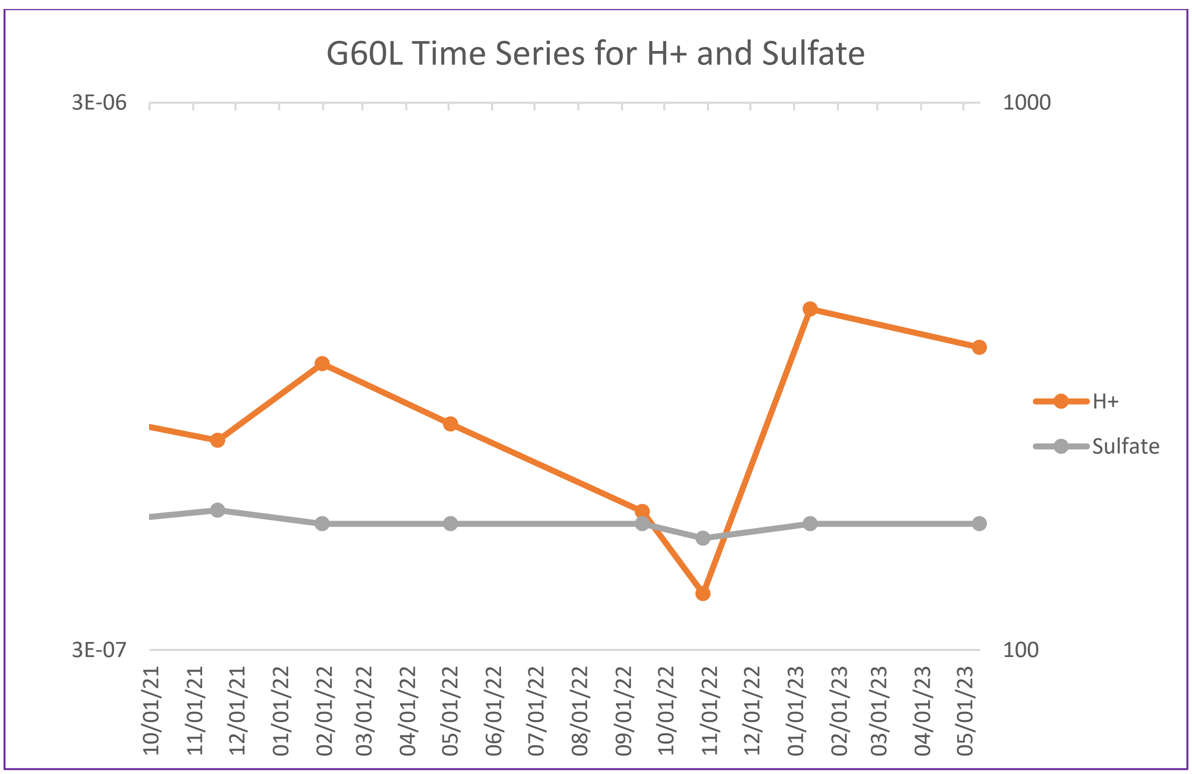
02/01/23
03/01/23
04/01/23
05/01/23
H+
Boron


G60L Time Series for H+ and Sulfate
3E-06
3E-07
1000
100
10/01/21
11/01/21
12/01/21
01/01/22
02/01/22
03/01/22
04/01/22
05/01/22
06/01/22
07/01/22
08/01/22
09/01/22
10/01/22
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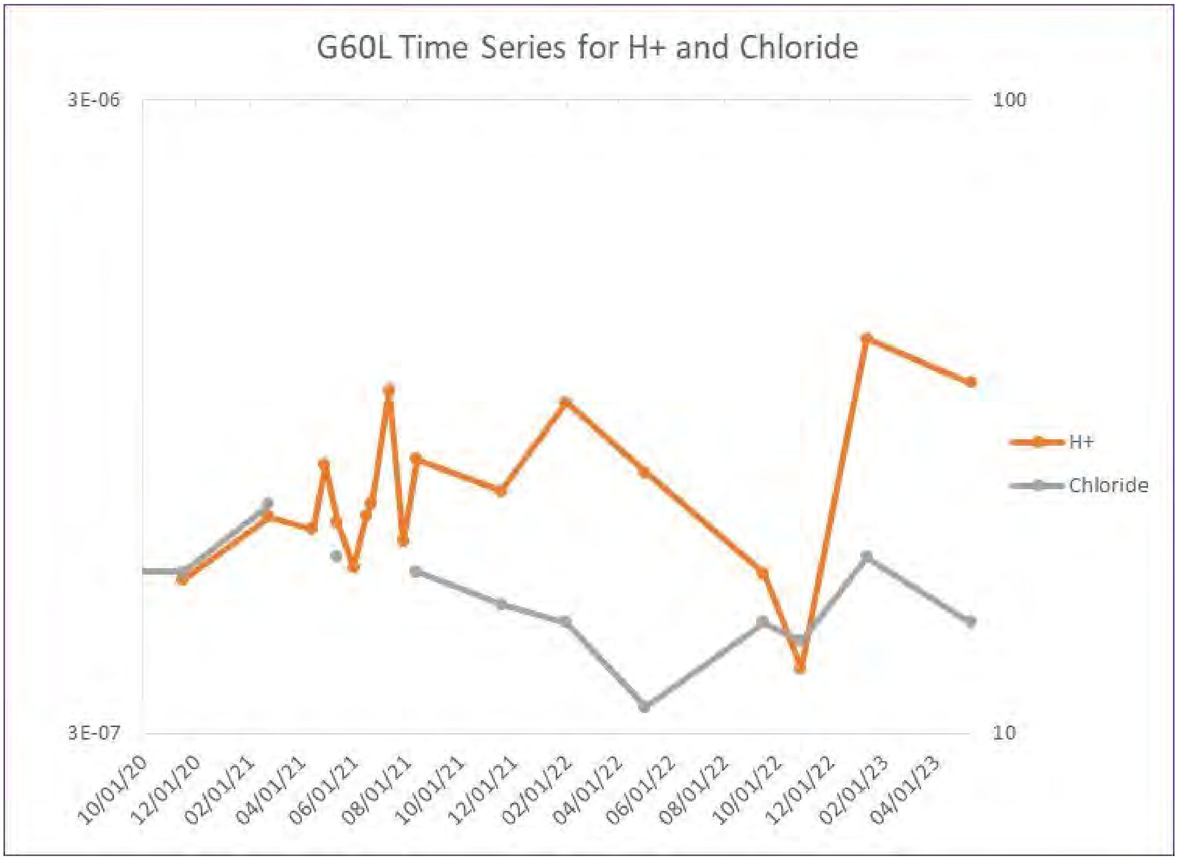
04/01/23
05/01/23
H+
Sulfate



10) Native peat layers up to 4 feet in thickness have been observed at nearby monitoring well P60 and boring B-55 at slightly higher elevation from the G60L screen (approximately a 2-foot vertical separation from the lower identified and thicker layer). Peat is a common source of acid due to its origin and composition that is rich in organic matter (plant detritus).[16] When a peat bog is formed, it is fed by rainwater with naturally acidic pH.[17] When peat organic matter decays into organic acids, pH is further depressed and elements (nutrients) including carbon,

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[16] Bourbonniere, R.A., Review of Water Chemistry Research in Natural and Disturbed Peatlands, Canadian Water Resources Journal, Vol. 34, No. 4, p. 402.

[17] Bourbonniere, R.A., Review of Water Chemistry Research in Natural and Disturbed Peatlands, Canadian Water Resources Journal, Vol. 34, No. 4, 2009, p. 404.

hydrogen, nitrogen, phosphorus and sulfur are released.[18] Peat is also a source of dissolved organic matter that migrates in groundwater, so the peat itself can be a source of acidity, but the dissolved and migrating organic matter is also a source of acidity due to its decay process.

11) The top of the P60 well screen is approximately 5 feet below a 1-foot peat layer (a greater vertical separation from a thinner peat layer than G60L). This well may have also been impacted by the peat as the two pH measurements (in February and March of 2021) have been acidic, with one below the GPS range of 6.5 to 9 S.U. These observations suggest that the acidity observed in G60L is naturally occurring due to the presence of peat pockets at similar elevations in the subsurface

12) Compliance well G60L is screened in a "potential migration pathway" unit that includes the Peoria/Roxanna Loess (a fine-grained silt with origins of wind-blown dust). This unit lies above and is distinct from the shallow sand of the uppermost aquifer where the background wells G02S, G50S, and G51S are screened. As such, groundwater in this well likely has a different geochemical signature. It is also more likely to be impacted by peat deposits due to its higher elevation. Samples from G60L plot near other wells screened in the Loess (G50L, G51L, and G52L) on

[18] Leifeld, J., et al, Soil Organic Matter Stoichiometry as Indicator for Peatland Degradation, Nature Scientific Reports, Vol. 10, 2020, p. 7634

the Principal Component Analysis (PCA) biplot shown in Appendix C, Attachment 2 to the ASD, indicating a similar geochemical signature

13) In its December 6, 2023 letter, the IEPA denied the Duck Creek ASD due to perceived "data gaps" that included the following:

a) Source characterization of the CCR at the GMF Pond must include total solids sampling in accordance with SW846.

b) Characterization to include sample and analysis in accordance with 35 IAC 845.640 of alternative source must be provided with the ASD.

14) The CCR source characterization request is vague and inappropriate for the lines of evidence presented in the ASD. However, if the IEPA is requesting "total" constituent analysis of CCR in milligrams per kilograms (mg/kg; mass of constituent per mass of CCR on a dry weight basis), that information would not be more appropriate for a source impact analysis than the porewater and leachate data used for the ASD. In a land disposal scenario, groundwater would be impacted if leachate (or porewater) from the solid waste (rather than the solid waste itself) travels to and mixes with (and is diluted by) groundwater, then the impacted groundwater travels downgradient where dispersion and diffusion processes further dilute solid waste component concentrations. The most critical data needed for a groundwater impact analysis is the leachate quality, not the total amount of constituent in a solid sample of CCR, because leachate is the material that potentially mixes with

groundwater. Similarly, if the IEPA is requesting laboratory leach testing of solid CCR samples either by Toxicity Characteristic leaching procedure (TCLP), Synthetic Precipitation Leaching Procedure (SPLP), or Leaching Environmental Assessment Framework (LEAF), that information would also not be more appropriate for a source impact analysis than the actual porewater and leachate data collected from the CCR presented in the Duck Creek ASD. All of the synthetic laboratory leach tests on a solid sample aim to simulate a landfill environment in order to predict leachate quality from a solid sample. Synthetic leach test results are compared to actual field leachate data for fly ash and slag in order to evaluate the representativeness of their results, i.e., field verification.[19] U.S. EPA advises that these "batch" 1-day laboratory tests on a relatively small sample do not account for the long-term climatic and meteorological influences on a full-scale landfill operation.[20] These tests often yield high initial concentrations that are not typical of a full-scale operation.[21]Other researchers evaluating the utility of the synthetic precipitation leaching procedure (SPLP) to assess the risk of groundwater contamination posed by the land application of granular solid waste report that the use of a total pollutant concentration (mg/kg) in conjunction with SPLP

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[19] Tiwari, M.K., et al, Suitability of Leaching Test Methods for Fly Ash and Slag: A Review, Journal of Radiation Research and Applied Sciences, Vol.8, 2015. pp. 523-537.

[20] U.S. EPA Office of Solid Waste and Emergency Response, Solid Waste Disposal Criteria, Technical Manual, EPA530-R-93-017, p. 125.

[21] *Ibid.*

concentrations (milligrams per liter [mg/L]) to estimate pore water concentration was unreliable as this method underestimates the measured porewater concentrations.[22] pH is not a conservative solute, but rather is dependent on local geochemistry including buffering capacity, and varies due to redox reactions and biological activity. These conditions vary in the subsurface and are particularly difficult to simulate in a laboratory. Clearly, directly measuring CCR analyte concentrations and pH in actual porewater and leachate samples from the actual disposal environment is a more accurate basis for an impact analysis than using laboratory predictions of those values. As stated above, the GMF Pond CCR and adjacent groundwater quality have been adequately characterized for performing an alternative source demonstration. Data from the GMF Pond porewater and leachate samples relied upon in the Alternative Source Demonstration Report[23] are sufficient to define the strength and variability of source water for this assessment. Collection of additional CCR source characterization data referenced in IEPA's December 6, 2023 letter is not required for the ASD by Part 845 or Part 257 and would not change the conclusion of the ASD.

15) Similarly, the collection of alternate source samples is not required for the ASD and development of such information would not change the conclusion of

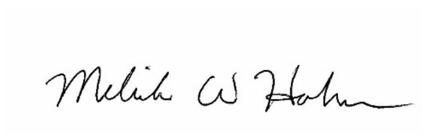
[22] Townsend, T, et al, Interpretation of Synthetic Precipitation Leaching Procedure (SPLP) Results for Assessing Risk to Groundwater from Land-Applied Granular Waste, Environmental Engineering Science, Vol. 23, No. 1, 2005.

[23] Ramboll, Alternative Source Demonstration Report for Joppa GMF POND, October 20, 2023. Appendix C.

the ASD. Parts 845 and 257 do not even require identification of the alternate source – only that a source other than the CCR is causing the pH exceedance and that the CCR is not contributing to the exceedances. At the DCPP GMF Pond, the identified source of the exceedances is not a single physical source area in a single geologic unit with a conservative solute that can be sampled, but the presence of peat at multiple locations that changes the local and downgradient geochemistry. The downgradient geochemistry is governed by the interaction of the local aquifer solids (the Loess) and the migrating groundwater impacted by peat deposits. Geochemical parameters that are critical to understanding the pH exceedances such as oxidation-reduction potential (ORP), dissolved organic matter concentrations, microbial activity, and nutrient (iron, manganese, magnesium, or potassium) concentrations are not discussed at all in Part 845. As such, the "alternate source" cannot be characterized with groundwater samples under Part 845.640 or by physical sampling and analysis for total or leachable analytes according to SW846. An accurate laboratory simulation of transport, mixing and chemical/biological reactions of peat-impacted groundwater with downgradient groundwater and aquifer solids at a field scale with site-specific chemistry is likely not possible, and definitely not practical, and is beyond the scope of both SW846 and Part 845. Further characterization of the peat deposits under Part 845.640 would not add information that would change the conclusion of the ASD that an alternative source is responsible for the pH exceedance at well G60L, and the GMF Pond is not contributing to the pH exceedance at well G60L.

I declare under penalty of perjury that the foregoing is true and correct.

Dated: January 12, 2024



Melinda W. Hahn, PhD

ATTACHMENT A

Curriculum Vitae of Melinda Hahn, PhD

ENVIRONMENT
& HEALTH

RAMBOLL

MELINDA W. HAHN, PH.D.

Senior Managing Consultant

Dr. Hahn's practice areas include site investigation and remediation, contaminant fate and transport modelling, statistics of environmental data, forensic analysis, and litigation support, including primarily environmental liability and cost allocation. Regulatory areas include RCRA, CERCLA, TSCA, and Voluntary Cleanup/Risk-Based Corrective Action. Dr. Hahn has experience in the following industry categories: energy (electric utilities, petroleum dispensing, pipeline operations, former manufactured gas plant sites), industrial equipment manufacturing, metal working and metal recycling, automobile manufacturing, ink and chemical manufacturing, wood treating, mining, cement manufacturing, milling and smelting operations, secondary aluminum production, and dry cleaning.

EDUCATION

1995
PhD, Environmental Engineering
The Johns Hopkins University

1990
BS, Physics
The University of Texas at Austin

1990
BS, Mathematics
The University of Texas at Austin

ACADEMIC HONORS

1992-1995
Graduate Fellow, National Science Foundation

1995
Most Distinguished Environmental Engineering Dissertation, Association of Environmental Engineering Professors

CAREER

1998-Present
Senior Managing Consultant, ENVIRON/Ramboll

1997-1998
Consultant, Roy Ball, PC

1995-1997
Senior Project Engineer, Environmental Resources Management-North Central, Inc.

CONTACT INFORMATION

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11782 Jollyville Road
Suite 211
Austin, TX 78759
United States of America

PROJECTS

- Provided technical litigation support for over 50 matters regarding extent, severity, timing, and source of soil and ground water contamination and vapor intrusion, necessity for and costs of remediation, human health risk assessment, toxic tort liability, Superfund cost allocation (including consistency with the NCP), insurance cost recovery, and the siting and monitoring of a hazardous waste landfill. The regulatory frameworks included Illinois Voluntary Cleanup Program, Illinois Leaking Underground Storage Tank Program, RCRA, CERCLA, TSCA, NCP, and California Proposition 65. Completed projects in more than twenty states, with a focus in the Midwest.
- Provided expert testimony in matters involving Superfund cost allocation, statistics of environmental data, and contaminant fate and transport.
- Retained as an expert witness and provided litigation/mediation support for a number of cost allocation cases involving remediation of contaminated soil, groundwater, and sediment.
- Provided litigation support for environmental liability/cost allocation mediation and litigation at several large sediment sites. Evaluated historical information on industrial processes and discharges, and conducted forensic/statistical analysis to estimate the relative contribution of contaminants to sediments.
- Provided litigation support for a number of insurance cost recovery projects, including a former wood treating facility, a jewelry manufacturer, metal plating facility, machine shop and dry cleaner. Tasks included the identification of likely sources and timing of contamination.
- Evaluated claims of residents living near a scrap metal facility of transport and deposition of lead-containing particles in their homes using statistical analysis of plaintiffs' chemical data. Provided expert testimony based on this analysis.
- Evaluated the hydrogeological setting of a proposed petroleum pipeline pumping station and estimated the likelihood of a release and groundwater contamination. Provided expert testimony based on this analysis.
- Provided expert testimony on proposed coal ash impoundment closure regulations and proposed new state groundwater standards in Illinois.
- Conducted environmental forensic evaluations to determine sources of observed environmental contamination in soil, groundwater, sediment and sub-slab/indoor air for sites in litigation and pre-litigation phases.
- Performed multivariate statistical analyses of data for forensic analysis, for contaminant ecological impact analysis, to determine appropriate remedial objectives, and as part of human health and ecological risk assessments.
- Lead RCRA Corrective Action at a former manufacturing facility.
- Directed and assisted in the closure of a number of sites in the Illinois Voluntary Cleanup Program and the Illinois Leaking Underground Storage Tank Program.
- Evaluated the potential contribution of urban industrial sources of heavy metals to urban soil and sediments using both simple data comparisons and multivariate statistical techniques.
- Performed ground water and contaminant fate and transport modeling using MODFLOW and MT3D for use as a Superfund cost allocation tool in support of expert testimony. Relative mass of TCE entering the Superfund Site from sources on two PRP's properties was used as a basis for cost allocation. A Monte Carlo analysis was also performed to evaluate the sensitivity of the proposed allocation to changes in key variables.

- Performed Monte Carlo analysis of risk to ground water posed by a proposed petroleum pipeline in support of expert testimony. The analysis examined the likelihood of the exceedance of the Illinois Class I ground water standard for benzene per mile of proposed pipeline.
- Performed Monte Carlo cost allocation among four PRPs for a Superfund Site in support of expert testimony. Total volume, volume of hazardous substances, and volume of drummed materials were considered.
- Utilized 3-D geostatistical interpolation techniques to visualize environmental data, to estimate excavation volumes for remediation, and to identify and distinguish source areas and potential preferential pathways of migration for a number of contaminated sites.
- Performed research and analysis of remedial activities and associated costs to determine compliance with the NCP for cost recovery matters for a number of sites.

PUBLICATIONS AND PRESENTATIONS

1993
Stochastic Models of Particle Deposition in Porous Media
Paper presented at the 1993 Midwest Regional Conference on Environmental Chemistry, University of Notre Dame
Authors: Hahn, M.W., and C. F. O'Melia

1994
Deposition and Reentrainment of Particles in Porous Media
Poster presented at the 1994 Gordon Research Conference on Environmental Science, Water, New Hampshire
Authors: Hahn, M.W., D. Abadzic, and C. R. O'Melia

1994
Colloid Transport in Groundwaters: Filtration of Fine Particles at Low Filtration Rates
Presented at the 1994 ASCE National Conference, Boulder, Colorado
Authors: Hahn, M.W., D. Abadzic, and C. R. O'Melia

1995
Deposition and Reentrainment of Brownian Particles under Unfavorable Chemical Conditions
Presented at the 1995 ACE National Conference, Environmental Chemistry Division
Authors: Hahn, M.W., D. Abadzic, and C. R. O'Melia

1995
Deposition and Reentrainment of Brownian Particles under Unfavorable Chemical Conditions
Doctoral Dissertation, Johns Hopkins University
Author: Hahn, M.W.

1997
Some Effects of Particles Size in Separation Processes Involving Colloids
Wat. Sci. Tech. Vol. 36, No. 4 pp. 119–126
Authors: O'Melia, C.R., M.W. Hahn, and C. Chen

1997
Literature Review 1997: Storage, Disposal, Remediation, and Closure
Water Environment Research, Vol. 69, No. 4, pp 6389-719
Authors: Millano E.F. and M.W. Hahn

1998
The Statistics of Small Data Sets
Accepted for publication, Superfund Risk Assessment in Soil Contamination Studies: Third Volume, ASTM STP 1338, K.B. Hoddinott Ed., American Society for Testing and Materials
Authors: Ball, R.O., and M.W. Hahn

1998
RBCA Compliance for Small Data Sets
Battelle Conference Proceedings, Remediation of Chlorinated and Recalcitrant Compounds: Risk, Resource and Regulatory Issues
The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, pp. 73-78
Authors: Hahn, M.W., A.E. Sevcik, and R.O.Ball

1998
Contaminant Plume and using 3D Geostatistics
Battelle Conference Proceedings, Remediation of Chlorinated and Recalcitrant Compounds: Risk, Resource and Regulatory Issues
The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, pp. 85-90
Authors: Ball, R.O., M.W. Hahn, and A.E. Sevcik1998
RBCA Closure at DNAPL Sites
Battelle Conference Proceedings, Remediation of Chlorinated and Recalcitrant Compounds: Risk, Resource and Regulatory Issues
The First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, pp.181-186
Authors: Sheahan, J.W., R.O. Ball, and M.W. Hahn

1998
RBCA Closure at DNAPL Sites, Ground Water Monitoring and Research
Authors: Sheahan, J.W., R.O. Ball, and M.W. Hahn

2004
Deposition and Reentrainment of Brownian Particles in Porous Media under Unfavorable Chemical Conditions: Some Concepts and Applications
Environmental Science & Technology, Vol. 38, pp 210-220
Authors: Hahn, M.W. and C.R. O'Melia

2010
Making the Case for Causation in Toxic Tort Cases: Superfund Rules Don't Apply
Environmental Law Reporter, News & Analysis, July 2010, pp. 10638-10641
Authors: More, J.R. and M.W. Hahn

Exhibit D

DECLARATION OF CYNTHIA VODOPIVEC
ON BEHALF OF ILLINOIS POWER RESOURCES GENERATING, LLC

I, Cynthia Vodopivec, affirm and declare as follows:

1. I present this Declaration on behalf of Illinois Power Resources Generating, LLC (hereinafter "IPRG"). I am Senior Vice President, Environmental Health and Safety at Vistra Corp., the indirect corporate parent of IPRG. As part of my duties, I oversee permitting, regulatory development, compliance (air, water, and waste issues), and health and safety at the Company, including IPRG's formerly operating Duck Creek Power Plant in Fulton County, Illinois. I received a Bachelor's Degree in Engineering from Dartmouth College in 1998 and an MBA from Rensselaer in 2009. I state the following in support of IPRG's Petition for Review of Illinois Environmental Protection Agency's Non-Concurrence with Alternative Source Demonstration under 35 Ill. Adm. Code Part 845 and Motion for Stay ("Petition").

2. IPRG received IEPA's letter dated December 6, 2023 notifying IPRG of IEPA's nonconcurrence with the Duck Creek Gypsum Management Facility ("GMF") Pond Alternative Source Demonstration via U.S. Mail on December 11, 2023. This letter is attached as Exhibit A of the Petition.

3. Performing source characterization of the CCR at the Duck Creek GMF Pond using total solids sampling techniques under SW846 would require drilling within the Duck Creek GMF Pond with up to 3 borings using specialized equipment to collect 6 samples. It would further require complete laboratory analyses, data evaluation and reporting for those samples. Assuming a driller is readily available, which is not always the case, this process would likely take approximately 20-22 weeks to complete, and would likely cost approximately $150-000 to $175,000.

4. Conducting a characterization of the local peat unit near the Duck Creek GMF Pond in accordance with 35 Ill Adm. Code 845.640 would require locating and drilling into the unit, well installation, solids and groundwater sampling and analyses, potential batch testing and data evaluation and reporting. Assuming a driller is readily available, which is not always the case, this process would take approximately 20-22 weeks and would cost approximately $105,000.

5. Completing an assessment of corrective measures for a pH exceedance at the Duck Creek GMF Pond in accordance with the requirements and deadlines of 35 Ill. Adm. Code § 845.660 would likely cost approximately $35,000. Completing the requirements of 35 Ill. Adm. Code § 845.670, including determining nature and extent, conducting a geochemical evaluation, preparing and submitting the semi-annual reports, a construction permit application and a corrective action plan, for a pH exceedance at the Duck Creek GMF Pond would likely cost approximately $400,000. Undertaking the steps required in Sections 845.660 and 845.670 is a considerable undertaking that requires the dedication of many resources. For example, the corrective measures assessment may require development of groundwater models specific to pH and could result in the development of potential engineered remedies. The Corrective Action Plan may require a 30 percent design for the selected remedy, a groundwater monitoring plan, a new Construction Permit Application, and attendance at a public meeting. Significant personnel time and resources will be necessary to dedicate specifically to this work.

FURTHER, the Declarant sayeth not.

Dated: January 12, 2024

Cynthia S. Vody