Kincaid Generation, LLC
1500 Eastport Plaza Dr.
Collinsville, IL 62234

May 8, 2025

Illinois Environmental Protection Agency
DWPC – Permits MC #15
Attn: Part 845 Coal Combustion Residual Rule Submittal
2520 W Iles Ave
P.O. Box 19276
Springfield, IL 62794-9276

Re: Kincaid Power Plant Ash Pond; IEPA ID # W0218140002-01

Dear Mr. LeCrone:

In accordance with 35 I.A.C. § 845.200, Kincaid Generation, LLC ("Kincaid") is submitting a supplement to the previously submitted operating permit application for the Kincaid Power Plant Ash Pond (IEPA ID # W0218140002-01) to address the corrective action requirements of Part 845.

Kincaid previously submitted an operating permit application for Kincaid Power Plant Ash Pond on October 25, 2021. The enclosed supplemental information is being submitted in accordance with 35 I.A.C. § 845.200(a)(3) in order to "[modify] the facility's operating permit when the approved corrective action does not require the modification of the CCR surface impoundment." This amendment includes a corrective action plan containing corrective action alternatives analysis, groundwater modeling, and corrective action groundwater monitoring program. One hardcopy is provided with this submittal.

Sincerely,

Phil Morris
Sr. Director, Environmental

Enclosures

Visual Road Map for Corrective Action
Supplement to Operating Permit Application
Kincaid Power Plant, Ash Pond
Kincaid, IL

Road Map for Corrective Action
Supplement to Operating Permit Application
Kincaid Power Plant, Ash Pond
Kincaid, IL

Section	Rule Text	Location of Information Demonstrating Compliance			Version History			Notes
		Document	Section or Appendix	PDF Page No. & Hyperlink	Submitted Previously	Updated Version	New Submittal	
Section 845.620 - Hydrogeologic Site Characterization								
845.620	Hydrogeologic Site Characterization	---	---	---	x			HCR was submitted on October 25, 2021 as Attachment B to CP application.
Section 845.660 - Assessment of Corrective Measures								
845.660	Assessment of Corrective Measures	CMA	---	322		x		Resubmittal with no updates
Section 845.670 - Corrective Action Plan								
845.670(a)	The owner or operator must prepare a semi-annual report describing the progress in selecting a remedy and developing a CAP. The semi-annual report must be submitted to IEPA and placed in the operating record as required by 35 I.A.C. § 845.800(d)(17).							
845.670(b)	Within one year after completing the assessment of corrective measures as specified in 35 I.A.C. § 845.660, and after completion of the public meeting in 35 I.A.C. § 845.660(d), the owner or operator of the CCR surface impoundment must submit, in a CP application [or modification to the facility's operating permit] to IEPA, a CAP that identifies the selected remedy. This requirement applies in addition to, not in place of, any applicable standards under any other State or federal law.	Supplement to Operating Permit Application	---	1			x	A corrective action CP is not required when the proposed corrective action does not require modification of the CCR SI or the installation or modification of related treatment or mitigation facilities per 845.200(a)(3)
845.670(c)	The CAP must meet the following requirements:							
845.670(c)(1)	Be based on the results of the CMA conducted under 35 I.A.C. § 845.660;	CMA	---	322			x	
845.670(c)(2)	Identify a selected remedy that at a minimum, meets the standards listed in subsection (d);	CAAA	Section 2	50			x	
845.670(c)(3)	Contain the corrective action alternatives analysis specified in subsection (e); and	CAAA	Section 2	50			x	
845.670(c)(4)	Contain proposed schedules for implementation, including an analysis of the factors in subsection (f).	CAP	Table 1	25			x	
845.670(d)	The selected remedy in the CAP must:							
845.670(d)(1)	Be protective of human health and the environment;	CAAA	Section 2.2.1	56			x	
845.670(d)(2)	Attain the GWPS specified in 35 I.A.C. § 845.600;	Groundwater Modeling Technical Memodandum	Section 6	169			x	
845.670(d)(3)	Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents listed in 35 I.A.C. § 845.600 into the environment;	CAAA	Section 2.2.2	56			x	
845.670(d)(4)	Remove from the environment as much of the contaminated material that was released from the CCR surface impoundment as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and	CAAA	Section 2.5	69			x	
845.670(d)(5)	Comply with standards for management of wastes as specified in 35 I.A.C. § 845.680(d).	CAAA	Section 2	50			x	
845.670(e)	CAAA. In selecting a remedy that meets the standards of subsection (d), the owner or operator of the CCR surface impoundment must consider the following evaluation factors:							
845.670(e)(1)	The long- and short-term effectiveness and protectiveness of each potential remedy, along with the degree of certainty that the remedy will prove successful based on consideration of the following:	CAAA	Section 2.2	55			x	
845.670(e)(1)(A)	Magnitude of reduction of existing risks;	CAAA	Section 2.2.1	55			x	
845.670(e)(1)(B)	Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;	CAAA	Section 2.2.3	57			x	
845.670(e)(1)(C)	The type and degree of long-term management required, including monitoring, operation, and maintenance;	CAAA	Section 2.2.4	57			x	
845.670(e)(1)(D)	Short-term risks that might be posed to the community or the environment during implementation of a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminants;	CAAA	Section 2.2.5	58			x	
845.670(e)(1)(E)	Time until GWPS in 35 I.A.C. § 845.600 are achieved;	CAAA	Section 2.2.6	63			x	
845.670(e)(1)(F)	The potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, containment, or changes in groundwater flow;	CAAA	Section 2.2.7	64			x	
845.670(e)(1)(G)	The long-term reliability of the engineering and institutional controls, including an analysis of any off-site, nearby destabilizing activities; and	CAAA	Section 2.2.8	65			x	
845.670(e)(1)(H)	Potential need for replacement of the remedy.	CAAA	Section 2.2.9	66			x	
845.670(e)(2)	The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of each of the following potential factors:	CAAA	Section 2.2.2	56			x	
845.670(e)(2)(A)	The extent to which containment practices will reduce further releases; and	CAAA	Section 2.2.2	56			x	
845.670(e)(2)(B)	The extent to which treatment technologies may be used.	CAAA	Section 2.2.2	56			x	
845.670(e)(3)	The ease or difficulty of implementing each potential remedy based on consideration of the following types of factors:							
845.670(e)(3)(A)	Degree of difficulty associated with constructing the technology;	CAAA	Section 2.3.1	66			x	
845.670(e)(3)(B)	Expected operational reliability of the technologies;	CAAA	Section 2.3.2	67			x	
845.670(e)(3)(C)	Need to coordinate with and obtain necessary approvals and permits from other agencies;	CAAA	Section 2.3.3	67			x	
845.670(e)(3)(D)	Availability of necessary equipment and specialists; and	CAAA	Section 2.3.4	68			x	
845.670(e)(3)(E)	Available capacity and location of needed treatment, storage, and disposal services.	CAAA	Section 2.3.5	68			x	
845.670(e)(4)	The degree to which community concerns are addressed by each potential remedy.	CAAA	Section 2.4	69			x	

Road Map for Corrective Action
Supplement to Operating Permit Application
Kincaid Power Plant, Ash Pond
Kincaid, IL

Section	Rule Text	Location of Information Demonstrating Compliance			Version History			Notes
		Document	Section or Appendix	PDF Page No. & Hyperlink	Submitted Previously	Updated Version	New Submittal	
845.670(f)	The owner or operator must specify, as part of the CAP, a schedule for implementing, of and completing, remedial activities. The schedule must require the completion of remedial activities within a reasonable time, taking into consideration the factors in this subsection (f). The owner or operator of the CCR surface impoundment must consider the following factors in determining the schedule of remedial activities:							
845.670(f)(1)	Extent and nature of contamination, as determined by the characterization required under 35 I.A.C. § 845.650(d);	CAP	Section 3.3	16			x	
845.670(f)(2)	Reasonable probabilities of remedial technologies achieving compliance with the GWPS established by 35 I.A.C. § 845.600 and other objectives of the remedy;	CAP	Section 3.3	16			x	
845.670(f)(3)	Availability of treatment or disposal capacity for CCR managed during implementation of the remedy;	CAP	Section 3.3	16			x	
845.670(f)(4)	Potential risks to human health and the environment from exposure to contamination before completion of the remedy;	CAP	Section 3.3	16			x	
845.670(f)(5)	Resource value of the aquifer, including:							
845.670(f)(5)(A)	Current and future uses, including potential residential, agricultural, commercial industrial and ecological uses;	CAP	Section 3.3	16			x	
845.670(f)(5)(B)	Proximity and withdrawal rate of users;	CAP	Section 3.3	16			x	
845.670(f)(5)(C)	Groundwater quantity and quality;	CAP	Section 3.3	16			x	
845.670(f)(5)(D)	The potential impact to the subsurface ecosystem, wildlife, other natural resources, crops, vegetation, and physical structures caused by exposure to CCR constituents;	CAP	Section 3.3	16			x	
845.670(f)(5)(E)	The hydrogeologic characteristic of the facility and surrounding land; and	CAP	Section 3.3	16			x	
845.670(f)(5)(F)	The availability of alternative water supplies; and	CAP	Section 3.3	16			x	
845.670(f)(6)	Other relevant factors.	CAP	Section 3.3.1	21			x	
Section 845.680 Implementation of the Corrective Action Plan								
845.680(a)	Within 90 days after the Agency's approval of the corrective action plan submitted under Section 845.670, the owner or operator must initiate corrective action. Based on the schedule approved by the Agency for implementation and completion of corrective action, the owner or operator must:							
845.680(a)(1)	Establish and implement a corrective action groundwater monitoring program that:							
845.680(a)(1)(A)	At a minimum, meets the requirements of the monitoring program under Section 845.650;	CA GMP	Section 2.1	1854			x	
845.680(a)(1)(B)	Documents the effectiveness of the corrective action remedy; and	CA GMP	Section 3	1858			x	
845.680(a)(1)(C)	Demonstrates compliance with the groundwater protection standard under subsection (c).	CA GMP	Section 3	1858			x	
845.680(a)(2)	Implement the corrective action remedy approved by the Agency under Section 845.670; and	CAP	Section 1.4	10			x	
845.680(a)(3)	Take any interim measures necessary to reduce the contaminants leaching from the CCR surface impoundment, and/or potential exposures to human or ecological receptors. Interim measures must, to the greatest extent feasible, be consistent with the objectives of, and contribute to the performance of, any remedy that may be required by Section 845.670. The following factors must be considered by an owner or operator in determining whether interim measures are necessary:							
845.680(a)(3)(A)	Time required to develop and implement a final remedy;	CAP	Section 3.4	21			x	
845.680(a)(3)(B)	Actual or potential exposure of nearby populations or environmental receptors to any of the constituents listed in Section 845.600;	CAP	Section 3.4	21			x	
845.680(a)(3)(C)	Actual or potential contamination of sensitive ecosystems or current or potential drinking water supplies;	CAP	Section 3.4	21			x	
845.680(a)(3)(D)	Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously;	CAP	Section 3.4	21			x	
845.680(a)(3)(E)	Weather conditions that may cause any of the constituents listed in Section 845.600 to migrate or be released;	CAP	Section 3.4	21			x	
845.680(a)(3)(F)	Potential for exposure to any of the constituents listed in Section 845.600 as a result of an accident or failure of a container or handling system; and	CAP	Section 3.4	21			x	
845.680(a)(3)(G)	Other situations that may pose threats to human health and the environment.	CAP	Section 3.4	21			x	

Notes:
CAA = Closure Alternatives Analysis
CAAA = Corrective Action Alternatives Analysis
CAP = corrective action plan
CCR = coal combustion residuals
CMA = Corrective Measures Assessment
CP = Construction Permit
GMP = Groundwater Monitoring Plan
GWPS = groundwater protection standards
HCR = Hydrogeologic Site Characterization Report
IEPA = Illinois Environmental Protection Agency
N&E = Nature and Extent Report and Addendum
SI = Surface Impoundment

RAMBOLL

Intended for
Kincaid Generation, LLC
199 IL 104
Kincaid, IL 62540

Date
May 8, 2025

Project No.
1940110241-007

CORRECTIVE ACTION PLAN

KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

CORRECTIVE ACTION PLAN
KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940110241-007**
Recipient	**Kincaid Generation**
Document type	**Corrective Action Plan**
Revision	**FINAL**
Date	**May 8, 2025**
Prepared by	**Sarah Jo Martens**
Checked by	**Melanie Conklin**
Approved by	**Brian Hennings, PG**
Description	**Corrective Action Plan for 35 I.A.C. § 845**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Sarah Jo Martens
Project Engineer

Melanie Conklin
Project Manager

Brian G. Hennings, PG
Project Officer, Hydrogeology

CONTENTS

TABLES

TABLES IN TEXT

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
AP	Ash Pond, also referred to as the Site
bgs	below ground surface
CAA	Closure Alternatives Analysis
CAAA	Corrective Action Alternatives Analysis
CA GMP	Corrective Action Groundwater Monitoring Plan
CAAA-SIR	Corrective Action Alternatives Analysis Supporting Information Report
CAP	Corrective Action Plan
CCR	coal combustion residuals
Federal CCR Rule	40 C.F.R. § 257 Subpart D
CIP	closure-in-place
CMA	Corrective Measures Assessment
COC	Constituent of Concern
COI	constituent of interest
CP	Construction Permit
CY	cubic yards
Gradient	Gradient Corporation
GWE	Groundwater Extraction
GWP	Groundwater Polishing
GWPS	groundwater protection standards
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
IPCB	Illinois Pollution Control Board
ISGS	Illinois State Geological Survey
ISWS	Illinois State Water Survey
KPP	Kincaid Power Plant
LAU	lower aquifer unit
LCU	lower confining unit
NAVD88	North American Vertical Datum of 1988
No.	number
NPDES	National Pollutant Discharge Elimination System
OP	Operating Permit
PMP	Primary Migration Pathway
PWS	Public water system
Ramboll	Ramboll Americas Engineering Solutions, Inc.
TDS	Total Dissolved Solid
UA	uppermost aquifer
UCU	upper confining unit
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

1.1 Plant and Site Information

Kincaid Generation, LLC (Kincaid Generation) is the operator of the coal-fired Kincaid Power Plant (KPP), located in Christian County, Illinois, approximately four miles west of the Village of Kincaid. Kincaid Generation intends to complete groundwater corrective action for the coal combustion residuals (CCR) surface impoundment (SI), referred to as the Ash Pond (AP), is identified by Illinois Environmental Protection Agency (IEPA) identification (ID) number (No.) W0218140002-01, CCR Unit ID No. 141, and National Inventory of Dams (NID) No. IL50706. This Corrective Action Plan (CAP) has been prepared for the AP at the KPP under the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments [1] and the requirements of Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 Subpart D, herein referred to as the Federal CCR Rule [2].

1.2 Organization of the Corrective Action Plan

This CAP is organized in the following manner:

- **Section 1** includes an introduction to the AP, lists the status of other 35 I.A.C. § 845 permit applications submitted to IEPA, identifies the selected remedy, and provides a narrative of remedy construction;
- **Section 2** includes an overview of the Corrective Action process, including the results of the Corrective Measures Assessment (CMA) and Corrective Action Alternatives Analysis (CAAA);
- **Section 3** provides the CAP requirements, the selected remedy, an evaluation of effectiveness and an implementation schedule, as required by 35 I.A.C. § 845.670; and
- **Section 4** includes reference documents used in the development of this CAP.

This CAP was prepared as an attachment to a supplement to the submitted Operating Permit (OP) application for the AP as required by 35 I.A.C. § 845.200(a)(3).

1.3 Permit Status

The following 35 I.A.C. § 845 permit applications have previously been submitted to IEPA by Kincaid Generation for the AP:

- An OP application, as required by 35 I.A.C. § 845.230, was submitted on October 25, 2021 [3].
- A Construction Permit (CP) application for final closure of the AP, as required by 35 I.A.C. § 845.220, including a CCR Surface Impoundment Final Closure Plan, as required by 35 I.A.C. § 845.720, was submitted on July 28, 2022 [4].

The Final Closure Plan selected closure-in-place (CIP) with a consolidate-and-cap approach as the most appropriate closure method for the AP.

As of the date of this CAP, the OP and final closure CP applications for the AP are pending with IEPA.

1.4 Selected Corrective Action Remedy

Groundwater Polishing (GWP) following source control (*i.e.,* consolidate-and-cap) presented within the Final Closure Plan [5], has been identified as the most appropriate remedy for the AP, based on the CAAA provided in **Appendix A**. Potential remedies evaluated in the CAAA included Source Control with GWP and Source Control with Groundwater Extraction (GWE).

The CAAA, which was prepared by Gradient Corporation (Gradient), was based on a CAAA Supporting Information Report (CAAA-SIR) that was prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) and is attached to the CAAA. The CAAA-SIR includes the results of groundwater modeling and feasibility-level design information for each remedy.

A Groundwater Polishing Evaluation Report is also attached to the CAAA. This report presents results from geochemical modeling of exceedance[1] parameters addressed at AP by the CAP. Geochemical modeling supports the assessment of groundwater polishing as a component of the proposed corrective action by evaluating the potential for chemical attenuation of constituents of concern (COCs) before and after source control as a means of contextualizing the times to meet GWPS estimated in the flow and transport model.

1.4.1 Narrative Description of Selected Corrective Action Remedy

Corrective action will consist of source control, as outlined in the Final Closure Plan for the AP [5]. The source control will be followed by GWP. The proposed closure exceeds the minimum Closure Performance Standards listed in 35 I.A.C. § 845.750. The closure will include removing free liquids in accordance with the performance standard in 35 I.A.C. § 845. The closure will control infiltration in accordance with the performance standard in 35 I.A.C. § 845, thus removing the hydraulic head that can force leachate into subsurface soils and is the mechanism that can drive risk (United States Environmental Protection Agency [6]:

> *EPA's risk assessment shows that the highest risks are associated with CCR surface impoundments due to the hydraulic head imposed by impounded water. Dewatered CCR surface impoundments will no longer be subjected to hydraulic head so the risk of releases, including the risk that the unit will leach into the groundwater, would be no greater than those from CCR landfills.*

The AP will be closed using a consolidate-and-cap approach consisting of excavating approximately 1.9 million cubic yards of CCR and placing it in a consolidated CCR footprint at an elevation greater than 10 feet above the uppermost aquifer (UA) and above the estimated post-closure water table. The consolidated CCR will be covered with an alternate geomembrane final cover system having performance that exceeds the 35 I.A.C. § 845.750(c)(2) minimum final cover requirements. The proposed source control is predicted to reduce water flux into and out of the AP by approximately 99 percent [7] and allow the GWPS to be achieved within approximately 17 years[2] . These source control activities will serve as the primary groundwater corrective measure at the AP.

1.4.1.1 Narrative Discussion of Remedy Design and Function

The USEPA has stated that source control is the most effective means of ensuring the timely attainment of remediation objectives [8]. Natural geochemical processes are appropriate as a

[1] Throughout this document, "exceedance" or "exceedances" is intended to refer only to potential exceedances of proposed applicable background statistics or GWPSs as described in the proposed groundwater monitoring program, which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC operating permit application for the KPP AP. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and, therefore, Kincaid Generation, LLC has not identified any actual exceedances.

[2] From Groundwater Modeling Technical Memorandum included in Appendix A as an attachment to CAAA-SIR.

"polishing step" for residual plume management after effective source control implementation (*i.e.*, groundwater polishing) because there are no risks to receptors and the contaminant plume is not expanding. Groundwater polishing will achieve the GWPS by natural physical and chemical mechanisms within the groundwater which reduce the concentrations of COCS. Therefore, selection of groundwater monitoring network, groundwater monitoring, and adaptive management are critical components of remedy design and function which are further described in Section 1.4.2.

1.4.2 Narrative Description of Proposed Groundwater Monitoring

Corrective action groundwater monitoring will be conducted during remedy operation to evaluate the effectiveness of the corrective action remedy and whether groundwater concentrations are achieving the GWPS as predicted by the groundwater model. Groundwater data collected as part of the monitoring program will be analyzed to determine if the remedy is on track to meet GWPS and to inform adaptive management decisions if performance metrics are not achieved. A Corrective Action Groundwater Monitoring Plan (CA GMP) with details on how the groundwater monitoring network will be monitored, how the data will be analyzed, and what will trigger adaptive site management directions is included as **Appendix B**. Information associated with these activities is described below.

- Regular groundwater monitoring will be conducted utilizing a corrective action groundwater monitoring network designed in accordance with 35 I.A.C. § 845.680(a)(1).
- Laboratory parameters include major ions for evaluating groundwater chemistry and COCs (*i.e.*, reported exceedances in accordance with the Operating GMP) the corrective action is intended to address. Sampling to evaluate corrective action effectiveness will begin the quarter after the corrective action remedy is implemented and commissioned. Samples will be collected on a quarterly basis initially and potentially reduced to a semiannual basis once five years of monitoring have occurred, in accordance with 35 I.A.C. § 845.650(b)(4). Monitoring results will be submitted to IEPA for each monitoring event, in addition to an Annual Groundwater Monitoring and Corrective Action Report, in accordance with 35 I.A.C. § 845.610(e).
- Routine maintenance of the monitoring well network will include inspecting the wells, making repairs to the wells (as needed) and rehabilitating and/or replacing wells to improve performance (as needed).
- Adaptive site management strategies will be employed as an integral part of ongoing corrective action at the AP. The adaptive site management approach will allow timely incorporation of new site information to ensure the achievement of the GWPS. The effectiveness of the remedy at each phase is evaluated using performance metrics designed to assess the goals of that phase. Performance metrics answer questions designed to evaluate multiple aspects of remedy effectiveness with the ultimate goal of holistically guiding management decisions [9]. The goals and performance metrics of each phase of remedy evaluation are presented in Section 3 of the CA GMP (**Appendix B**).
- Documentation of remedy progress metrics will be provided in the Annual Groundwater Monitoring and Corrective Action Report beginning after the second year of data collection: a minimum of eight data points is required to complete meaningful statistical analysis required for evaluation of the remedy progress metrics, which will be available after two years of quarterly sampling. Per USEPA guidance [9], a thorough review of corrective action progress and remedy effectiveness will be conducted every five years. A Five-Year Annual Groundwater

Monitoring and Corrective Action Report will evaluate the comprehensive data set and, if triggered by the results of the remedy progress evaluation metrics, evaluate whether adaptive management actions are needed. The five-year time frame allows adaptive management decisions to be based on a robust data sufficient to complete meaningful statistical analysis while remaining responsive to changing site conditions [9].

- Corrective Action Confirmation Monitoring and Completion
  - Per 35 I.A.C. § 845.680(c), corrective action is considered complete when compliance with the GWPS has been demonstrated "at all points within the plume of contamination that lies beyond the waste boundary […] for a period of three consecutive years". At that time, an attainment evaluation will be implemented. This will include monitoring each well for three additional years to confirm that GWPS have been achieved, in accordance 35 I.A.C. § 845.680(c).
  - After completion of the corrective action confirmation attainment monitoring period, a Corrective Action Completion Report and Certification will be prepared and submitted to IEPA, in accordance with 35 I.A.C. § 845.680(e).

2. CORRECTIVE ACTION OVERVIEW

This CAP is based on the tiered assessment and analysis of alternative remedial technologies and remedies that were completed via the CMA and CAAA (**Appendix A**). The objective of these assessments was to determine the optimal alternative for the AP that, when coupled with the source control proposed in the Final Closure Plan [5], would remediate groundwater and provide compliance with the GWPS specified under 35 I.A.C. § 845.600.

2.1 Integration of Corrective Action with Source Control (Final Closure)

All documents, assessments, and analyses performed as part of this CAP assume that the source control presented in the Final Closure Plan [5] for the AP will also be implemented. Source control is the primary corrective action for the AP and will consist of removing free liquids from the CCR and completing CIP with a consolidate-and-cap approach. This is estimated to include moving a total of 1.9 million cubic yards of CCR from the northern portion of the 172-acre AP and consolidation into an 84-acre area in the southern portion of the AP. When source control is completed, the remaining CCR in the AP will be fully encapsulated on all sides by underlying native soils, low-permeability embankment dikes, and a low-permeability final cover system.

Source control alone, without other supplemental corrective action, has been estimated via groundwater modeling to reduce the infiltration of liquids into the AP by 99 percent (%) relative to pre-closure conditions. Groundwater modeling performed to support CAAA-SIR estimates that source control activities are expected to result in GWPS being achieved approximately 17 years after closure completion, without implementing other forms of corrective action [7].

The remedy presented in this CAP is supplemental to the removal of free liquids, completion of source control via closure, and placing the CCR above the groundwater table and UA, which when combined, are the primary remedial action that will be performed at the site.

2.2 Corrective Measures Assessment

The CMA [10] was performed for the AP and submitted to the IEPA on May 12, 2024, after the exceedances of the GWPS were identified. The CMA considered a total of 5 corrective measures for the AP, including:

- Source Control with Groundwater Polishing (GWP)
- Source Control with Groundwater Extraction (GWE)
- Source Control with Groundwater Cutoff Wall
- Source Control with In-Situ Chemical Treatment
- Source Control with Phytoremediation

Based on the CMA, three corrective measures, including Source Control-GWP, Source Control-GWE, and Source Control with Phytoremediation, were identified as potentially viable corrective measures for the AP and were included for further evaluation, design advancement, and comparative assessment within the CAAA for the AP. The other corrective measures were determined by the CMA to unlikely be viable for the AP and were not evaluated further within the CAAA.

2.3 Analysis of Corrective Action Alternatives

2.3.1 Corrective Action Alternatives Analysis Supporting Information Report

The CAAA for the AP was prepared by Gradient based on a Corrective Action Alternatives Analysis Supporting Information Report (CAAA-SIR) prepared by Ramboll. The CAAA-SIR, which is included as Attachment B of the CAAA provided in **Appendix A**, included additional evaluation, design advancement, and comparative assessment of the Source Control-GWP and Source Control-GWE corrective measures identified as potentially viable for the AP by the CMA. Source Control with Phytoremediation was identified for further evaluation in the CMA and was evaluated in the groundwater modeling process described in the Groundwater Model Technical Memorandum[3]; however, the groundwater modeling indicated minimal to no impact or a longer time to achieve GWPSs than Source Control-GWP or Source Control-GWE. Therefore, Source Control with Phytoremediation was not selected for further consideration as a CAAA-SIR alternative as it did not provide tangible benefits in time to reach GWPS, relative to the degree of construction difficulty and operational reliability.

The CAAA-SIR evaluation included the completion of feasibility-level design activities for each alternative; this incorporated the following tasks:

- Performing predictive groundwater modeling to evaluate the scope (*i.e.,* location and extents) of each alternative and the corresponding estimated time to achieve GWPS;
- Developing feasibility-level design drawings showing the extents in plan and elevation view of each engineered remedy;
- Estimating the time required to design, construct, and implement each remedy, in addition to ongoing operational and maintenance requirements;
- Developing conceptual plans for the storage, treatment, and discharge of extracted groundwater for applicable remedies;
- Identifying future tasks required to implement each alternative, including permitting, investigation, and design efforts; and
- Estimating relevant material quantities, labor hours, delivery miles, equipment miles, and daily commuting miles associated with constructing each remedy.

2.3.2 Corrective Action Alternatives Analysis

The CAAA (**Appendix A**) included a detailed analysis of each of the corrective action alternatives presented in the CAAA-SIR, including an evaluation of:

- Long and short-term effectiveness and protectiveness;
- Ease or difficulty of implementation;
- Degree to which community concerns are addressed; and,
- Relative amount of contamination removed from the environment.

Based on the CAAA, Source Control-GWP was identified as the most appropriate corrective action for the AP and was selected for further design development as part of this CAP.

[3] The Groundwater Model Technical Memorandum is attached as Appendix A to the CAAA-SIR.

3. CORRECTIVE ACTION PLAN

The 35 I.A.C. § 845 requirements for the CAP and corresponding demonstrations that the proposed corrective measures meet these requirements are discussed individually in this section. Many of the CAP requirements are discussed within the CMA and CAAA documents that have been prepared to support the CAP. Therefore, the demonstrations will also refer to those documents.

3.1 General Requirements

35 I.A.C. § 845.670(c): The corrective action plan must meet the following requirements:

(1) Be based on the results of the corrective measures assessment conducted under 35 I.A.C. § 845.660;

(2) Identify a selected remedy that at a minimum, meets the standards listed in subsection (d);

(3) Contain the corrective action alternatives analysis specified in subsection (e); and

(4) Contain proposed schedules for implementation, including an analysis of the factors in subsection (f).

This CAP is based on the results of the CMA and CAAA, which are included within **Appendix A**. The proposed schedule for implementing the selected Source Control-GWP remedy is provided in **Table 1**.

3.2 Remedy Selection

35 I.A.C. § 845.670(d): The selected remedy in the corrective action plan must:

(1) Be protective of human health and the environment;

Current conditions at the AP pose no risk to human health or environment. There are also no unacceptable risks to human health and the environment under future conditions. Concentrations of CCR-derived constituents in groundwater are anticipated to decline over time once the AP is closed and the GWP remedy is in place as presented in the CAAA (**Appendix A)** [10].

(2) Attain the groundwater protection standards specified in 35 I.A.C. § 845.600;

Groundwater modeling indicates the selected Source Control-GWP remedy (Appendix B of the CAAA-SIR which is attached in **Appendix A**), which is selected as the remedy of this CAP, will result in attainment of the GWPS within the current monitoring system within 17 years of final closure completion.

(3) Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents listed in 35 I.A.C. § 845.600 into the environment;

The AP will be closed using a consolidate-and-cap approach which will act as the main control mechanism to prevent further releases of CCR-derived constituents. If the remedy is found to be unsuccessful in meeting remediation goals, adaptive site management actions will be taken as described within the CA GMP (**Appendix B**).

(4) Remove from the environment as much of the contaminated material that was released from the CCR surface impoundment as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems; and

No known releases of CCR due to a structural integrity issue have occurred at the AP.

(5) Comply with standards for management of wastes as specified in 35 I.A.C. § 845.680(d).

The CCR managed as part of the closure will be done in accordance with all 35 I.A.C. § 845 requirements and the submitted closure plan [5].

3.3 Schedule for Implementation

As presented in Section 4.1 of the CMA and in Section 1.4.1.1 of this CAP, source control is the most effective means of ensuring the timely attainment of remediation objectives [8]. With groundwater from the AP impoundment and potential groundwater contributions to surface water posing no unacceptable risks to human health or the environment [11], groundwater polishing is an appropriate "polishing step" provided the corrective action is managed within a reasonable timeframe.

The Source Control-GWP remedy will successfully attain GWPS in a reasonable time[4] as discussed in the following subsections. Timeframes to attain GWPS in the groundwater monitoring wells summarized in **Table A** indicates that 40% of progress is expected to occur within the first five years.

Table A. Estimated Timeframes to Attain GWPS in Groundwater Monitoring Wells

	2 years**	5 years**	10 years**	16 years**	17 years**
Percentage of Wells predicted to attain GWPS*	30 %	40 %	60 %	90 %	100 %

*: 10 wells were used to estimate time to reach GWPS in the 2025 Groundwater Modeling Technical Memorandum.

**: Years counted starting from completion of source control.

<u>35 I.A.C. § 845.670(f)</u>: The owner or operator must specify, as part of the corrective action plan, a schedule for implementing, of and completing, remedial activities. The schedule must require the completion of remedial activities within a reasonable time, taking into consideration the factors in this subsection (f). The owner or operator of the CCR surface impoundment must consider the following factors in determining the schedule of remedial activities:

The schedule for implementing and completing the Source Control-GWP remedy at the AP is included in **Table 1**.

The schedule was developed considering the factors required by 35 I.A.C. §§ 845.770(f)(1) through (5), as summarized below.

[4] Groundwater Modeling Technical Memorandum is an appendix to CAAA-SIR which is attached to CAAA, **Appendix A** of this CAP.

35 I.A.C. § 845.670(f)(1): Extent and nature of contamination, as determined by the characterization required under 35 I.A.C. § 845.650(d);

The Nature and Extent Report [12], which was submitted to the IEPA on May 12, 2024 and is included with relevant updates as Appendix D to the CAAA report (**Appendix A**). Groundwater modeling and geochemical analysis were performed by Ramboll as part of the CAAA-SIR and the modeling considered the nature and extent of contamination.

35 I.A.C. § 845.670(f)(2): Reasonable probabilities of remedial technologies achieving compliance with the GWPS established by 35 I.A.C. § 845.600 and other objectives of the remedy;

Several remedies were evaluated in the CAAA (**Appendix A**) and it was determined that the selected remedy (Source Control–GWP) is expected to achieve compliance with 35 I.A.C. § 845.600 in a reasonable timeframe. The potential for remedial technologies to achieve compliance with the GWPS was evaluated using groundwater modeling [13]. For the selected remedy, the results indicate that groundwater will achieve compliance with the GWPS approximately 17 years after completion of source control which is described in Section 1.4.1. Further, the groundwater modeling indicates flux into and out of the AP will be reduced by approximately 99%. suggesting a high probability of successful source control.

As documented in the CMA, source control via consolidate-and-cap approach is a proven method for addressing groundwater contamination [10]. The proposed consolidate-and-cap approach is consistent with the requirements of 40 C.F.R. § 257 and 35 I.A.C. § 845. The proposed cover has been demonstrated to be compliant by equivalency in the Final Closure Plan [5].

Groundwater polishing processes include both physical and chemical mechanisms within the groundwater which reduce the concentrations of COCs in the groundwater. Physical components of groundwater polishing are described by groundwater flow and transport modeling [13]. The contribution of chemical mechanisms to groundwater polishing under current conditions and after source control implementation are evaluated using a geochemical modeling-based approach [14]. When combined with source control, groundwater polishing processes will achieve the GWPS in a reasonable timeframe.

35 I.A.C. § 845.670(f)(3): Availability of treatment or disposal capacity for CCR managed during implementation of the remedy;

The selected remedy includes source control followed by GWP. The CCR will be managed within the footprint of the existing CCR Unit as proposed in the CP for final closure [15]. GWP is not expected to result in the management of an appreciable volume of CCR. Therefore, the treatment and disposal capacity of CCR is not an applicable consideration for the selected remedy.

35 I.A.C. § 845.670(f)(4): Potential risks to human health and the environment from exposure to contamination before completion of the remedy;

A Human Health and Ecological Risk Assessment was completed and included as an attachment to the CAAA (**Appendix A**) that considers the potential risks to human health and the environment before completion of the remedy. The Human Health and Ecological Risk Assessment concluded that groundwater from the AP impoundment and potential groundwater contributions to surface water pose no unacceptable risks to human health or the environment. This conclusion was reached using methodology consistent with applicable USEPA risk assessment principles. The assessment relied on conservative assumptions meant to overestimate possible exposures and risks and provide an additional level of certainty in the conclusions [11].

<u>35 I.A.C. § 845.670(f)(5):</u> Resource value of the aquifer, including:

The resource value of the aquifer is discussed in the Hydrogeologic Site Characterization Report (HCR), which is included as Attachment B in the CP application for final closure [16]. The uppermost aquifer includes the clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations, also includes the interface with the Vandalia Till in the vicinity of the AP. Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the AP does not meet the definition of Class I – Potable Resource Groundwater. As set forth in 35 I.A.C. § 620.220, any geologic material with a hydraulic conductivity of less than 1 x 10^{-4} cm/s, and which does not meet the provisions of 35 I.A.C. § 620.210 (Class I), 35 I.A.C. § 620.230 (Class III), or 35 I.A.C. § 620.240 (Class IV), meets the definition of Class II: General Resource Groundwater.

Based on the detailed geologic information provided for the unlithified materials and bedrock encountered at the AP and the hydrogeologic data, the groundwater in the uppermost aquifer can be classified as Class II groundwater: General Resource Groundwater. Discontinuous sand lenses of the Cahokia Formation present within the soils overlying the uppermost aquifer have been identified as a potential migration pathway between the AP and the uppermost aquifer with groundwater flowing towards Sangchris Lake adjacent to the Site. This information was also considered in the CAAA as part of the Human Health and Ecological Risk Assessment, which concluded that groundwater from the AP impoundment and potential groundwater contributions to surface water pose no unacceptable risks to human health or the environment.

Source Control followed by GWP will result in decline of concentrations of CCR-derived constituents in the uppermost aquifer and potential migration pathways. Off-site migration of CCR-derived constituents is not expected to occur. Groundwater polishing and adaptive site management following Source Control will function until the GWPS is achieved in accordance with the CA GMP (**Appendix B**). Paragraphs (A) through (F) from 35 I.A.C. § 845.670(f)(5) are further addressed, as summarized below.

<u>35 I.A.C. § 845.670(f)(5)(A)</u>: Current and future uses, including potential residential, agricultural, commercial industrial and ecological uses; and

Current uses and users of the groundwater are discussed in the HCR, Section 5.1 and attachments; and, were considered in the CAAA as part of the Human Health and Ecological Risk Assessment which concluded that groundwater from the AP impoundment and potential groundwater contributions to surface water pose no unacceptable risks to human health or the environment. Exceedances do not extend beyond the property boundary[5] and are expected to remain within property controlled by Kincaid Generation.[6] No changes in future residential, commercial or ecological use of the aquifer are expected. In the absence of changes to current and future uses there is no applicable scheduling consideration.

[5] Based on Nature & Extent Report with Addendum attached to CAAA as Appendix D.
[6] Described in the Groundwater Modeling Technical Memorandum attached to CAAA-SIR which is an attachment of CAAA, **Appendix A** of this document.

<u>35 I.A.C. § 845.670(f)(5)(B)</u>: Proximity and withdrawal rate of users;

A water well inventory was completed in 2021 utilizing federal and state databases to assess nearby pumping wells, drinking water receptors, and other uses of water in the vicinity of the AP. A search of the Illinois State Geological Survey (ISGS) Illinois Water and Related Wells (ILWATER) Map identified nine wells located within 1,000-meters of the AP. The wells that were identified included two wells that were identified as dry, one well identified as a municipal water supply well, two wells identified as private water wells, one well identified as a commercial well, and three coal mining or engineering related test wells. Two (120210003900 and 120212289800) of the nine wells are located downgradient of the AP. While there is no information available about the current use of these wells, they are either unlikely to be used as sources of drinking/irrigation water and/or are unlikely to be affected by potential CCR-derived constituents originating from the AP due to locations side gradient of the AP or listed as dry and/or abandoned. The assessment concluded there are no existing off-site water wells, potable or non-potable, that could potentially be impacted by groundwater from the AP. This information was also considered in the CAAA as part of the Human Health and Ecological Risk Assessment, which concluded that groundwater from the AP impoundment and potential groundwater contributions to surface water pose no unacceptable risks to human health or the environment. In the absence of changes in current and future aquifer uses there is no applicable scheduling consideration for proximity and withdrawal rates of users.

<u>35 I.A.C. § 845.670(f)(5)(C)</u>: Groundwater quantity and quality;

Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the AP meets the definition of Class II – General Resource Groundwater. The Human Health and Ecological Risk Assessment (Appendix A in CAAA) concluded that groundwater from the AP impoundment and potential groundwater contributions to surface water pose no unacceptable risks to human health or the environment. The selected remedy includes source control followed by GWP. GWP does not include the management of any volume of groundwater. In the absence of groundwater management there is no applicable scheduling consideration pertaining to the quantity and quality of groundwater.

<u>35 I.A.C. § 845.670(f)(5)(D)</u>: The potential impact to the subsurface ecosystem, wildlife, other natural resources, crops, vegetation, and physical structures caused by exposure to CCR constituents;

Potential surface receptors are discussed in the HCR Sections 5.2 and 5.3. A survey to identify surface water features, nature preserves, and historic sites was conducted for a 1,000-meter radius around the AP. Section 3.5 of the Human Health and Ecological Risk Assessment included as Appendix A of the CAA and CMA/CAAA Report discusses the ecological risk evaluation.

1. Ecological receptors exposed to surface water include aquatic and marsh plants, amphibians, reptiles, and fish. The risk evaluation showed that none of the Constituents of Interest (COIs) in surface water exceeded protective screening benchmarks.
2. Ecological receptors exposed to sediment include benthic invertebrates. The modeled sediment COIs did not exceed the conservative screening benchmarks, therefore, none of the COIs evaluated in sediment are expected to pose an unacceptable risk to ecological receptors.
3. Ecological receptors were also evaluated for exposure to bioaccumulative COIs. This evaluation considered higher trophic-level wildlife with direct exposure to surface water and

sediment and secondary exposure through the consumption of dietary items (*e.g.,* plants, invertebrates, small mammals, fish). Mercury was the only ecological COI identified as having potential bioaccumulative effects. However, the modeled concentrations did not exceed benchmarks protective of bioaccumulative effects. Therefore, mercury is not considered to pose an ecological risk *via* bioaccumulation. Overall, this evaluation demonstrated that none of the COIs evaluated are expected to pose an unacceptable risk to ecological receptors.

Overall, this evaluation demonstrated that none of the COIs evaluated are expected to pose an unacceptable risk to ecological receptors. The selected remedy will reduce the concentrations of COI in groundwater. In the absence of unacceptable risks to ecological receptors there is no applicable scheduling consideration.

35 I.A.C. § 845.670(f)(5)(E): The hydrogeologic characteristic of the facility and surrounding land; and

In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU)/Potential Migration Pathway (PMP):** Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU are more likely to facilitate contaminant migration and these materials are referred to as the PMPs.
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet[7]. The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit) identified as the Vandalia Till.
- **Bedrock Confining Unit (BCU)**: This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and is present beneath the entire AP. Using locations where bedrock was encountered, the elevation of the top of bedrock is highest at MW-20 (548.02 feet) beneath the eastern portion of the AP and declines in elevation to the west toward MW-12D (540.68 feet) and to the south toward KIN-B005 (520 feet).

The effects of these hydrostratigraphic units on schedule were considered by incorporating the geometry, hydraulic, and geochemical properties of these units into the groundwater modeling and groundwater polishing reports, attached to the CAAA-SIR and CAAA, respectively, included in **Appendix A**, which estimate the time to reach the GWPS for remedial alternatives.

[7] All elevations in this report are referenced to North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

35 I.A.C. § 845.670(f)(5)(F): The availability of alternative water supplies.

As discussed in subsection A, there are nine potable water wells within 1,000 meters of the AP [16]. There is currently no need for an alternative water supply well as there are no current unacceptable risks to human or ecological receptors at the site. There are no applicable schedule concerns regarding the availability of alternative water supplies.

3.3.1 Other Relevant Factors

35 I.A.C. § 845.670(f)(6): Other relevant factors.

No additional factors were identified for consideration.

3.4 Necessity of Interim Measures

Source control using the consolidate-and-cap approach is projected to be complete within four to six years after approval of the final closure CP application [5]. 35 I.A.C § 845.680(a)(3) states the owner or operator must take any interim measures necessary to reduce the contaminants leaching from the CCR surface impoundment, and/or potential exposures to human or ecological receptors. Upon completion of source control, the AP will immediately transition to GWP, therefore no interim measures are required. Further, all subsections of this requirement are discussed as follows.

35 I.A.C. § 845.680(a)(3)(A): Time required to develop and implement a final remedy.

Source control and GWP will be completed in accordance with the schedule provided in **Table 1**. The GWPS will be achieved within a reasonable time frame.

35 I.A.C. § 845.680(a)(3)(B): Actual or potential exposure of nearby populations or environmental receptors to any of the constituents listed in 35 I.A.C. § 845.600.

There are no current unacceptable risks to human or ecological receptors at the site [11]. It was concluded that shallow groundwater and surface water are not a source of drinking water [11]. As there are no current conditions that present a risk to human health or the environment, there will also be no unacceptable risk to human health or the environment for future conditions [11].

35 I.A.C. § 845.680(a)(3)(C): Actual or potential contamination of sensitive ecosystems or current or potential drinking water supplies.

The nature and extent of exceedances have been evaluated in the Nature and Extent Report [12]. As stated above, there are no current unacceptable risks to human or ecological receptors at the site. Additionally, an ecological risk assessment was completed [11] and no unacceptable risks were identified for ecological receptors exposed to surface water and sediment. No potential groundwater receptors are in the vicinity of the AP [11] and therefore no benefits are anticipated from implementation of an interim measure.

35 I.A.C. § 845.680(a)(3)(D): Further degradation of the groundwater that may occur if remedial action is not initiated expeditiously.

The selected remedy of source control and GWP will achieve the GWPS in a reasonable time frame and no current unacceptable risks to human health or the environment have been identified. No interim measure is expected to prevent further degradation of the groundwater more expeditiously than implementation of the selected remedy.

35 I.A.C. § 845.680(a)(3)(E): Weather conditions that may cause any of the constituents listed in 35 I.A.C. § 845.600 to migrate or be released.

As stated above, the selected remedy of source control and GWP will achieve the GWPS in a reasonable timeframe and no current unacceptable risks to human health or the environment have been identified. No interim measure is expected to further prevent migration of constituents more expeditiously than implementation of the selected remedy.

35 I.A.C. § 845.680(a)(3)(F): Potential for exposure to any of the constituents listed in 35 I.A.C. § 845.600 as a result of accident or failure of a container or handling system.

As stated above, GWP will be implemented immediately after Source Control is completed. As AP is closed-in-place within a consolidated footprint, no container or handling system will be in use.

35 I.A.C. § 845.680(a)(3)(G): *Other situations that may pose threats to human health and the environment.*

No other situations have been identified where AP CCR leachate poses threats to human health and environment.

4. REFERENCES

[1] "35 Ill. Admn. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments," Illinois Environmental Protection Agency, Springfield, IL, 2021.

[2] Code of Federal Regulations, "Title 40, Chapter I, Subchapter I, Part 257, Subpart D, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," April 17, 2015.

[3] Burns & McDonnell, "Initial Operating Permit, Kincaid Power Plant Ash Pond," October 25, 2021.

[4] Burns & McDonnell Engineering Company, Inc., "Construction Permit Application, Kincaid Power Plant, Ash Pond, (IEPA ID W0218140002-01), Kincaid, Illinois," July 28, 2022.

[5] Burns & McDonnell Engineering Company, Inc., "CCR Surface Impoundment Final Closure Plan,Kincaid Power Plant, Ash Pond, (IEPA ID W0218140002-01), Kincaid, Illinois," July 28, 2022.

[6] United States Environmental Protection Agency (USEPA), "40 CFR Parts 257 and 261 Hazardous and Solid Waste [EPA–HQ–RCRA–2009–0640; FRL–9919–44–OSWER]," 2015. April 17.

[7] Ramboll Americas Engineering Solutions, Inc., "Groundwater Modeling Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois," July 28, 2022.

[8] U. S. E. P. A. (USEPA), "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. Directive No. 9200.U-17P.," EPA, Office of Solid Waste and Emergency Response, Washington D.C., 1999.

[9] United States Environmental Protection Agency, "Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind," Office of Solid Waste and Emergency Response, 2014.

[10] Ramboll Americas Engineering Solutions, Inc., "35 I.A.C. § 845 Corective Measures Assessment, Ash Pond, Kincaid Power Plant, Kincaid, Illinois, IEPA ID: W0218140002-01.," May 12, 2024.

[11] Gradient Corp, "Human Health and Ecological Risk Assessment, Ash Pond, Kincaid Power Plant, Kincaid, Illinois," July 28, 2022.

[12] Ramboll Americas Engineering Solutions, Inc., "Nature and Extent Report, Kincaid Power Plant, Ash Pond, IEPA ID NO. W0218140002-01," May 12, 2024.

[13] Ramboll Americans Engineering Solutions, Inc., "Groundwater Modeling Technical Memorandum, Kincaid Power Plant, Ash Pond," 2025.

[14] Lifecycle Geo, LLC, "Groundwater Polishing Evaluation Report, Ash Pond, Kincaid Power Plant," 2025.

[15] Gradient Corp, "Closure Alternatives Analysis for the Ash Pond at the Kincaid Power Plant, Kincaid, Illinois," July 28, 2022.

[16] Ramboll Americas Engineering Solutions, Inc., "Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois," October 25, 2021.

TABLES

Table 1. Proposed Milestone Schedule for Implementing Corrective Action Remedy (Source Control-Groundwater Polishing)

Corrective Action Plan
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Milestone		Timeframe (Preliminary Estimates)
Pre-Implementation	Corrective Action Plan Submittal	May 2025
Source Control Construction	Source Control (Closure) Construction • Complete implementation of Source Control	3 to 5 years (after approval of Final Closure Plan and All Other Closure-Related Permits)
	Timeframe to Complete Source Control[1]	**3 to 5 years** (after receipt of all permits required for closure)
Corrective Action Implementation	Corrective Action Operations and Maintenance • Perform groundwater monitoring and reporting per Corrective Action Groundwater Monitoring Plan	17 years (after completion of Source Control[2])
	Corrective Action Groundwater Confirmation Monitoring • Perform groundwater monitoring to demonstrate compliance with GWPS for 3 years, per 35 I.A.C. § 845.680(c)	3 years (after Corrective Action Operations and Maintenance)
	Corrective Action Completion • Prepare Corrective Action Completion Report, per 35 I.A.C. § 845.680(E)	3 to 6 months after Corrective Action Compliance Monitoring
	Timeframe to Complete Corrective Action (after completion of Source Control)[1]	**21 years** (after completion of Source Control[1])

Notes:

[1]All timeframes are preliminary and may change as the project develops. Timeframes may also be affected by regulatory review and/or permit approval processes, for both 35 I.A.C. § 845 and non-35 I.A.C. § 845 permits.

[2] See Table A in Section 3.3 of the report, 60% of progress toward meeting GWPS is expected to occur within the first 10 years.

GWPS = Groundwater Protection Standard

RAMBOLL

APPENDIX A
CORRECTIVE ACTION ALTERNATIVES ANALYSIS (845.670(E)), INCLUDING CORRECTIVE MEASURES ASSESSMENT (845.660)

Corrective Action Alternatives Analysis for the Ash Pond at the Kincaid Power Plant, Kincaid, Illinois

May 8, 2025

GRADIENT

www.gradientcorp.com
One Beacon Street, 17th Floor
Boston, MA 02108
617-395-5000

Table of Contents

Page

List of Tables

List of Figures

Abbreviations

AP	Ash Pond
BMP	Best Management Practice
BCU	Bedrock Confining Unit
CAA	Closure Alternatives Analysis
CAAA	Corrective Action Alternatives Analysis
CCR	Coal Combustion Residual
CIP	Closure-in-Place
CMA	Corrective Measures Assessment
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CY	Cubic Yard
GHG	Greenhouse Gas
GMP	Groundwater Monitoring Plan
GWE	Groundwater Extraction Trench
GWP	Groundwater Polishing
GWPS	Groundwater Protection Standard
IAC	Illinois Administrative Code
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
KPP	Kincaid Power Plant
LCU	Lower Confining Unit
LLDPE	Linear Low-Density Polyethylene
N_2O	Nitrous Oxide
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PM	Particulate Matter
PMP	Potential Migration Pathway
Source Control-GWE	Source Control with Groundwater Extraction Trenches
Source Control-GWP	Source Control with Groundwater Polishing
TDS	Total Dissolved Solids
UA	Uppermost Aquifer
USCU	Upper Semi-confining Unit
US DOT	United States Department of Transportation
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Summary of Findings

Title 35, Part 845 of the Illinois Administrative Code (IAC) (IEPA, 2021a) requires that a Corrective Action Alternatives Analysis (CAAA) be performed as part of the remedy selection, prior to undertaking any corrective actions at certain coal combustion residual (CCR)-containing impoundments, where exceedances of groundwater protection standards (GWPSs) have been identified. This report presents a CAAA for the Ash Pond (AP) at the Kincaid Power Plant (KPP) pursuant to the requirements under IAC Section 845.670. The goal of performing a CAAA is to holistically evaluate the potentially viable corrective actions identified in the Corrective Measures Assessment (CMA; Appendix C, Ramboll, 2024a) in order to remediate groundwater and achieve compliance with the groundwater protection standards (GWPSs) specified under IAC Section 845.600 (IEPA, 2021a). These analyses assess potentially viable corrective action alternatives based on a wide range of factors, including the efficiency, reliability, and ease of implementation of a corrective action; its potential positive and negative short- and long-term impacts on human health and the environment; and its ability to address concerns raised by the community (IEPA, 2021a).

It is important to note that many CCR sites are complex groundwater environments where remedial actions would inherently take many years to complete. While no formal definition of a complex groundwater environment exists, most would agree that there are a number of common characteristics at complex groundwater sites, including the following (National Research Council, 2013):

- Highly heterogeneous subsurface environments;
- Large source zones;
- Multiple, recalcitrant constituents; and
- Long timeframes over which releases occurred.

Each of these characteristics are common at CCR sites. Surface impoundments are often tens to hundreds of acres in size and many have operated for decades, leading to large source zones and prolonged releases. Furthermore, CCR impoundments are often located in alluvial geologic settings where sands are interbedded with silts and clays. This results in a heterogeneous environment where constituent mass may persist for many years in low-permeability deposits. Finally, the constituents that are most common at CCR sites include metals and inorganics that do not naturally biodegrade. The combination of these factors results in a complex groundwater environment where remediation, even under the best of circumstances, may take many years to achieve GWPSs. It is for these reasons that the United States Environmental Protection Agency (US EPA) refused to specify what is a reasonable *vs.* an unreasonable timeframe for groundwater corrective actions at CCR sites, stating that it "was truly unable to establish an outer limit on the necessary timeframes – including even a presumptive outer bound" (US EPA, 2015a, p. 21,419).

In this CAAA, all corrective actions that have been evaluated consist of source control and residual plume management. Source control is generally considered to be one of the more effective remedial action approaches. Source control involves removing the hydraulic head from an impoundment (*i.e.*, unwatering and dewatering) and preventing further downward migration of constituents. US EPA has found that "releases from surface impoundments [to groundwater] drop dramatically after closure" (US EPA, 2014, pp. 5-18 to 5-19). US EPA has also stated that source control is the most effective means of ensuring the timely attainment of remediation objectives (US EPA, 2015b). As a result, the implementation of source control often has a substantial and immediate effect on groundwater quality improvements.

The specific source control method that is the central component of all the corrective action alternatives evaluated in this CAAA is closure-in-place (CIP) using a consolidate-and-cap approach. Specifically, this approach includes the removal of free liquids, excavation of CCR from the northern and western portion of the AP and consolidation into the southern portion of the AP, and the installation of a low-permeability geomembrane final cover system. These activities are designed to control, minimize or eliminate, post closure infiltration of liquids into the impounded CCR. Excavation and consolidation would result in CCRs being separated vertically, by up to 10 feet (ft), from underlying groundwater during the simulated post-closure conditions. The final cover systems include a 40-milliliter (mil) low density polyethylene (LLDPE) geomembrane layer, a geotextile drainage layer, and 24 inches (in) of protective soil. These measures (consolidation of CCR and installation of a geomembrane cover) will control to the maximum extent feasible the migration of CCR constituents into groundwater, thus facilitating the achievement of the GWPSs in accordance with IAC Section 845.600 (Ramboll, 2022). As demonstrated by the groundwater modeling in support of the Closure Alternatives Analysis (CAA) (Gradient, 2022a), this source control approach would result in a reduction of the migration of water into the AP by 99.82% compared to pre-closure conditions. Additionally, source control would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022), demonstrating that source control will control, minimize or eliminate post-closure releases of leachate.

Two potential corrective actions are evaluated in this CAAA: Source Control with Groundwater Polishing (Source Control-GWP) and Source Control with Groundwater Extraction Trenches (Source Control-GWE); both alternatives consist of source control and residual plume management, and both were identified as viable approaches in the CMA (Appendix C; Ramboll, 2024a). The residual plume management portions of these corrective action alternatives include groundwater polishing (GWP) and groundwater extraction trenches (GWE).

Under the Source Control-GWP alternative, constituent concentrations in groundwater over time would be actively monitored to ensure the improvement of downgradient groundwater quality resulting from physical and geochemical attenuation mechanisms. Site-specific evaluations demonstrated that groundwater polishing is appropriate at the AP because site conditions are favorable for physical and geochemical processes of inorganic contaminants *via* adsorption (Appendix E; Life Cycle Geo, LLC, 2025). Under the Source Control-GWE alternative, two groundwater extraction trenches would be constructed within the footprint of the AP to remove impacted groundwater. The extraction trenches would be designed to intercept groundwater within the uppermost aquifer (UA) and would extend 1-2 ft into the lower confining unit (LCU). One extraction trench (*i.e.,* Northern Trench) would be 3,400-ft long and 2-ft wide; the other (*i.e.*, Southern Trench) would be 2,700-ft long and 2-ft wide. Horizontal collection pipes would be installed at the bottom of the trenches. The trenches would be backfilled with clean granular fill and capped with compacted clay to reduce surface water infiltration. The collection pipes would drain to sumps spaced throughout the trenches to extract groundwater. Extracted groundwater would be collected and sent to a new on-site lined pond and discharged from either a new or existing outfall managed under the National Pollutant Discharge Elimination System (NPDES) permit for the site. As part of both corrective action alternatives, an adaptive site management plan would be implemented in order to optimize the selected remedy based on real-time data that are collected.

Table S.1 evaluates both corrective actions alternatives (Source Control-GWP and Source Control-GWE) with regard to each of the factors specified under IAC Section 845.670(d) and IAC Section 845.670(e) (IEPA, 2021a). Based on this evaluation and the details provided in Section 2 of this report, the most appropriate corrective action for this Site is Source Control-GWP. While the time to achieve GWPSs as predicted by groundwater modeling (excluding corrective action confirmation monitoring and completion reporting) is similar under both alternatives (17 years under Source Control-GWP *vs.* 16 years under Source Control-GWE), the expected impacts on workers, nearby communities, and the environment under the

Source Control-GWP alternative are lower than those under the Source Control and GWE alternative. Thus, Source Control-GWP is the most appropriate corrective action alternative for the AP.

Table S.1 Comparison of Proposed Corrective Action Alternatives with Respect to Factors Specified in IAC Section 845.670(d) and IAC Section 845.670(e)

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
Magnitude of Reduction of Existing Risks/Be Protective of Human Health and the Environment (Section 2.2.1; IAC Section 845.670(e)(1)(A)/ IAC Section 845.670(d)(1))	Because current conditions do not present a risk to human health or the environment at the AP, there will be no unacceptable risk to human health or the environment for future conditions when the unit has been closed and source control/residual plume management has been implemented. Concentrations of CCR-related constituents will decline over time and, consequently, potential exposures to CCR-related constituents in the environment will also decline. The magnitude of the reduction of existing risks is the same for the two potential corrective action alternatives, and both corrective action alternatives are equally protective of human health and the environment.	Because current conditions do not present a risk to human health or the environment at the AP, there will be no unacceptable risk to human health or the environment for future conditions when the unit has been closed and source control/residual plume management has been implemented. Concentrations of CCR-related constituents will decline over time and, consequently, potential exposures to CCR-related constituents in the environment will also decline. The magnitude of the reduction of existing risks is the same for the two potential corrective action alternatives, and both corrective action alternatives are equally protective of human health and the environment.
Effectiveness of the Remedy in Controlling the Source (Section 2.2.2; IAC Section 845.670(e)(2))		
Extent to Which Containment Practices Will Reduce Further Releases/Control the Sources of Releases to Reduce or Eliminate, to the Maximum Extent Feasible (IAC Section 845.670(e)(2)(A)/ IAC Section 845.670(d)(3))	Both alternatives include source control using CIP with a consolidation-and-cap approach (which is the primary remedial measure) and residual plume management. Modeling results (see the CAA; Gradient, 2022a) indicate that source control in the AP would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions. Source control is thus, effective at controlling releases. Under the residual plume management for this alternative, physical and geochemical attenuation mechanisms would mitigate impacts to downgradient groundwater quality and control the residual plume (Appendix E; Life Cycle Geo, LLC, 2025). If necessary, remedy optimizations would be implemented under the adaptive site management program.	Both alternatives include source control using CIP with a consolidation-and-cap approach (which is the primary remedial measure) and residual plume management. Modeling results (see the CAA; Gradient, 2022a) indicate that source control in the AP would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions. Source control is thus effective at controlling releases. Under the residual plume management for this alternative, groundwater extraction trenches would remove impacted groundwater and control downgradient migration of impacted groundwater. Physical and geochemical attenuation mechanisms would also help mitigate impacts to the downgradient groundwater quality and control the residual plume (Appendix E; Life Cycle

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
		Geo, LLC, 2025). If necessary, remedy optimizations would be implemented under the adaptive site management program.
Extent to Which Treatment Technologies May Be Used (IAC Section 845.670(e)(2)(B))	Source Control-GWP would rely on physical and geochemical attenuation processes. If necessary, remedy optimizations would be implemented under the adaptive site management program.	For the Source Control-GWE alternative, extracted groundwater would be managed and treated by a newly constructed on-site settling pond, although other methods for treating extracted groundwater may be evaluated during the design process. This remedy also relies on physical and geochemical attenuation processes. If necessary, remedy optimizations would be implemented under the adaptive site management program.
Likelihood of Future Releases of CCR (Section 2.2.3; IAC Section 845.670(e)(1)(B))	Both corrective action alternatives include source control using CIP with a consolidate-and-cap approach. As part of this, a new cover system would be installed, which would consist of a 40-mil low density polyethylene (LLDPE) geomembrane layer, a geotextile drainage layer, and 24 in of protective soil. Relative to current conditions, this cover system would provide increased protection against berm and surface erosion, precipitation infiltration, and other adverse effects that could potentially trigger a release of CCR (Appendix B; Ramboll, 2025a). As a result, there would be minimal risk of accidental CCR releases occurring post-closure.	Both corrective action alternatives include source control using CIP with a consolidate-and-cap approach. As part of this, a new cover system would be installed, which would consist of a 40-mil low density polyethylene (LLDPE) geomembrane layer, a geotextile drainage layer, and 24 in of protective soil. Relative to current conditions, this cover system would provide increased protection against berm and surface erosion, precipitation infiltration, and other adverse effects that could potentially trigger a release of CCR (Appendix B; Ramboll, 2025a). As a result, there would be minimal risk of accidental CCR releases occurring post-closure.
Type and Degree of Long-Term Management, Including Monitoring, Operation, and Maintenance (Section 2.2.4; IAC Section 845.670(e)(1)(C))	Minimal long-term O&M efforts would be required under Source Control-GWP, because it would not require the installation, operation, or maintenance of any engineered systems or structures other than maintenance of the monitoring well network. Corrective action groundwater monitoring would continue until GWPSs have been achieved. Post-closure care groundwater monitoring would continue for a minimum of 30 years as required by IAC Section 845.780(c). Additionally,	Long-term O&M efforts required under Source Control-GWE would include the maintenance of the GWE system and discharge of extracted groundwater. Extracted groundwater would be managed and treated with a newly-constructed on-Site settling pond and discharged *via* a NPDES permitted Outfall. Corrective action groundwater sampling would continue until GWPSs have been achieved. Post-closure care groundwater monitoring would continue for a minimum of 30 years as required by IAC Section 845.780(c). Additionally,

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
	corrective action groundwater monitoring would continue for 3 years after GWPS have been achieved. Based on the adaptive site management approach, remedy optimizations (additional methods or techniques) may be implemented to ensure achievement of the GWPSs.	corrective action groundwater monitoring would continue for 3 years after GWPS have been achieved. Based on the adaptive site management approach, remedy optimizations (additional methods or techniques) may be implemented to ensure achievement of the GWPSs.
Short-Term Risks to the Community or the Environment During Implementation of Remedy (Section 2.2.5; IAC Section 845.670(e)(1)(D))		
Safety Impacts	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. While appropriate controls would be established to prevent accidents and injuries from occurring, the risks of accidents and injuries occurring during source control would be the same for both corrective action alternatives. These source control risks were evaluated in the CAA (Gradient, 2022a). Overall, no worker accidents or injuries would be expected under the Source Control-GWP alternative because no installation, operation, and maintenance of engineered systems or structures would be required. Similarly, no off-Site impacts on nearby residents would be expected under the Source Control-GWP alternative.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. While appropriate controls would be established to prevent accidents and injuries from occurring, the risks of accidents and injuries occurring during source control would be the same for both corrective action alternatives. These source control risks were evaluated in the CAA (Gradient, 2022a). Overall, considering worker accidents occurring during residual plume management both on- and off-Site, 0.46 worker injuries and 7.3×10^{-3} worker fatalities would be expected under the Source Control-GWE alternative, which is higher than the injuries and fatalities expected under the Source Control-GWP alternative. In total, an estimated 0.10 injuries and 1.3×10^{-3} fatalities would be expected to occur among community members due to off-Site activities under the Source Control-GWE alternative, which is higher than the injuries and fatalities expected under the Source Control-GWP alternative.

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
Cross-Media Impacts to Air	Cross-media impacts to air can include air pollutants and greenhouse gas (GHG) emissions, which are proportional to the potential impact of each alternative on other emissions from construction vehicles and equipment. Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Air impacts occurring during source control would be the same for both corrective action alternatives. Impacts associated with CIP using a consolidation-and-cap approach were evaluated in the CAA (Gradient, 2022a). Residual plume management for the Source Control-GWP alternative would be expected to have minimal air impacts, because it would not require the construction of any engineered systems or structures other than activities associated with groundwater monitoring.	Cross-media impacts to air can include air pollutants and GHG emissions, which are proportional to the potential impact of each alternative on other emissions from construction vehicles and equipment. Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Air impacts occurring during source control would be the same for both corrective action alternatives. Impacts associated with CIP using a consolidation-and-cap approach were evaluated in the CAA (Gradient, 2022a). Residual plume management for the Source Control-GWE alternative would have greater air impacts than the Source Control-GWP alternative due to the construction and operation of the GWE system.
Cross-Media Impacts to Surface Water and Sediments	Groundwater modeling performed in support of the CAA (Gradient, 2022a) predicted that source control (*i.e.*, CIP using a consolidate-and-cap approach) would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022). Under residual plume management for the Source Control-GWP alternative, minimal surface water and sediment impacts would be expected, because it would not require the construction of any engineered systems or structures.	Groundwater modeling performed in support of the CAA (Gradient, 2022a) predicted that source control (*i.e.*, CIP using a consolidate-and-cap approach) would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022). Under residual plume management for the Source Control-GWE alternative, extracted groundwater would be treated at the on-Site settling pond and discharged to the Sangchris Lake *via* a NPDES-permitted outfall. Surface water and sediment impacts associated with residual plume management would be higher than the those of Source Control-GWP alternative due to the construction of the extraction trench system and the settling pond. Erosion and sediment runoff may occur

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
		due to the close proximity to the wetlands and surface water bodies during construction activities.
Control of Exposure to Any Residual Contamination During Implementation of the Remedy	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. While appropriate controls would be established to prevent exposures of CCR during source control, the risks of CCR exposure during source control activities would be the same for both corrective action alternatives. Risks to workers arising from potential contact with residual contamination during construction activities associated with residual plume management would be minimal under the Source Control-GWP alternative, which would not involve exposure to any soil or groundwater waste streams.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. While appropriate controls would be established to prevent exposures of CCR during source control, the risks of CCR exposure during source control activities would be the same for both corrective action alternatives. Risks to workers arising from potential contact with residual contamination during construction, operation, and maintenance activities associated with residual plume management would be higher for the Source Control-GWE alternative than for the Source Control-GWP alternative, because Source Control-GWE would involve the production, management, and treatment of extracted groundwater, as well as on-Site disposal of excavated spoils generated during extraction trench construction.
Other Identified Impacts	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, impacts during source control would be the same for both corrective action alternatives (see the CAA; Gradient, 2022a). The energy demands of construction equipment and vehicles associated with residual plume management would be greater under the Source Control-GWE alternative, while the energy demands under the Source Control-GWP would be lower because this alternative would not require any significant construction activity. Traffic and noise impacts associated with residual plume management are expected to be higher under the Source	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, impacts during source control would be the same for both corrective action alternatives (see the CAA; Gradient, 2022a). The energy demands of construction equipment and vehicles associated with residual plume management would be greater under the Source Control-GWE alternative, because this alternative would involve construction of the GWE system. Traffic and noise impacts associated with residual plume management are expected to be higher under the Source Control-GWE alternative than the

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
	Control-GWE alternative than the Source Control-GWP alternative, due to the construction activities that would be required to construct the extraction trenches and settling pond. Traffic and noise impacts associated with residual plume management from the Source Control-GWP are expected to be minimal because no installation, operation, and maintenance of engineered systems or structures would be required. There would be no impacts to natural resources and habitat under the Source Control and GWP alternative because no additional construction activities would be required.	Source Control-GWP alternative due to the construction activities that would be required to construct the GWE system. Under the Source Control-GWE alternative, there would be some negative impacts to natural resources and habitat, including disturbance of some existing habitat near the construction areas, habitat in the immediate vicinity of these locations by causing alarm and escape behavior in nearby wildlife (*e.g.*, due to noise disturbances), and interruption to sensitive aquatic and wetland species in Sangchris Lake and other surface water ponds due to potential sediment runoff during construction. Construction activities would also generate limited negative impacts on the scenic, or recreational value due noise, obstructions of the view, or restricted access during the construction phase.
Time Until Groundwater Protection Standards Are Achieved/Attain the Groundwater Protection Standards Specified in Section 845.600 (Section 2.2.6; IAC Section 845.670(e)(1)(E); IAC Section 845.670(d)(2))	Groundwater modeling performed in support of the CAA (Gradient, 2022a) concluded that source control (*i.e.*, CIP using a consolidation-and-cap approach) alone would result in a 99.98% reduction in mass flux from the AP into the underlying groundwater. Additional modeling was conducted to evaluate future groundwater quality in the vicinity of the AP under each of the proposed corrective action alternatives. The results indicate that groundwater would attain the GWPSs for all constituents identified as having potential exceedances within 17 years after closure under the Source Control-GWP alternative (Appendix B; Ramboll, 2025b). In addition, there would be at least 3 years of corrective action confirmation monitoring, and 6 months of post-closure reporting. So, the overall corrective action implementation duration for the Source Control-GWP alternative is	Groundwater modeling performed in support of the CAA (Gradient, 2022a) concluded that source control (*i.e.*, CIP using a consolidation-and-cap approach) alone would result in a 99.98% reduction in mass flux from the AP into the underlying groundwater. Additional modeling was conducted to evaluate future groundwater quality in the vicinity of the AP under each of the proposed corrective action alternatives. The results indicate that groundwater would attain the GWPSs for all constituents identified as having potential exceedances within approximately 16 years after closure under the Source Control-GWE alternative (Appendix B; Ramboll, 2025b). In addition, there would be at least 3 years of corrective action confirmation monitoring, and 6 months of post-closure reporting. So, the overall corrective action implementation duration for the

Evaluation Factor (Report Section; Part 845 Section)	**Source Control-GWP**	**Source Control-GWE**
	approximately 20.5 years after closure (Appendix B; Ramboll, 2025a, Section 2.2.6).	Source Control-GWE alternative is approximately 19.5 years after closure (Appendix B; Ramboll, 2025a, Section 2.2.6).
Potential for Exposure of Humans and Environmental Receptors to Remaining Wastes, Considering the Potential Threat to Human Health and the Environment Associated with Excavation, Transportation, Re-disposal, Containment, or Changes in Groundwater Flow (Section 2.2.7; IAC Section 845.670(e)(1)(F))	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives and, thus, potential exposures to CCR remaining in the AP would be the same under both alternatives. Once source control activities have been completed, this corrective action alternative is expected to limit exposure of humans and environmental receptors to CCR remaining in the AP. Furthermore, as a result of the source control, there would be minimal risks of CCR releases post-closure.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives and, thus, potential exposures to CCR remaining in the AP would be the same under both alternatives. Once source control activities have been completed, this corrective action alternative is expected to limit exposure of humans and environmental receptors to CCR remaining in the AP. Furthermore, as a result of the source control, there would be minimal risks of CCR releases post-closure. Potential risks to workers that come in contact with CCR-related constituents during groundwater extraction and treatment would be managed through the use of rigorous safety protocols and personal protective equipment. Some changes in groundwater flow (*i.e.*, controlled discharge into Sangchris Lake) may occur under the Source Control-GWE alternative, due to the operation of the GWE system. Hydrogeological changes would also be expected under this alternative, such as lowering groundwater table in the vicinity of the extraction trenches, altering flow patterns in the UA, and causing changes in hydraulic gradients. However, changes to groundwater flow would not be expected to have an effect on the potential for the exposure of humans and environmental receptors to remaining wastes.

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
Long-Term Reliability of the Engineering and Institutional Controls (Section 2.2.8; IAC Section 845.670(e)(1)(G))	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, long-term reliability during source control would be the same for both corrective action alternatives (see the CAA for an assessment of CIP using a consolidate-and-cap approach; Gradient, 2022a). The source control activities are expected to be reliable, provided that construction is completed in accordance with the design and specifications. Residual plume management under the Source Control-GWP alternative would be reliable because it is a proven process that would rely on physical and geochemical attenuation processes and active monitoring. If necessary, remedy optimizations would be implemented under the adaptive site management program.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, long-term reliability during source control would be the same for both corrective action alternatives (see the CAA for an assessment of CIP using a consolidate-and-cap approach; Gradient, 2022a). The source control activities are expected to be reliable, provided that construction is completed in accordance with the design and specifications. Residual plume management under the Source Control-GWE alternative would be reliable, as long as the extraction trenches and pumps are maintained and operated appropriately, because it is a proven remedy that has been implemented at many sites. If necessary, remedy optimizations would be implemented under the adaptive site management program.
Potential Need for Replacement of the Remedy (Section 2.2.9; IAC Section 845.670(e)(1)(H))	Replacement of the residual plume management remedy under the Source Control-GWP alternative would likely be unnecessary, because the alternative would not require the installation, operation, and maintenance of engineered systems or structures. Adaptive site management strategies would be used to implement remedy optimizations, if necessary, to ensure that remedial goals are achieved.	Replacement of the residual plume management remedy under the Source Control-GWE alternative would likely be unnecessary as long as the extraction trenches and treatment system are maintained appropriately. Adaptive site management strategies would be used to implement remedy optimizations, if necessary, to ensure that remedial goals are achieved.
Degree of Difficulty Associated with Constructing the Remedy (Section 2.3.1; IAC Section 845.670 (e)(3)(A))	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, the construction difficulties associated with source control activities would be the same for both corrective action alternatives. Difficulties associated with implementing CIP using a consolidate-and-cap approach were evaluated in the CAA (Gradient, 2022a).	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, the construction difficulties associated with source control activities would be the same for both corrective action alternatives. Difficulties associated with implementing CIP using a consolidate-and-cap approach were evaluated in the CAA (Gradient, 2022a).

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
	Residual plume management under the Source Control-GWP alternative would rely on physical and geochemical attenuation processes and therefore would not pose any significant construction challenges.	Residual plume management under the Source Control-GWE alternative would rely on the extraction trenches and a settling pond to extract and treat impacted groundwater, as well as physical and geochemical attenuation processes. Shallow groundwater trenches are commonly constructed at similar depths using conventional equipment. Therefore, while some construction is required, the degree of difficulty would be anticipated to be low.
Expected Operational Reliability of the Remedy (Section 2.3.2; IAC Section 845.670 (e)(3)(B))	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, the reliability associated with source control activities would be the same for both corrective action alternatives. The reliability associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management under the Source Control-GWP alternative would have high operational reliability because this alternative would rely on natural processes and active monitoring. Adaptive site management strategies would be used to implement remedy optimizations, if necessary.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, the reliability associated with source control activities would be the same for both corrective action alternatives. The reliability associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management under the Source Control-GWE alternative would have high operational reliability because it is an established technology, as long as the extraction trench system is maintained and operated appropriately. Adaptive site management strategies would be used to implement remedy optimizations, if necessary.
Need to Coordinate with and Obtain Necessary Approvals and Permits from Other Agencies (Section 2.3.3; IAC Section 845.670 (e)(3)(C))	Required coordination, approvals, and permits associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management for the Source Control-GWP alternative would require regulatory approval, but no additional permits would be needed.	Required coordination, approvals, and permits associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management for the Source Control-GWE alternative would require regulatory approval. Groundwater extracted from the extraction trenches would require a modified NPDES permit, which would likely require renewals depending on the timeline of corrective action

Evaluation Factor (Report Section; Part 845 Section)	**Source Control-GWP**	**Source Control-GWE**
		implementation. In addition, permits from the IEPA for construction of stormwater controls and Best Management Practices (BMPs), placement of excavated spoils beneath the AP final cover system *via* an amendment to the AP Closure Plan and Construction Permit Application, and operating permit would be required.
Availability of Necessary Equipment and Specialists (Section 2.3.4; IAC Section 845.670 (e)(3)(D))	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, equipment and specialist needs would be the same for source control activities associated with both corrective action alternatives. An assessment of necessary equipment and specialists associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management under the Source Control-GWP alternative would require standard environmental monitoring equipment and groundwater professionals. Specialists such as geologists, hydrogeologists, statisticians (*i.e.*, statistical analysis), and geochemists would be available to collect and evaluate the data.	Source control (*i.e.*, CIP using a consolidation-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, equipment and specialist needs would be the same for source control activities associated with both corrective action alternatives. An assessment of necessary equipment and specialists associated with implementing CIP using a consolidation-and-cap approach was evaluated in the CAA (Gradient, 2022a). Residual plume management under the Source Control-GWE alternative would require standard environmental monitoring equipment and groundwater professionals, as well as specialists to manage the GWE system throughout its operational period, including earthwork contractors for construction of the trench and settling pond.
Available Capacity and Location of Needed Treatment, Storage, and Disposal Services/Comply with Standards for Management of Wastes as Specified in Section 845.680(d) (Section 2.3.5; IAC Section 845.670 (e)(3)(E)/ IAC section 845.670(d)(5))	No treatment, storage, or disposal services would be required under the residual plume management for the Source Control-GWP alternative, as GWP would not generate any significant volume of waste or wastewater.	Residual plume management for the Source Control-GWE alternative would require the construction of the extraction trench system, which would generate spoils during the construction phase, and the waste materials would be placed beneath the AP final cover system. Extracted groundwater would be treated at an on-Site settling pond. Discharge from the settling pond would be conveyed to an NPDES permitted outfall.

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
The Degree to Which Community Concerns Are Addressed by the Remedy (Section 2.4; IAC Section 845.670(e)(4))	The combination of source control (*i.e.*, CIP using a consolidation-and-cap approach) and residual plume management would cause groundwater concentrations to decline over time under all of the corrective action alternatives, as suggested by the groundwater modeling (Appendix B; Ramboll, 2025b), thus addressing community concerns. A public meeting was held on February 27, 2025, pursuant to requirements under IAC Section 845.660(d). Questions raised by attendees were addressed at the meeting; a written summary of the questions and responses was prepared.	The combination of source control (*i.e.*, CIP using a consolidation-and-cap approach) and residual plume management would cause groundwater concentrations to decline over time under all of the corrective action alternatives, as suggested by the groundwater modeling (Appendix B; Ramboll, 2025b), thus addressing community concerns. A public meeting was held on February 27, 2025, pursuant to requirements under IAC Section 845.660(d). Questions raised by attendees were addressed at the meeting; a written summary of all questions and responses was prepared.
Remove from the Environment as Much of the Contaminated Material That Was Released from the CCR Surface Impoundment as Is Feasible, taking into Account Factors Such as Avoiding Inappropriate Disturbance of Sensitive Ecosystems (Section 2.5; IAC Section 845.670(d)(4))	No known releases of CCR due to a structural integrity issue have occurred at the AP. Both potential corrective action alternatives would have source control and residual plume management efforts. The source control would include a consolidate-and-cap approach to control, minimize or eliminate, post closure infiltration of liquids into the impounded CCR. Additionally, residual plume management under the Source Control-GWP alternative would address impacted groundwater by relying on natural physical and geochemical attenuation processes to reduce the residual concentrations of CCR-related constituents in groundwater. Site-specific evaluations demonstrated that conditions are favorable for the attenuation of inorganic contaminants *via* adsorption. Dissolution and remobilization of contaminants that have been adsorbed is unlikely as groundwater returns to background condition. In addition, the modeling results indicate that geochemical changes occurring during the "return to background," such as a more oxidized redox condition, are unlikely to	No known releases of CCR due to a structural integrity issue have occurred at the AP. Both potential corrective action alternatives would have source control and residual plume management efforts. The source control would include a consolidate-and-cap approach to control, minimize or eliminate, post closure infiltration of liquids into the impounded CCR. Additionally, residual plume management under the Source Control-GWE alternative would utilize an engineered system to actively remove constituent mass from the environment. Groundwater quality would also be improved as a result of physical and geochemical attenuation processes. Site-specific evaluation demonstrated that the site conditions are favorable for the attenuation of inorganic contaminants *via* adsorption. Dissolution and remobilization of contaminants that have been adsorbed is unlikely as groundwater returns to background condition. In addition, the modeling results indicate that geochemical changes occurring during the "return to background," such as a more oxidized redox condition, are

Evaluation Factor (Report Section; Part 845 Section)	Source Control-GWP	Source Control-GWE
	increase the estimated time to reach the GWPS (Appendix E; Life Cycle Geo, LLC, 2025). No ecosystems would be disturbed because no construction activities are expected under the Source Control-GWP alternative.	unlikely to increase the estimated time to reach the GWPS (Appendix E; Life Cycle Geo, LLC, 2025). The construction activities would likely result in some negative impacts to the ecosystem, including disturbance of some existing habitat near the construction areas. Short-term impacts could also occur to sensitive aquatic and wetland species in Sangchris Lake and surface water bodies near the AP due to sediment runoff during construction.

Notes:

AP = Ash Pond; CAA = Closure Alternatives Analysis; CCR = Coal Combustion Residual; CIP = Closure-in-Place; GWP = Groundwater Polishing; GWPS = Groundwater Protection Standard; IAC = Illinois Administrative Code; IEPA = Illinois Environmental Protection Agency; NPDES = National Pollutant Discharge Elimination System; O&M = Operations and Maintenance; Source Control-GWE = Source Control with Groundwater Extraction Trenches; Source Control-GWP = Source Control with Groundwater Polishing; UA = Uppermost Aquifer.

1 Introduction

1.1 Site Description and History

1.1.1 Site Location and History

Kincaid Power Plant (KPP) is an electric power generating facility owned by Kincaid Generation, LLC. The facility is located approximately 4 miles west of the Village of Kincaid, Illinois, along the shores of Sangchris Lake. From 1914 until 1994, the Peabody Coal Company undertook underground shaft mining below and surrounding the single coal combustion residual (CCR)-containing impoundment at the Site – the Kincaid Ash Pond (AP). Mining operations on the property have since ceased (Ramboll, 2021). The Kincaid Power Plant began operating in 1967 and is currently scheduled to cease coal operations by the end of 2027 (Moore, 2020; Ramboll, 2021; Power-technology.com, 2021).

1.1.2 CCR Impoundment

As part of its operations, Kincaid Power Plant produces and stores CCRs. The Kincaid Ash Pond (AP) (Vistra ID No. CCR Unit 141, Illinois Environmental Protection Agency [IEPA] ID No. W0218140002-01, and National Inventory of Dams [NID] ID No. IL50706), is the only CCR-containing impoundment at the Site and is the subject of this report. The AP will not receive sluiced ash after the Kincaid Power Plant is retired. The final closure of the AP is expected to be completed in 2027 (Appendix B).

The AP (Figure 1.1) is a 172-acre unlined surface impoundment that was constructed in 1964-1965 for the management of both CCR and non-CCR waste streams (AECOM, 2016a; Ramboll, 2021). The AP has been in continuous operation since 1967 (Ramboll, 2021). Currently, it receives sluiced bottom ash *via* eight sluice pipes, which discharge into the southwest side of the basin. A third-party recycling company periodically recovers a portion of the ash from the AP for beneficial re-use (AECOM, 2016b). The AP will no longer receive sluiced ash after coal operations cease at the Kincaid Power Plant. The final closure of the AP is expected to be completed in October 2028 (Burns & McDonnell Engineering Company, Inc., 2022).

During normal operating conditions, outflows from the AP are either conveyed back to the Kincaid Power Plant *via* a concrete recycle pipe for re-use in plant processes or are diverted to an on-Site wastewater treatment plant. Effluent from the wastewater treatment plant is conveyed into the discharge flume that runs along the southern boundary of the pond (Figure 1.1), which is permitted to discharge to the eastern lobe of Sangchris Lake *via* a National Pollutant Discharge Elimination System (NPDES)-permitted outfall (Geosyntec Consultants, 2021; IEPA, 2021b).

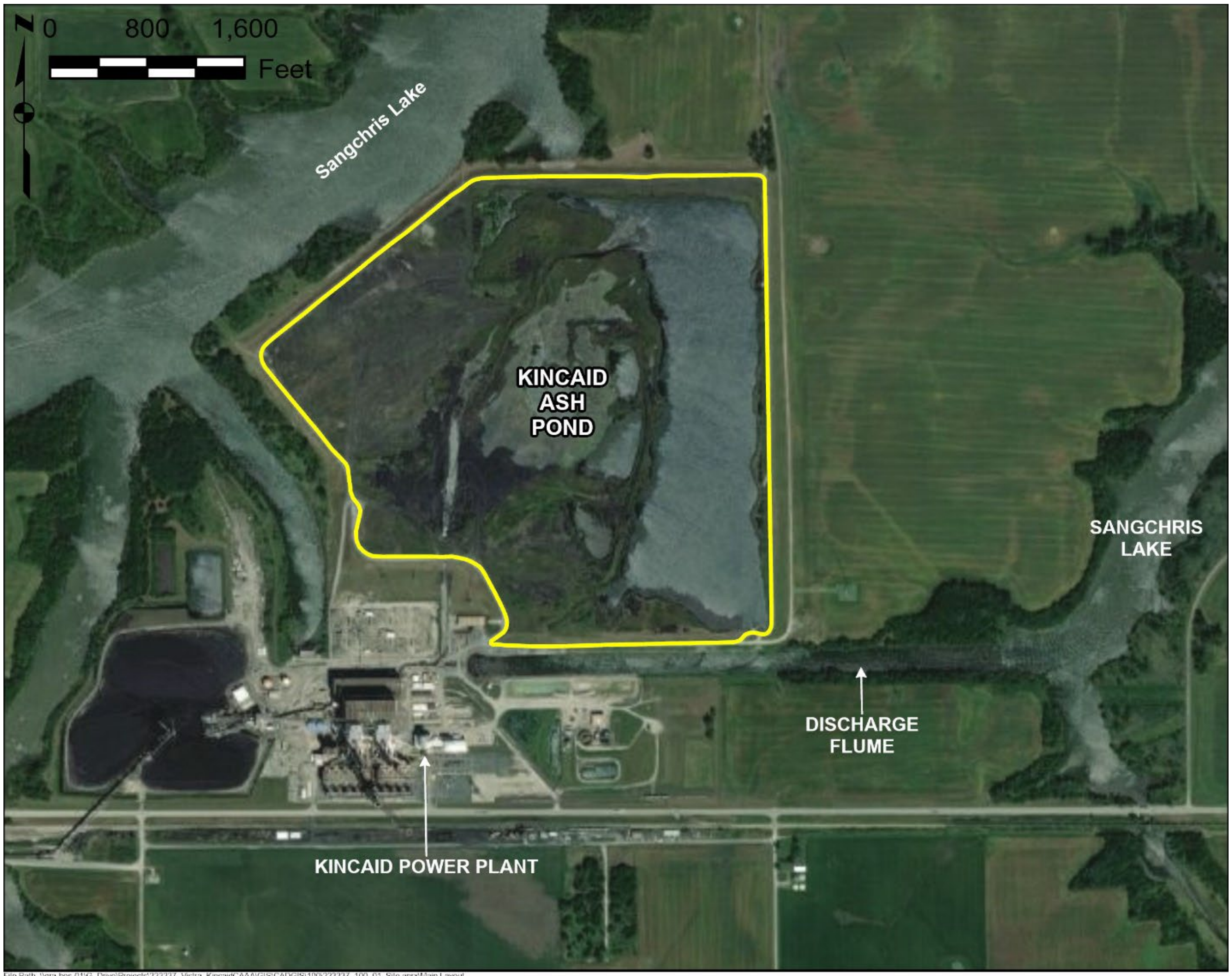


Figure 1.1 Site Location Map. Adapted from Geosyntec Consultants (2021, Figure 2).

1.1.3 Surface Water Hydrology

The Kincaid AP is located within the Sangchris Lake Watershed (Hydrologic Unit Code 071300070402) and directly borders a portion of Sangchris Lake to the northwest (Figure 1.1; AECOM, 2016a; Ramboll, 2021). The Kincaid Power Plant uses the Sangchris Lake as its cooling pond. Sangchris Lake was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River (Ramboll, 2021). As described above (Section 1.1.2), the AP discharges decanted water either directly or indirectly (*e.g.*, *via* the on-Site wastewater treatment plant) to the discharge flume along the southern boundary of the pond, which connects to the eastern lobe of Sangchris Lake (AECOM, 2016a,b; Geosyntec Consultants, 2021; IEPA, 2021b; Ramboll, 2021).

Sangchris Lake is listed on the 2018 Illinois Section 303(d) List as being impaired for fish consumption due to mercury. In addition, Sangchris Lake is impaired for aesthetic quality due to total phosphorus and total suspended solids (IEPA, 2016, 2019a). In addition to Sangchris Lake, several unnamed freshwater ponds are located on the property to the south of the AP (Ramboll, 2021; US FWS, 2021).

1.1.4 Hydrogeology

The geology underlying the Site in the vicinity of the AP consists of four distinct hydrostratigraphic units (Ramboll, 2021):

- **Upper Semi-confining Unit (USCU):** The USCU consists of low-permeability clay, with some silt and minor sand, silt layers, and some discontinuous lenses of sand. The higher-permeability sand lenses located within this unit have been identified as potential migration pathways (PMPs). The USCU includes the lithologic layers identified as the Cahokia Formation.
- **Uppermost Aquifer (UA):** The UA is a thin (generally less than 4 ft thick) unit comprised of moderately permeable sand, silty sand, and clayey sand and gravel. The UA includes the clays and silts of the Upper Cahokia Formation and the sands and gravels of the Lower Cahokia Formation. Groundwater flow through the UA is the primary pathway for contaminant migration at the Site.
- **Lower Confining Unit (LCU):** The LCU, which underlies the UA, is comprised of low-permeability silt and clay with minor sand, silt layers, and occasional discontinuous lenses of sand. The LCU includes the lithologic layers identified as the Vandalia Till.
- **Bedrock Confining Unit (BCU):** The BCU, which is comprised of interbedded shale and limestone of the Pennsylvanian Age Bond Formation, underlies the entire AP and acts as an aquitard due to its low hydraulic conductivity.

Groundwater within the UA migrates northwest toward Sangchris Lake. In the vicinity of the AP, groundwater within the USCU similarly appears to flow predominantly north/northwest towards the western lobe of Sangchris Lake. However, there is also a component of groundwater flow to the south and east towards the discharge flume that runs along the southern boundary of the AP, which flows into the eastern lobe of Sangchris Lake (Ramboll, 2021).

During groundwater's interaction with surface water, CCR-related constituents may partition between sediments and the surface water column. It should be noted that many CCR-related constituents can also arise from other industrial sources and occur naturally in sediments and surface water. As a result, their presence in the sediments and/or surface water of the lake does not necessarily signify contributions from the AP.

1.1.5 Site Vicinity

The Kincaid Power Plant property is situated in a mainly rural area. It is bounded by the lobes of Sangchris Lake to the north and east, and by Route 104 to the south. The AP overlies two abandoned underground coal mines, the Peabody No. 8 Mine (active from 1914 to 1954) and the Peabody No. 10 Mine (active from 1951 to 1994) (AECOM, 2016b; Ramboll, 2021).

Scenic, recreational, and historical areas near the Site include the Sangchris Lake State Recreation Area and the Abraham Lincoln National Heritage Area (Ramboll, 2021). The Sangchris Lake State Recreation Area, which surrounds the Site to the north and east, is used for boating, fishing, camping, hunting, hiking, and picnicking (IDNR, 2022). The Abraham Lincoln National Heritage Area is a Category III Natural Historic Site that spans 43 counties and 17 million acres in Central Illinois (Looking for Lincoln Heritage Coalition, 2022; Ramboll, 2021). Although the Kincaid Power Plant property is located within the greater Abraham Lincoln National Heritage Area, the nearest site with known historic relevance inside of the greater heritage area (the Great Eastern Stagecoach, exhibit on the "Looking for Lincoln Story Trail") lies over 6 miles from the Site, in Edinburg, Illinois (Looking for Lincoln Heritage Coalition, 2022; Ramboll, 2021). Based on a review of the Illinois Department of Natural Resources (IDNR) Historic Preservation Division database and the Illinois State Archaeological Survey database, there are no historic sites located within 1,000 meters of the AP (Ramboll, 2021).

1.2 Part 845 Regulatory Review and Requirements

Title 35, Part 845 of the Illinois Administrative Code (IAC) (IEPA, 2021a) requires that a Corrective Action Alternatives Analysis (CAAA) be performed as part of the remedy selection, prior to undertaking any corrective actions at certain CCR-containing impoundments where exceedances of groundwater protection standard (GWPSs) have been identified. Because exceedances[1] of GWPSs in groundwater associated with the AP have been identified for boron, sulfate, and total dissolved solids (TDS) (Appendix D; Ramboll, 2024b), this report presents a CAAA for the AP pursuant to the requirements under IAC Section 845.670. The goal of a CAAA is to holistically evaluate a range of factors for the various corrective actions being considered at an impoundment, including the efficiency, reliability, and ease of implementation of the corrective action; its potential positive and negative short- and long-term impacts on human health and the environment; and its ability to address concerns raised by the community (IEPA, 2021a). A CAAA is a decision-making tool that is designed to aid in the selection of a corrective action alternative.

[1] Throughout this document, "exceedance" or "exceedances" is intended to refer only to potential exceedances of proposed applicable background statistics or Groundwater Protection Standards (GWPS) as described in the proposed groundwater monitoring program which was submitted to IEPA on October 25, 2021 as part of Kincaid Generation LLC's operating permit application for the AP (Burns and McDonnell, 2021). That operating permit application, including the proposed groundwater monitoring program, remains under review by IEPA and therefore Kincaid Generation LLC has not identified any actual exceedances.

2 Corrective Action Alternatives Analysis

This section presents the CAAA pursuant to requirements under IAC Section 845.670 (IEPA, 2021a). The goal of a CAAA is to fully evaluate proposed viable corrective measures that were identified in the CMA. The CAAA evaluates potential corrective actions with respect to a wide range of factors, including the performance, reliability, and ease of implementation of the corrective action; its potential impacts on human health and the environment; and its ability to address concerns raised by the community (IEPA, 2021a).

Per IAC Section 845.670(d) (IEPA, 2021a), any corrective actions selected under a Corrective Action Plan must:

1. Be protective of human health and the environment;
2. Attain the groundwater protection standards specified in Section 845.600;
3. Control the sources of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents listed in Section 845.600 into the environment;
4. Remove from the environment as much of the contaminated material that was released from the CCR surface impoundment as is feasible, considering factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
5. Comply with standards for management of wastes as specified in Section 845.680(d).

At the AP, a CAAA is required because groundwater monitoring associated with the AP identified exceedances of the GWPSs. Groundwater monitoring was conducted in accordance with the proposed groundwater monitoring plan (GMP) between 2015 and 2023 (Appendix D; Ramboll, 2024b). The groundwater samples collected from groundwater compliance monitoring wells were used to monitor groundwater quality and evaluate compliance with the groundwater quality standards listed in IAC Section 845.600(a). As of the date of this report, boron, sulfate, and TDS were identified as constituents/parameters with concentrations in excess of their corresponding GWPSs (Appendix D, Ramboll, 2024b).

Two potentially viable corrective actions for the AP were selected in the CMA for further consideration in this CAAA. The corrective actions alternatives that are considered in this CAAA are Source Control with Groundwater Polishing (Source Control-GWP) and Source Control with Groundwater Extraction Trenches (Source Control-GWE). The corrective actions are described below in Section 2.1.

2.1 Corrective Action Alternative Descriptions

For both corrective actions evaluated in this CAAA, source control is the primary remedy. US EPA has stated that source control is the most effective means of ensuring the timely attainment of remediation objectives (US EPA, 2015b). The source control for the AP consists of CIP using a consolidate-and-cap approach. Specific elements of this approach include:

- Construction of a temporary water management system, including ditches, sumps, pumps, and/or detention basin(s), within the AP to collect and discharge stormwater during construction associated with closure. Collected flows would be managed in accordance with the NPDES permit for the Site;

- Removal of free liquids prior to final cover installation *via* drains and pumps. Water would be managed in accordance with the NPDES discharge requirements;
- Excavation of approximately 1.9 million cubic yards (CY) of CCRs from the northern portion of the 172-acre AP and consolidation into an 84-acre area in the southern portion of the AP;
- Transportation of approximately 0.5 million CY of soils from existing berms and dikes on-site as well as from an off-site borrow area which would be used for contouring and grading beneath the final cover system;
- Construction of a new soil containment berm to separate the 84-acre excavated portion of the AP from the consolidate-and-cap portion of the AP;
- Installation of a hydraulic cut-wall along the north and west berms of the consolidated footprint area in order to maintain an operating pool until operation ceases at the KPP at which point any free water remaining would be removed by *via* pumping; and
- Construction of a final cover system consisting of a 40-mil linear low-density polyethylene (LLDPE) geomembrane layer, a geotextile protective layer, and 24 in of protective soil cover suitable for facilitating vegetative growth.

These source control activities would excavate and consolidate CCR above the uppermost aquifer and would physically separate CCR from the current and predicted post-closure water table by up to 10 ft (Ramboll, 2022), controlling to the maximum extent feasible, the migration of CCR constituents into groundwater, thus expediting the achievement of the GWPSs. A cover system consisting of a 40-mil LLDPE geomembrane layer, a geotextile drainage layer, and 24 in of protective soil would be installed. This cover system would control, minimize, or eliminate post-closure infiltration of liquids into the impounded CCR. As demonstrated by the groundwater modeling in support of the CAA (Gradient, 2022a), source control (CIP with consolidate-and-cap approach) would result in a reduction of infiltration into the AP by 99.82% compared to pre-closure conditions (Ramboll, 2022). Additionally, source control would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022). Due to the reduction in the hydraulic flux out of the AP, the mass flux out of the AP would also be controlled or minimized, demonstrating that source control will control, minimize or eliminate post-closure release of leachate.

In addition to source control, the corrective actions evaluated in this CAAA include residual plume management. Two potential corrective actions, identified as viable in the CMA, are evaluated in this CAAA for the AP:

- **Alternative 1:** Source Control with Groundwater Polishing (Source Control-GWP); and
- **Alternative 2:** Source Control with Groundwater Extraction Trenches (Source Control-GWE).

For both potential corrective action alternatives, adaptive site management strategies would be integrated into residual plume management. This approach ensures the timely incorporation of new site information throughout the corrective action process in order to optimize the remediation and expedite achievement of the GWPSs. As part of the adaptive site management approach, system performance and residual plume conditions would be monitored throughout the implementation of the selected corrective action. If groundwater concentrations do not respond as expected to the corrective action, the adaptive site management approach would enable prompt adjustments, optimizations, or replacement of the remedy to ensure overall effectiveness.

2.1.1 Alternative 1: Source Control-GWP

The first corrective action alternative is Source Control-GWP. This remedy includes source control (*i.e.*, CIP using a consolidation-and-cap approach) and residual plume management based on natural physical and geochemical processes that would reduce groundwater concentrations downgradient of the AP. Groundwater polishing mechanisms were evaluated using geochemical speciation and reaction models. The primary objective of the geochemical model was to support the evaluation of groundwater polishing as a potential remedy for the site. The model focused on evaluating the dominant geochemical reactions that may occur at time scales relevant to groundwater flow, including adsorption and mineral dissolution/precipitation reactions (*i.e.*, iron and aluminum hydroxides, carbonates, and some sulfates) (Appendix E; Life Cycle Geo, LLC, 2025). Model inputs included geochemically reactive solid mineral phases, downgradient groundwater composition, and background groundwater composition derived from site-specific data. Speciation models analyzed the distribution of chemical constituents between solid and aqueous phases, while reaction models assessed how these distributions may shift in response to changing site conditions (US EPA, 2015b).

Components of residual plume management for the Source Control-GWP remedy alternative include:

- Groundwater concentrations would be reduced in the downgradient plume as a result of physical and geochemical attenuation processes. Site-specific evaluations have shown that groundwater polishing would reduce the groundwater concentrations and mobility of inorganic contaminants, especially after the implementation of source control. Specifically, the aquifer solids assessment revealed that adsorptive minerals, such as iron and aluminum hydroxides, are present within the aquifer and have effectively bound boron and sulfate within the reactive fraction of the solid matrix (Appendix E; Life Cycle Geo, LLC, 2025). Additionally, dissolution and remobilization of contaminants in groundwater is unlikely as "groundwater quality returns to background conditions." The modeling results also indicate that geochemical changes occurring during the "return to background," such as a more oxidized redox condition, are unlikely to increase the estimated time to reach the GWPS. This attenuation process would reduce the flux of CCR constituents in downgradient groundwater (Appendix E; Life Cycle Geo, LLC, 2025).
- Corrective action groundwater monitoring using a groundwater monitoring system designed in accordance IAC Section 845.680(c) would be performed within the plume that lies beyond the waste boundary.
- Adaptive site management strategies for this alternative would include geochemical modeling. Groundwater monitoring results would be evaluated and compared to the model-predicted concentrations. In situations in which observed groundwater concentrations deviate significantly from modeled conditions, alternative methods or techniques to achieve the GWPSs would be evaluated, and if viable, incorporated as per IAC Section 845.680(b).
- Corrective action confirmation groundwater sampling would be performed for 3 years after GWPSs have been achieved.
- Following the completion of the corrective action confirmation monitoring period, a report and certification for Corrective Action Completion would be prepared and submitted to IEPA as per IAC Section 845.680(e).

The overall corrective action implementation duration for this alternative is approximately 20.5 years (246 months) after source control has been completed (Appendix B; Ramboll, 2025a), including:

- Approximately 17 years (204 months) of corrective action monitoring (*i.e.*, time to meet GWPSs);
- At least 3 years (36 months) of corrective action confirmation monitoring,[2] and
- Approximately 6 months associated with post-closure reporting.

Although source control (*i.e.*, control-in-place [CIP]) is a primary component of the corrective action, the labor time, equipment usage, and mileage linked to source control were previously estimated in the Closure Alternative Analysis (CAA) (Gradient, 2022a) and are not repeated in this analysis. There is no labor and mileage incurred with the residual plume management under the Source Control-GWP alternative, because no construction would be required under this alternative. Mileage and labor associated with corrective action monitoring was not included in this analysis (Appendix B; Ramboll, 2025a).

2.1.2 Alternative 2: Source Control-GWE

The second corrective action alternative is Source Control-GWE. This remedy includes source control (*i.e.*, CIP using a consolidate-and-cap approach) and groundwater extraction trenches as the residual plume management approach. The residual plume management would include the construction of two extraction trenches, referred to as the Northern and the Southern Trenches. Both trenches would be installed to depths such that they intercept groundwater in the UA and extend an additional 1 to 2 ft below the UA into the LCU. The GWEs would be constructed by excavation of existing soils, installing collection pipes and sumps, backfilling with clean fill, and installing a compacted clay cap to reduce infiltration (Appendix B; Ramboll, 2025a). The Northern Trench would be located along the interior toe of the northern perimeter of the excavated portion of the AP and between the AP and Sangchris Lake. The Northern Trench would be about 3,400 ft long, 2 ft wide, and extend to an elevation of about 600 ft or about 22 ft below ground surface (bgs).[3] The Southern Trench would be located along the north and northwest toe of the consolidated portion of the AP. The Southern Trench would be about 2,700 ft long, 2 ft wide, and extend to an elevation of about 600 ft or about 25 ft bgs. Groundwater that is captured would be pumped to a new on-site lined settling pond and discharged through either a new or existing outfall, and would be managed in accordance with the NPDES permits for the site.

Implementation of residual plume management for Source Control-GWE is expected to include various tasks across three major phases: pre-construction activities (Phase 1), corrective action construction (Phase 2), and corrective action operations, maintenance, and closeout (Phase 3). The activities associated with each of these phases are summarized below:

- **Phase 1:** Pre-construction activities including obtaining permits from agencies, and completing site investigations and engineering designs;
- **Phase 2:** Construction of the extraction trench, settling pond, and minor site restoration of disturbed areas;
    - Mobilization of equipment and materials to the site, and preparation for site construction;

[2] It should be noted that post-closure care groundwater monitoring will continue for a minimum of 30 years as required by IAC Section. 845.780(c).
[3] All elevations in this report are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted. The actual elevation may be variable based on the thickness of UA at the particular location (Appendix B; Ramboll, 2025a).

- The GWEs would be constructed using one-pass trenching methods by excavating subgrade soils, placing collection piping and pumps, and backfilling the trench;
- The 1-acre, geomembrane-lined settling pond would be constructed to manage extracted groundwater using conventional construction equipment;
- Site restoration would be completed following the construction of the GWEs and settling pond.

▪ **Phase 3:** Operations, Maintenance, and Closeout of the GWE system. Details pertaining to each of these activities are outlined below.

- Operation of the GWE system;
- Corrective Action operations and maintenance (O&M) would involve routine and non-routine maintenance of extraction pumps, air compressor, and other system components.
- Monitoring of extracted groundwater under the appropriate modified NPDES permit
- Groundwater concentrations would be also reduced in the downgradient plume as a result of physical and geochemical attenuation processes. Site-specific evaluations demonstrated that the site conditions are favorable for physical and geochemical processes of inorganic contaminants *via* adsorption. Additionally, dissolution and remobilization of contaminants in groundwater is unlikely as "groundwater quality returns to background conditions" (Refer to section 2.1.1 for detailed discussion; Appendix E; Life Cycle Geo, LLC, 2025).
- Adaptive site management strategies would be employed to track remediation progress and incorporate new site information to assure the achievement of the GWPSs.
- Corrective action monitoring using a corrective action groundwater monitoring network designed in accordance with IAC Section 845.680(c) would be performed within the plume that lies beyond the waste boundary.
- Corrective action confirmation monitoring would be performed for 3 years after GWPSs have been achieved.
- Following the completion of the corrective action confirmation monitoring period, a report and certification for Corrective Action Completion would be prepared and submitted to IEPA as per IAC Section 845.680(e).

The overall corrective action implementation duration is approximately 22.4 to 23.8 years (269 to 286 months) after source control has been implemented (Appendix B; Ramboll, 2025a), including:

▪ Approximately 3 to4 years (32 to 48 months) of pre-construction activities (Phase 1; assumed to occur concurrently with source control);

▪ Approximately 3 to 4 months of corrective action construction (Phase 2; assumed to occur concurrently with source control), and;

▪ Approximately 19.5 years (234 months) of corrective action operation, maintenance, and closeout (Phase 3) after source control.

- The duration of Phase 3 (corrective action operation, maintenance, and closeout) is estimated to include 16 years (192 months) of corrective action O&M (*i.e.*, time to meet GWPSs), at least

3 years (36 months) of corrective action confirmation monitoring,[4] and 6 months associated with post-closure reporting.

Key parameters for the Source Control-GWE corrective action alternative are shown in Table 2.1, below.

Table 2.1 Key Parameters for the Source Control-GWE Corrective Action Alternative[a]

Parameter[b]	Value[c]
Labor Hours	
Total On-Site Labor	27,600 hours
Total Off-Site Labor	0 hours
40% Contingency	11,000 hours
Total Labor Hours:	38,600 hours
Vehicle and Equipment Travel Miles	
Vehicles On-Site	25,800 miles
On-Site Haul Trucks (Unloaded + Loaded)	878 miles
Labor Mobilization	259,000 miles
Equipment Mobilization (Unloaded + Loaded)	6,890 miles
Off-Site Haul Trucks (Unloaded + Loaded)	142,300 miles
Material Deliveries (Unloaded + Loaded)	6,2700 miles
Total On-Site Vehicle and Equipment Travel Miles:	26,700 miles
Total Off-Site Vehicle and Equipment Travel Miles:	414,000 miles
Total Vehicle and Equipment Travel Miles:	441,000 miles

Notes:
Source Control-GWE = Source Control with Groundwater Extraction Trench.
(a) Although source control (*i.e.*, control-in-place [CIP]) is a primary component of the corrective action, the labor time, equipment usage, and mileage linked to source control were previously estimated in the Closure Alternative Analysis (CAA) and are not repeated in this analysis.
(b) Mileage and labor related to sampling and monitoring is not included for either alternative.
(c) Values reported in this table were rounded to reflect 3 significant figures.
Source: Appendix B; Ramboll, 2025a.

2.2 Long- and Short-Term Effectiveness and Protectiveness of Corrective Action Alternative (IAC Section 845.670(e)(1))

2.2.1 Magnitude of Reduction of Existing Risks/Be Protective of Human Health and the Environment (IAC Section 845.670(e)(1)(A)/IAC Section 845.670(d)(1))

There are no current unacceptable risks to human or ecological receptors at this Site associated with the AP, based on a Human Health and Ecological Risk Assessment performed for the Site (Appendix A; Gradient, 2022b). Because current conditions do not present a risk to human health or the environment at the AP, there will be no unacceptable risk to human health or the environment for future conditions when the unit has been closed and source control/residual plume management has been implemented. Concentrations of CCR-related constituents will decline over time and, consequently, potential exposures

[4] It should be noted that post-closure care groundwater monitoring would continue for a minimum of 30 years or until such time as GWPSs are achieved, whichever is longer, as required by IAC Section 845.780(c).

to CCR-related constituents in the environment will also decline. As a result of this, the magnitude of the reduction of existing risks is the same for both corrective action alternatives (IAC Section 845.670(e)(1)(A)), and both corrective action alternatives are equally protective of human health and the environment (IAC Section 84.670(d)(1)).

2.2.2 Effectiveness of the Remedy in Controlling the Source (IAC Section 845.670(e)(2)/IAC Section 845.670(d)(3))

Extent to Which Containment Practices Will Reduce Further Releases/Control the Sources of Releases to Reduce or Eliminate, to the Maximum Extent Feasible (IAC Section 845.670(e)(2)(A)/IAC Section 845.670(d)(3))

Source control (CIP using a consolidate-and-cap approach) which includes the excavation of CCR in the northern and western portions of the AP and consolidation into the southern portion of the AP, and the installation of a low-permeability final cover system designed to limit the infiltration of precipitation into the impounded CCR, would be implemented for both corrective action alternatives. Groundwater modeling performed in support of the CAA (Gradient, 2022a) concluded that source control alone would result in a 99.98% reduction in mass flux from the AP into the underlying groundwater (Ramboll, 2022). Because source control would be undertaken at the Site prior to the implementation of any residual plume management, both corrective action alternatives would remove the potential for CCR within the impoundment to impact groundwater. Therefore, both corrective action alternatives would be equally and fully protective with regard to source control (*i.e.*, of CCR in the AP). The effectiveness of residual plume management for each of the corrective action alternatives is summarized below.

- Under the Source Control-GWP alternative, the attenuation of dissolved constituent concentrations remaining after source control would be achieved through natural physical and geochemical processes. Site-specific evaluations have demonstrated that conditions are favorable for physical and geochemical processes of inorganic contaminants *via* adsorption. By monitoring groundwater concentrations and, if necessary, optimizing the remedy, the Source Control-GWP alternative would be effective at controlling the residual plume and downgradient groundwater impacts (Appendix E Life Cycle Geo, LLC, 2025). In cases in which observed groundwater concentrations deviate significantly from modeled conditions, alternative methods or techniques to achieve the GWPSs would be evaluated under the adaptive site management plan, and if viable, incorporated as per IAC Section 845.680(b).
- Under the Source Control-GWE alternative, residual contamination control would be achieved by extracting impacted groundwater and preventing downgradient migration through installation of two extraction trenches at the northern perimeter of the original AP footprint (*i.e.*, the Northern Trench) and the northern perimeter of the CIP portion of the AP (*i.e.*, the Southern Trench), respectively. GWE is a widely used corrective measure that have been effectively implemented at many sites to contain and capture dissolved-phase groundwater plumes. Physical and geochemical attenuation would also help control the residual plume and prevent downgradient migration. In cases in which observed groundwater concentrations deviate significantly from modeled conditions, alternative methods or techniques to achieve the GWPSs would be evaluated under the adaptive site management plan, and if viable, incorporated as per IAC Section 845.680(b).

Because both corrective action alternatives include source control and residual plume management, both potential corrective action alternatives would be equally effective at reducing, to the maximum extent feasible, releases from both primary and residual sources (IAC Section 845.670(e)(2)(A)/IAC Section 845.670(d)(3)).

Extent to Which Treatment Technologies May Be Used (IAC Section 845.670(e)(2)(B))

Because Source Control-GWP would rely on natural attenuation processes, no additional treatment technologies would be required under this alternative. For the Source Control-GWE alternative, in addition to physical and geochemical processes, extracted groundwater would be managed and treated by a newly constructed on-site settling pond, although other methods for treating extracted groundwater may be evaluated at later phases of designs (Appendix B; Ramboll, 2025a). For both corrective action alternatives, remedy optimizations would be implemented, if necessary, under the adaptive site management program.

2.2.3 Likelihood of Future Releases of CCR (IAC Section 845.670(e)(1)(B))

Both corrective action alternatives include source control using CIP with a consolidate-and-cap approach. A new cover system would be installed over the AP, which would include a 40-mil LLDPE geomembrane layer, a geotextile drainage layer, 24 in of protective soil, as well as new stormwater control structures. Relative to current conditions, this cover system would provide increased protection against berm and surface erosion, precipitation infiltration, and other adverse effects that could potentially trigger a release of CCR. There would be minimal risk of accidental CCR releases occurring post-closure under either of the corrective action alternatives.

2.2.4 Type and Degree of Long-Term Management, Including Monitoring, Operation, and Maintenance (IAC Section 845.670(e)(1)(C))

The type and degree of long-term residual groundwater plume management associated with each corrective action alternative is summarized below.

- Residual plume management for the Source Control-GWP alternative would not require the installation, operation, or maintenance of any engineered systems or structures, other than maintenance of the monitoring well network. The only long-term management activity required under this alternative would be corrective action groundwater monitoring and routine maintenance of the monitoring wells, which would continue for at least 3 years after GWPSs have been achieved for all wells, in accordance with IAC Section 845.680(c)(2). Post-closure care groundwater monitoring would continue for a minimum of 30 years as required by IAC Section 845.780(c). Based on the adaptive site management approach, remedy optimization (additional methods or techniques) may be implemented to ensure the achievement of the GWPSs.
- Residual plume management for the Source Control-GWE would require multiple tasks to be completed over three phases: pre-construction activities (Phase 1), corrective action construction (Phase 2), and corrective action O&M, and closeout (Phase 3). Once pre-construction activities are completed, construction of the extraction trenches would occur concurrently with AP closure activities. This approach would allow for the spoils generated from the extraction trenches to be disposed beneath the final cover system of the AP. Corrective action O&M would require regular inspection and maintenance of the extraction trench system. Extracted groundwater would be managed and treated by a newly constructed on-Site settling pond and discharged *via* a new or existing NPDES outfall to Sangchris Lake. Additionally, corrective action groundwater sampling and routine maintenance of the monitoring well network would continue for at least 3 years after GWPSs have been achieved at all wells, in accordance with IAC Section 845.680(c)(2). Post-closure care groundwater monitoring would continue for a minimum of 30 years as required by IAC Section 845.780(c). Based on the adaptive site management approach, remedy optimization (additional methods or techniques) may be implemented to ensure the achievement of the GWPSs.

2.2.5 Short-Term Risks to the Community or the Environment During Implementation of Remedy (IAC Section 845.670(e)(1)(D))

2.2.5.1 Safety Impacts

Best practices would be employed during construction in order to ensure worker safety and comply with all relevant regulations, permit requirements, and safety plans. However, it is impossible to completely eliminate risks to workers during construction and/or other corrective action activities. For example, injuries and fatalities can occur due to truck accidents or equipment malfunctions. Truck accidents that occur off-Site can also result in injuries or fatalities to community members. The safety impacts associated with source control (CIP using a consolidate-and-cap approach), which were evaluated in the CAA (Gradient, 2022a), are the same for both corrective action alternatives. The safety impacts associated with residual plume management (*i.e.*, construction, as well as O&M) for each corrective action alternative are described below.

- The Source Control-GWP alternative would not include installation, operation, and maintenance of engineered systems or structures, and therefore no safety impacts are expected.
- The Source Control-GWE alternative would include the construction of a groundwater extraction trench system and settling pond to collect, extract, and treat CCR-impacted groundwater. Potential safety concerns would be related to construction and O&M of the GWE extraction trenches and settling pond.

Worker Risks

On-Site accidents include injuries and deaths arising from the use of heavy equipment and/or earthmoving operations during Site activities. Off-Site accidents include injuries and deaths due to vehicle accidents during labor and equipment mobilization/demobilization, as well as materials/supplies hauling and deliveries.

As discussed in section 2.1.1, there are no construction activities or operational requirements associated with residual plume management for the Source Control-GWP alternative. Ramboll estimates that residual plume management for the Source Control-GWE corrective action alternative would require 27,600 on-Site labor hours associated with construction and operation of the system (Appendix B; Ramboll, 2025a). The US Bureau of Labor Statistics (US DOL, 2020a,b) provides an estimate of the hourly fatality and injury rates for construction workers. Based on the accident rates reported by the US Bureau of Labor Statistics and the on-Site labor hours reported in Appendix B, we estimate that approximately 0.29 worker injuries and 2.5×10^{-3} worker fatalities would occur on-Site under the Source Control-GWE corrective action alternative (Table 2.2). The number of on-Site worker accidents is therefore expected to be higher under the Source Control-GWE alternative and no worker accidents would be expected under the Source Control-GWP alternative.

Table 2.2 Expected Number of On-Site Worker Accidents Under Each Corrective Action Alternative[a]

Corrective Action Alternative	Injuries	Fatalities
Source Control-GWP	0	0
Source Control-GWE	0.29	2.5×10^{-3}

Notes:
Source Control-GWP = Source Control with Groundwater Polishing; Source Control-GWE = Source Control with Groundwater Extraction Trench.
(a) Although source control (*i.e.*, control-in-place [CIP]) is a primary component of the corrective action, the worker accidents associated with source control were previously estimated in the Closure Alternative Analysis (CAA) and are not repeated in this analysis.

Off-Site, haul truck miles, labor and equipment mobilization/demobilization miles, and material delivery miles would be required under the Source Control-GWE (Table 2.1). For residual plume management under the Source Control-GWE corrective action alternative, 414,000 total off-Site vehicle and equipment travel miles would be required. In contrast, for residual plume management under the Source Control-GWP alternative, no vehicle and equipment travel miles would be required (Appendix B; Ramboll, 2025a). The United States Department of Transportation (US DOT) provides estimates of the expected number of fatalities and injuries "per vehicle mile driven" for drivers and passengers of large trucks and passenger vehicles (US DOT, 2023a). Table 2.3 shows the expected number of off-Site accidents under each corrective action alternative due to all categories of off-Site vehicle usage. For these calculations, it was assumed that labor mobilization/demobilization would rely upon passenger vehicles (cars or light trucks, including pickups, vans, and sport utility vehicles) and that hauling, equipment mobilization/demobilization, and material deliveries would rely upon large trucks. Based on US DOT's accident statistics and the mileage estimates in Appendix B, 0.19 worker injuries and 4.9×10^{-3} worker fatalities would be expected to occur due to off-Site activities under the Source Control-GWE alternative, while there are no off-Site accidents expected under the Source Control-GWP alternative.

Table 2.3 Expected Number of Off-Site Worker Accidents Related to Off-Site Car and Truck Use Under Each Corrective Action Alternative[a]

Off-Site Vehicle Use Category	Source Control-GWP		Source Control-GWE	
	Injuries	Fatalities	Injuries	Fatalities
Hauling	0	0	3.0×10^{-2}	2.3×10^{-3}
Labor Mobilization/Demobilization	0	0	0.15	2.5×10^{-3}
Equipment Mobilization/Demobilization	0	0	1.5×10^{-3}	1.1×10^{-4}
Material Deliveries	0	0	1.3×10^{-3}	9.9×10^{-5}
Total:	0	0	0.19	4.9×10^{-3}

Notes:
Source Control-GWP = Source Control with Groundwater Polishing; Source Control-GWE = Source Control with Groundwater Extraction Trench.
(a) Although source control (*i.e.*, closure-in-place [CIP]) is a primary component of the corrective action, the worker accidents associated with source control were previously estimated in the Closure Alternative Analysis (CAA) and are not repeated in this analysis.

Overall, considering accidents occurring both on- and off-Site, no worker injuries and worker fatalities would be expected to occur for residual plume management under the Source Control-GWP alternative; and 0.47 worker injuries and 7.4×10^{-3} worker fatalities would be expected to occur for residual plume management under the Source Control-GWE alternative. Thus, overall risks to workers would be higher under the Source Control-GWE alternative.

Community Risks

Vehicle accidents that occur off-Site can result in injuries or fatalities among community members as well as workers. Based on the accident statistics reported by US DOT (2023b) and the off-Site travel mileages reported in Appendix B (and summarized in Table 2.1), off-Site vehicle accidents could result in an estimated 0.10 community injuries and 1.3×10^{-3} community fatalities. No off-Site risks are expected under the Source Control-GWP alternative. Therefore, off-Site impacts on nearby residents, including injuries or fatalities, would be higher under the Source Control-GWE alternative.

Table 2.4 Expected Number of Community Accidents Under Each Corrective Action Alternative

Off-Site Vehicle Use Category	Source Control-GWP		Source Control-GWE	
	Injuries	Fatalities	Injuries	Fatalities
Hauling	0	0	3.7×10^{-2}	2.8×10^{-4}
Labor Mobilization/Demobilization	0	0	6.3×10^{-2}	9.9×10^{-4}
Equipment Mobilization/Demobilization	0	0	1.8×10^{-3}	1.3×10^{-5}
Material Deliveries	0	0	1.6×10^{-3}	1.2×10^{-5}
Total:	0	0	0.10	1.3×10^{-3}

Notes:
Source Control-GWP = Source Control and Groundwater Polishing; Source Control-GWE = Source Control and Groundwater Extraction Trench.
(a) Although source control (*i.e.*, closure-in-place [CIP]) is a primary component of the corrective action, the worker accidents associated with source control were previously estimated in the Closure Alternative Analysis (CAA) and are not repeated in this analysis.

2.2.5.2 Cross-Media Impacts to Air

Air pollution can occur both on-Site (*e.g.*, construction activities) and off-Site (*e.g.*, along transportation routes), potentially impacting workers as well as community members. Diesel emissions are a major source of air pollutants and greenhouse gas (GHG) emissions at construction sites. Diesel exhaust contains air pollutants, including nitrogen oxides (NO_x), particulate matter (PM), carbon monoxide (CO), and volatile organic compounds (VOCs) (Hesterberg *et al*., 2009; Mauderly and Garshick, 2009). Construction equipment also emits GHGs, including carbon dioxide (CO_2) and possibly nitrous oxide (N_2O). The potential impact of each corrective action alternative on GHG emissions is proportional to the potential impact of each alternative on other emissions from construction vehicles and equipment.

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. Air impacts occurring during source control would be the same for both corrective action alternatives. Impacts associated with CIP using a consolidate-and-cap approach were evaluated in the CAA (Gradient, 2022a). On-Site emissions would be higher for residual plume management under the Source Control-GWE alternative due to the greater amount of on-Site vehicle travel miles required under this corrective action alternative (26,700 total on-Site travel miles under the Source Control-GWE alternative while no on-Site travel miles under the Source Control-GWP alternative; Section 2.1.1 and Table 2.1). Off-Site emissions would similarly be higher for residual plume management under the Source Control and GWE alternative due to the greater amount of off-Site vehicle and equipment travel miles required under this alternative (414,000 total off-Site travel miles under the Source Control-GWE alternative while no off-Site travel miles under the Source Control-GWP alternative). In summary, air impacts would be higher for the Source Control and GWE alternative than the Source Control-GWP alternative.

2.2.5.3 Cross-Media Impacts to Surface Water and Sediments

Under both corrective action alternatives, the constituent mass flux from groundwater into surface water would decline over time after source control has been completed (Ramboll, 2022). Source control would include removal of free liquids, consolidation of CCR in the AP and the installation of a low-permeability final cover system to limit the precipitation infiltration into the CCR unit. This approach would minimize the amount of water retained within the impoundment, which further reduces the hydraulic flux through the CCR. As demonstrated by the groundwater modeling in support of the Closure Alternatives Analysis (CAA) (Gradient, 2022a), this source control approach would result in a reduction of the migration of water into the AP by 99.82% compared to pre-closure conditions. Additionally, source control would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022). Due to the reduction in the hydraulic flux out of the AP, the mass flux out of the EAP would also be controlled or minimized.

Under the Source Control-GWP alternative, minimal surface water and sediment impacts would be expected associated with residual plume management, because it would not require the construction of any engineered systems or structures (other than utilizing existing monitoring wells).

Under the Source Control-GWE alternative, surface water and sediment impacts associated with residual plume management would be higher than the those of Source Control-GWP alternative due to the construction of the extraction trench system and the settling pond. Construction can have short-term negative impacts on surface water and sediment quality immediately adjacent to a site due to erosion and sediment runoff. Any associated impacts would be addressed through Best Management Practices (BMPs) in accordance with site land disturbance permits.

2.2.5.4 Control of Exposure to Any Residual Contamination During Implementation of the Remedy

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. While appropriate controls would be established to prevent exposures of CCR during source control, the risks of CCR exposure during source control would be the same for both corrective action alternatives. For each of the other corrective action components for the two potential alternatives, no residual CCR exposures would be expected to occur. However, impacted soils and groundwater can be a source of CCR-related constituent exposure for workers. Risks to workers arising from potential contact with residual contamination during construction, operation, and maintenance activities associated with residual plume management would be higher for the Source Control-GWE alternative than for the Source Control-GWP alternative, because the Source Control-GWE would involve the production, management, and treatment of extracted groundwater, as well as on-Site disposal of excavated spoils generated during extraction trench construction. The Source Control-GWP alternative would not involve exposure to either of these soil or groundwater waste streams associated with residual plume management. Any potential CCR-exposures during the Source Control-GWE alternative would be managed through the use of rigorous safety protocols and personal protective equipment.

2.2.5.5 Other Identified Impacts

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, impacts during source control would be the same for both corrective action alternatives (see the CAA; Gradient, 2022a).

In addition to safety impacts, cross-media impacts, and the potential for workers to be exposed to residual contamination, construction activities and remedial operations can have significant energy demands and can cause nuisance impacts such as traffic and noise. Energy consumption at a construction site is synonymous with fossil fuel consumption, because the energy to power construction vehicles and equipment comes from the burning of fossil fuels. Fossil fuel demands considered here include the burning of diesel fuel during construction equipment and vehicle travel miles. Because GHG emission impacts and energy consumption impacts both arise from the same sources at construction sites, the trends discussed in Section 2.2.5.2 with respect to GHG emissions also apply to the evaluation of energy demands. Specifically, the energy demands of construction equipment and vehicles associated with residual plume management would be greater under the Source Control-GWE, while the energy demands under the Source Control-GWP alternative associated with residual plume management are expected to be lower, because the later alternative would not require any significant construction activity. In addition, energy would be required for the operation of the extraction trench system under the Source Control-GWE alternative, while there is no operational energy required under the Source Control-GWP alternative, because it would rely on natural physical and geochemical processes.

Similarly, traffic and noise impacts associated with residual plume management are also expected to be higher under the Source Control-GWE alternative than the Source Control-GWP alternative, due to the construction activities that would be required to construct the extraction trench system. Traffic may increase temporarily around the Site under the Source Control-GWE alternative due to the daily arrival and departure of the workforce, equipment mobilization/demobilization, and material deliveries. However, these impacts would be expected to largely occur at the beginning or end of each workday (for the arrival/departure of the work force), at the beginning or end of the construction period (for equipment mobilization/demobilization), and at specific times throughout the construction period (for material deliveries). Traffic and noise impacts associated with residual plume management from the Source Control-GWP alternative is expected to be minimal because no installation, operation, and maintenance of engineered systems or structures would be required.

Construction activities can negatively impact natural resources and habitat near the Site, as well as scenic, and recreational value. Based on a review of the IDNR Historic Preservation Division database and the Illinois State Archaeological Survey database, there are no historic sites located within 1,000 meters of the AP (Ramboll, 2021). There would be no impacts associated with residual plume management under the Source Control-GWP alternative because no additional construction activities would occur after implementation of source control. The Sangchris Lake State Recreation Area, which surrounds the Site to the north and east, is used for boating, fishing, camping, hunting, hiking, and picnicking (IDNR, 2022). The Source Control-GWE alternative would require construction of two extraction trenches and an on-Site settling pond, which would occur during the later phase of the AP closure construction, and specialty equipment such as one-pass trenching equipment and other supporting equipment would be used. Given the proximity between these areas and the expected construction, it is likely that these areas would experience some adverse impacts such as visual disturbance, obstruction of view, and noise during the construction period. The construction activities would likely result in some negative impacts to the ecosystem in the vicinity, including disturbance of habitat near the construction areas by causing alarm and escape behavior in nearby wildlife (*e.g.*, due to noise disturbances). It is also possible that limited negative short-term impacts could occur to sensitive aquatic and wetland species in Sangchris Lake and surface water ponds located within the area (see Section 1.1.3) due to sediment runoff during construction.

2.2.6 Time Until Groundwater Protection Standards Are Achieved/Attain the Groundwater Protection Standards Specified in Section 845.600 (IAC Section 845.670(e)(1)(E)/IAC Section 845.680(d)(2))

This section of the report evaluates the time required to achieve GWPSs, pursuant to requirements under IAC Section 845.670(e)(1)(E) (IEPA, 2021a) and under IAC Section 845.680(d)(2).

Groundwater within the UA flows northwest towards Sangchris Lake. In the vicinity of the AP, groundwater within the USCU similarly is observed to flow predominantly north/northwest towards the western lobe of Sangchris Lake. However, there is also a component of groundwater flow to the south and east towards the discharge flume that runs along the southern boundary of the AP, which flows into the eastern lobe of Sangchris Lake. This suggests that there is a groundwater divide beneath the AP, such that groundwater flows towards both the western and eastern lobes of Sangchris Lake (Ramboll, 2021). Groundwater elevations in the region of the AP are primarily controlled by water levels in Sangchris Lake and the AP. Surface water levels in Sangchris Lake are not expected to fluctuate within the area of the AP, because the lake elevation is controlled by a dam (Ramboll, 2021).

Groundwater modeling was performed in support of the CAA (Gradient, 2022a). The modeling predicted that source control would result in a reduction of the migration of water into the AP by 99.82% compared to pre-closure conditions. Additionally, source control would result in a reduction of hydraulic flux out of the AP by 99.98% compared to pre-closure conditions (Ramboll, 2022). Additional modeling was conducted for each of the corrective action alternatives to evaluate future groundwater quality in the vicinity of the AP as a result of residual plume management (Appendix B; Ramboll, 2025b), and the results of the modeling indicate that groundwater would attain the GWPSs for all of the constituents[5] identified as having potential groundwater exceedances in all monitoring wells within approximately 17 and 16 years under Source Control-GWP and Source Control-GWE alternatives, respectively (Appendix B; Ramboll, 2025b), and thus satisfy the GWPSs criteria in IAC Section 845.670(e)(1)(E) and IAC Section 845.680(d)(2). Table 2.5 summarizes and compares timeline and overall implementation schedule for both alternatives (also discussed in Sections 2.1.1 and 2.1.2).

[5] Boron was selected as a surrogate for the contaminant fate and transport simulations to evaluate the effectiveness of each of the corrective action alternative. Statistical significance was observed between concentrations of boron and of other parameter identified as having potential exceedances at the AP, and it was determined to be less likely than other parameters to be present in background groundwater. Modeling all constituents that exceed GWPS or have been detected at similar concentrations relative to their GWPSs is unnecessary, as these constituents will likely achieve their GWPSs more quickly (Appendix B; Ramboll, 2025b; Gradient, 2024; Ramboll, 2022).

Table 2.5 Estimated Timeline and Implementation Schedule for Source Control-GWP *vs.* Source Control-GWE

Implementation Phase	Implementation Task	Timeframe	
		Source Control-GWP	Source Control-GWE
1: Pre-Construction Activities[a] (Concurrent with Source Control)	Agency Coordination, Approvals, and Permitting	NA	8 to 12 months
	Final Design and Bid Process		24 to 36 months
	Total Timeframe to Complete Pre-Construction Activities		32 to 48 months (3-4 years)
2: Corrective Action Construction[a] (Concurrent with Source Control)	Corrective Action Construction	NA	3 to 4 months
	Total Timeframe to Complete Corrective Action Construction		3 to 4 months
3: Corrective Action O&M and Closeout[b] (After Completion of Source Control)	Corrective Action Monitoring (Time to Meet GWPS)	204 months (17 years)	192 months (16 years)
	Corrective Action Confirmation Monitoring	36 months	36 months
	Corrective Action Completion Reporting	6 months	6 months
	Total Timeframe to Complete Corrective Action O&M and Closeout	246 months (20.5 years)	234 months (19.5 years)
Total Timeline to Complete Corrective Action (All Phases)		246 months (20.5 years)	269 to 286 months (22.4 to 23.8 years)

Notes:
GWPS = Groundwater Protection Standard; NA = Non-applicable; O&M = Operations and Maintenance; Source Control-GWE = Source Control with Groundwater Extraction Trench; Source Control-GWP = Source Control with Groundwater Polishing.
(a) Pre-construction Activities (Phase 1) and Corrective Action Construction (Phase 2) are assumed to occur concurrently with the source control (*i.e.*, closure-in-place or CIP) activities, to allow waste materials to be placed underneath the Ash Pond (AP) final cover system.
(b) Corrective Action O&M and Closeout (Phase 3) is assumed to start after the source control (*i.e.*, closure-in-place or CIP) is complete and approval of the corrective action construction permit application has been issued by Illinois Environmental Protection Agency (IEPA), whichever is longer.
Source: Appendix B; Ramboll, 2025a.

2.2.7 Potential for Exposure of Humans and Environmental Receptors to Remaining Wastes, Considering the Potential Threat to Human Health and the Environment Associated with Excavation, Transportation, Re-disposal, Containment, or Changes in Groundwater Flow (IAC Section 845.670(e)(1)(F))

Section 2.2.1 describes the magnitude of reduction of existing risks under each corrective action alternative. Section 2.2.2 describes the effectiveness of the remedy in controlling the source, including the extent to which containment practices would reduce further releases. Section 2.2.3 describes the likelihood of future releases of CCR occurring under each corrective action alternative, and Section 2.2.5 describes the short-term risks to workers, the community, and the environment during implementation of the remedy, including safety impacts and control of exposure to any residual contamination. In summary, source control measures (*i.e.*, CIP using a consolidate-and-cap approach) would be undertaken at the Site. Thus, potential exposures to CCR remaining in the AP would be the same under both alternatives. Similarly, due to the source control common to both of the corrective action alternatives, a new geomembrane cover system would be placed over the AP, and no residual CCR exposures would be expected to occur during the implementation of any of the alternatives. Both corrective action alternatives would therefore be equally and fully protective with regard to exposure to residual CCR. There are no current or future risks to any human or ecological receptors at the Site, and there would be no risk of CCR releases post-closure.

For construction workers, risks arising from potential contact with residual contamination during construction, operation, and maintenance activities associated with residual plume management would be higher for the Source Control-GWE alternative than for the Source Control-GWP alternative, because the Source Control-GWE would involve the production, management, and potential treatment of extracted groundwater. The Source Control-GWP alternative would not involve exposure to either of these soil or groundwater waste streams. Any potential CCR exposures occurring under Source Control-GWE during groundwater extraction and treatment would be managed through the use of rigorous safety protocols, personal protective equipment, and appropriate disposal practice.

Some changes in groundwater flow (*i.e.*, controlled discharge into Sangchris Lake) may occur under the Source Control-GWE alternative, due to the operation of the GWE system. Hydrogeological changes would be expected under the Source Control-GWE alternative, such as lowering groundwater table in the vicinity of the extraction trenches, altering flow patterns in the UA, and causing changes in hydraulic gradients. However, changes to groundwater flow would not be expected to have an effect on the potential for the exposure of humans and environmental receptors to remaining wastes.

2.2.8 Long-Term Reliability of the Engineering and Institutional Controls (IAC Section 845.670(e)(1)(G))

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. The source control activities are expected to be reliable, provided that construction is completed in accordance with the design and specifications. Thus, long-term reliability of source control would be the same for both corrective action alternatives (Gradient, 2022a; Appendix B; Ramboll, 2025a). The long-term reliability of the engineering and institutional controls associated with residual plume management of both corrective alternatives are summarized below.

- Residual plume management under the Source Control-GWP alternative would be reliable, because it would rely on natural physical and geochemical processes, rather than the installation, operation, and maintenance of engineered systems or structures. Under this alternative, engineering failure would not occur, and no O&M activities would be required to ensure the success of the alternative (other than those required for groundwater monitoring). Active groundwater monitoring would be in place to track the remediation progress. Should the predicted decrease in groundwater concentrations not occur, the adaptive site management approach would enable prompt adjustments or enhancements to the corrective action in accordance with IAC Section 845.680(b). This strategy would allow continuous improvement of the AP groundwater remediation in response to new Site information and/or the performance of the corrective action alternative.
- GWE is a proven remedy that has been implemented at many sites. Thus, residual plume management under the Source Control-GWE alternative would be expected to be reliable provided it is constructed in accordance with standard design and specifications. Under this alternative, the extraction trench system and settling pond would require engineering design and installation for groundwater extraction and treatment. Routine maintenance of the GWE system is required to ensure reliable operation of the extraction trench and pumps, as well as other system components. Active groundwater monitoring would be in place, similar to those required under the Source Control-GWP alternative.

- For both corrective action alternatives, remedy optimizations would be implemented, if necessary, under the adaptive site management plan.

2.2.9 Potential Need for Replacement of the Remedy (IAC Section 845.670(e)(1)(H))

The potential need for the eventual replacement of the residual plume management remedy under each corrective action alternative is summarized as follows:

- Source Control-GWP would rely on natural physical geochemical processes to achieve reductions in groundwater concentrations to below the GWPSs. Because no installation, operation, and maintenance of engineered systems or structures would be required, it would be unlikely that the residual plume management remedy under the Source Control-GWP alternative would need to be replaced. Adaptive site management strategies would be used to implement remedy optimizations or replacement, as necessary based on data that are collected, to ensure that remedial goals are achieved.
- Source Control-GWE would utilize two extraction trenches and a settling pond to extract and treat contaminated groundwater to achieve reductions in groundwater concentrations to below GWPSs. While the GWE system would need ongoing maintenance and potential replacement of system components over time, it is unlikely that the residual plume management remedy under the Source Control-GWE alternative would need to be replaced. Adaptive site management strategies would be used to implement remedy optimizations or replacement, as necessary based on data that are collected, to ensure that remedial goals are achieved.

2.3 The Ease or Difficulty of Implementing a Remedy (IAC Section 845.670 (e)(3))

2.3.1 Degree of Difficulty Associated with Constructing the Remedy (IAC Section 845.670(e)(3)(A))

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, construction difficulties regarding source control would be the same for both corrective action alternatives. Difficulties associated with implementing CIP using a consolidate-and-cap approach were evaluated in the CAA (Gradient, 2022a). The expected degree of difficulty associated with residual plume management for each of the corrective action alternatives is summarized below.

- Residual plume management under the Source Control-GWP alternative would rely on physical and geochemical attenuation processes and therefore would not pose any significant construction challenges. This alternative would only require the construction and use of monitoring wells. Therefore, there would be minimal difficulty in constructing the Source Control-GWP remedy.
- Residual plume management under the Source Control-GWE would involve the construction of an extraction trench, settling pond and conveyance system to extract and treat contaminated groundwater and rely on physical and geochemical attenuation processes to address downgradient groundwater quality impacts. The shallow groundwater trench required by this alternative is commonly constructed at similar depths and can be performed using specialized and conventional construction equipment. Additional pre-design investigation activities would be required to confirm existing hydrogeologic conditions of the proposed trench locations. Therefore, while some

construction is necessary, the degree of difficulty is expected to be low (Appendix B; Ramboll, 2025a). Groundwater monitoring would be conducted using a groundwater monitoring network designed in accordance with IAC Section 845.680(c).

2.3.2 Expected Operational Reliability of the Remedy (IAC Section 845.670(e)(3)(B))

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, the operational reliability of the remedy would be the same for both corrective action alternatives. The reliability associated with implementing CIP using a consolidate-and-cap approach was evaluated in the CAA (Gradient, 2022a). Both corrective action alternatives would likely be highly reliable with respect to operational controls associated with residual plume management; specific details for each corrective action alternative are discussed below.

- Residual plume management under the Source Control-GWP alternative would have high operational reliability because it would rely on natural processes and active monitoring, rather than the installation, operation, and maintenance of engineered systems or structures (other than monitoring wells). Under the Source Control-GWP alternative, engineering failure would not occur and no O&M activities would be required to ensure the success of the alternative.
- Residual plume management under the Source Control-GWE alternative would also have high operational reliability because it is an established technology as long as the extraction trench system is constructed in accordance with the design and specifications. In addition, the remedy operates as a mechanical system and would require routine and non-routine maintenance of the GWE system to ensure reliable operation.

2.3.3 Need to Coordinate with and Obtain Necessary Approvals and Permits from Other Agencies (IAC Section 845.670(e)(3)(C))

Both corrective action alternatives would require regulatory approvals. Specific permits and approvals associated with source control (*i.e.*, CIP using a consolidation-and-cap-approach) are the same for both corrective action alternatives and are discussed in the CAA (Gradient, 2022a). The specific approvals and permits associated with residual plume management for both corrective action alternatives are discussed below.

- The Source Control-GWP alternative would not need additional permits from other agencies, other than the permits issued by IEPA for source control (*i.e.*, Closure Plan and Construction Permit Application) and approval of the eventual Corrective Action Plan.
- The Source Control-GWE alternative would require approvals and permits and Site-specific NPDES permits. Groundwater extracted from the GWE trenches would require a modified NPDES permit. The NPDES permit would likely require renewals depending on the timeline of corrective action implementation. In addition, permits from the IEPA for construction of stormwater controls and BMPs, placement of excavated spoils beneath the AP final cover system *via* an amendment to the AP Closure Plan and Construction Permit Application, and operating permit would be required. These permits and plans typically take 18-24 months to obtain, although some may already be obtained during the AP final closure (Appendix B; Ramboll, 2025a).

2.3.4 Availability of Necessary Equipment and Specialists (IAC Sections 845.670(e)(3)(D) and 845.660(c)(1), "Ease of Implementation")

Source control (*i.e.*, CIP using a consolidate-and-cap approach) would be implemented for both potential corrective action alternatives. Thus, equipment and specialist needs would be the same for both corrective action alternatives. An assessment of necessary equipment and specialists associated with implementing CIP using a consolidate-and-cap approach was evaluated in the CAA (see the CAA; Gradient, 2022a) associated with source control activities. Specialized equipment and personnel are essential for field data collection and groundwater sampling for residual plume management under both potential corrective action alternatives. Additionally, the assessment of groundwater concentrations for Site constituents would necessitate laboratory equipment and specialists for both alternatives. The availability of equipment and specialists associated with residual plume management for each corrective action alternative is summarized below.

- Residual plume management under the Source Control-GWP alternative would require groundwater professionals, such as geologists, hydrogeologists, statisticians (*i.e.*, statistical analysis), and geochemists to evaluate all monitoring data, ensuring that physical and geochemical processes function as anticipated for this alternative. The equipment and specialists needed for Site groundwater monitoring and analysis are currently engaged in these tasks as part of the routine groundwater monitoring program outlined in accordance with IAC Section 845.220(c)(4).
- Residual plume management under the Source Control-GWE alternative would require specialists to manage the GWE system throughout its operational period.
  - Construction of the groundwater extraction system (*i.e.*, the trenches and settling pond) on the Site would require a specialized contractor. The contractor would most likely need specialized and often custom-built equipment including one-pass construction equipment. The availability of contractors with such equipment may be limited. Specialists including design engineers, construction managers and contractor staff experienced in trench construction and similar geologic environments would be required as well. In addition, specialists and equipment may have backlogs from similar specialty ground improvement projects in the area.
  - This alternative would necessitate the use of equipment and the expertise of specialists for tasks such as field data collection, groundwater sampling, analysis, and periodic corrective action groundwater monitoring and reporting. Similar to those in the GWP alternative, these activities are already being conducted as part of routine groundwater monitoring in accordance with IAC Section 845.220(c)(4).

2.3.5 Available Capacity and Location of Needed Treatment, Storage, and Disposal Services/Comply with Standards for Management of Wastes as Specified in Section 845.680(d) (IAC Section 845.670(e)(3)(E)/IAC Section 845.670(d)(5))

The available capacity and location of needed treatment, storage, and disposal services associated with residual plume management under each corrective action alternative is summarized below. All the practices employed in both alternatives would comply with standards for the management of wastes as specified in IAC Section 845.670(e)(3)(E) and IAC Section 845.680(d)(5).

- Residual plume management for the Source Control-GWP remedy would not require any treatment, storage, or disposal services, because GWP is not anticipated to produce a substantial amount of waste or wastewater, aside from minor purge water volumes generated during routine groundwater sampling activities for residual plume management. This could be managed by a standard waste management contractor.

- Residual plume management for the Source Control-GWE alternative would require the construction of the extraction trench system and a new settling pond on-Site:
  - The construction of the extraction trenches would generate spoils, and the waste materials would be used as subgrade fill beneath the AP final cover system during the closure construction. Finishing the extraction trench construction at the same time as the AP closure would provide sufficient on-site capacity for the disposal of generated spoils.
  - The extraction trench system would send extracted groundwater to an on-site settling pond, which collects solids removed during groundwater recovery *via* the pneumatic extraction pumps and transfer piping. The settling pond would need to be sited, designed, constructed and maintained properly. The siting of the settling pond would need to consider limiting impacts to existing site infrastructure, nearby solar redevelopment, wetlands, and floodplains.
  - Discharge from the settling pond would be conveyed to a NPDES permitted outfall. Renewal of the NPDES permits may be necessary to continue operations, depending on the timeline of the corrective action implementation in relation to the source control completion.

2.4 The Degree to Which Community Concerns Are Addressed by the Remedy (IAC Section 845.670(e)(4))

Several nonprofit groups raised concerns regarding the potential impacts of the AP on groundwater and surface water quality including Earthjustice, the Prairie Rivers Network, and the Sierra Club (Earthjustice *et al*., 2018; Lydersen, 2017). The combination of source control (*i.e*., CIP using a consolidate-and-cap approach) and residual plume management would cause groundwater concentrations to decline over time under all of the corrective action alternatives, as demonstrated by the groundwater modeling (Ramboll, 2025b), thus addressing community concerns.

A public meeting was held on February 27, 2025, pursuant to requirements under IAC Section 845.660 (d). Questions raised by attendees were addressed at the meeting; a written summary of all questions and responses was prepared.

2.5 Remove From the Environment as Much of the Contaminated Material that Was Released from the CCR Surface Impoundment as Is Feasible, Taking into Account Factors such as Avoiding Inappropriate Disturbance of Sensitive Ecosystems (IAC Section 845.670(d)(4))

There have been no known releases of CCR at the AP. Both potential corrective action alternatives include source control (*i.e*., CIP using a consolidation-and-cap approach). The source control would include the consolidation of CCR in the AP into the southern portion of the impoundment and the installation of a low-permeability final cover system designed to limit the infiltration of precipitation into the impounded CCR. Groundwater modeling performed in support of the CAA (Gradient, 2022a) concluded that source control alone would result in a 99.98% reduction in mass flux from the AP into the underlying groundwater (Ramboll, 2022). Therefore, source control prevents further releases into the environment. Moreover, residual plume management under each corrective action alternative, discussed below, will further result in the improvement of downgradient groundwater quality.

- Residual plume management under the Source Control-GWP alternative would address impacted groundwater by relying on natural physical and geochemical attenuation processes to reduce the concentrations of CCR constituents in groundwater. Site-specific evaluation demonstrated conditions are favorable for the attenuation of inorganic contaminants *via* adsorption. Dissolution and remobilization of contaminants in groundwater is unlikely as "groundwater quality returns to background conditions" (Appendix E; Life Cycle Geo, LLC, 2025). In situations in which observed groundwater concentrations deviate significantly from modeled conditions, alternative methods or techniques to achieve the GWPSs would be evaluated under the adaptive site management plan, and if viable, incorporated as per IAC Section 845.680(b). No sensitive ecosystems would be disturbed because no construction activities would be expected under the Source Control-GWP alternative.
- Residual plume management under the Source Control-GWE alternative would utilize an engineered system to actively remove mass from the environment. Groundwater quality would also be improved as a result of physical and geochemical attenuation processes. Dissolution and remobilization of contaminants in groundwater is unlikely as "groundwater quality returns to background conditions" (Appendix E; Life Cycle Geo, LLC, 2025). The construction activities would likely result in some negative impacts to the ecosystem, including disturbance of habitat near the construction areas by causing alarm and escape behavior in nearby wildlife (*e.g.*, due to noise disturbances). Short-term impacts could also occur to sensitive aquatic and wetland species in Sangchris Lake and other wetlands and surface water near the AP (see Section 1.1.3) due to sediment runoff during construction located near the AP.

2.6 Summary

This CAAA evaluates both corrective action alternatives identified as potentially viable in the CMA with regard to each of the factors specified in IAC Section 845.670(d) and 845.670(e) (IEPA, 2021a). Based on this evaluation, the most appropriate corrective action for this Site is Source Control-GWP. While the time to achieve GWPS as predicted by groundwater modeling is similar under both alternatives (17 years under Source Control-GWP *vs.* 16 years under Source Control-GWE after completion of source control), the expected impacts on workers, nearby communities, and the environment under the Source Control-GWP alternative are lower than the Source Control-GWE alternative. Thus, Source Control-GWP is the most appropriate corrective action alternative for the AP.

References

AECOM. 2016a. "Letter Report to Kincaid Generation, L.L.C. re: History of Construction, USEPA Final CCR Rule, 40 CFR 257.73(c), Kincaid Power Station, Newton, Illinois." 28p., October.

AECOM. 2016b. "CCR Certification Report: Structural Stability Assessment, Safety Factor Assessment, and Hydrologic and Hydraulic Analyses for Kincaid Ash Pond at Kincaid Power Station." Report to Kincaid Generation, LLC (Kincaid, IL). 1139p., October.

Burns & McDonnell Engineering Company, Inc. 2022. "CCR Surface Impoundment Final Closure Plan, Kincaid Power Plant Ash Pond (IEPA ID W0218140002-01), Kincaid, Illinois (Final Draft)." Report to Kincaid Generation, LLC (Kincaid, IL). 338p., May 13.

Burns & McDonnell. 2021. "Initial Operating Permit, Kincaid Power Plant Ash Pond." Report to Kincaid Generation, LLC (Kincaid, IL). Submitted to Illinois Environmental Protection Agency (IEPA). October 25.

Earthjustice; Prairie Rivers Network; Environmental Integrity Project (EIP); Sierra Club. 2018. "Cap and Run: Toxic Coal Ash Left Behind by Big Polluters Threatens Illinois Water." 45p.

Geosyntec Consultants. 2021. "2021 USEPA CCR Rule Periodic Certification Report (§257.73(a)(2)-(3), (c), (d1), (e) and §257.82), Ash Pond, Kincaid Power Plant. Kincaid, Illinois." Report to Kincaid Generation, LLC (Kincaid, IL). 75p., October 11.

Gradient. 2022a. "Closure Alternatives Analysis for the Ash Pond at the Kincaid Power Plant Kincaid, Illinois." 93p., July 28.

Gradient. 2022b. "Human Health and Ecological Risk Assessment, Ash Pond, Kincaid Power Plant, Kincaid, Illinois." 55p., July 28.

Gradient. 2024. "Expert Report of Andrew Bittner, P.E.: Closure Alternatives Analysis Groundwater Modeling Review at the Coffeen Power Plant, Edwards Power Plant, Newton Power Plant, and Hennepin Power Plant." Report to ArentFox Schiff LLP (Chicago, IL). 38p., January 24.

Hesterberg, TW; Valberg, PA; Long, CM; Bunn, WB III; Lapin, C. 2009. "Laboratory studies of diesel exhaust health effects: Implications for near-roadway exposures." EM Mag.(August):12-16Accessed on March 05, 2014 at http://pubs.awma.org/gsearch/em/2009/8/hesterberg.pdf.

Illinois Dept. of Natural Resources (IDNR). 2022. "Sangchris Lake State Park" Accessed on March 21, 2022 at https://www2.illinois.gov/dnr/Parks/Pages/SangchrisLake.aspx.

Illinois Environmental Protection Agency (IEPA). 2016. "Appendix A-5. 303(d) Listed Waters Maps." In Illinois Integrated Water Quality Report and Section 303(d) List - Volume I: Surface Water - 2016 (Final as submitted to US EPA Region V on July 11, 2016). 34p. Accessed on October 21, 2021 at https://www2.illinois.gov/epa/Documents/iepa/water-quality/watershed-management/tmdls/2016/303-d-list/appendix-a5.pdf.

Illinois Environmental Protection Agency (IEPA). 2019. "Appendix A-1. Illinois' 2018 303(d) List and Prioritization." In Illinois Integrated Water Quality Report and Section 303(d) List, 2018 (Final as submitted to US EPA Region V on February 22, 2021). 40p., May 20. Accessed on October 21, 2021 at https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Documents/Appendix%20A-1_303d_by_priority_FINAL_5-20-19.pdf.

Illinois Environmental Protection Agency (IEPA). 2021a. "Standards for the disposal of coal combustion residuals in surface impoundments." Accessed on October 4, 2021 at https://www.ilga.gov/commission/jcar/admincode/035/03500845sections.html.

Illinois Environmental Protection Agency (IEPA). 2021b. "Draft Reissued NPDES Permit to Discharge into Waters of the State, Kincaid Generation Station. Kincaid, IL." Submitted to Kincaid Generation LLC (Kincaid, IL). NPDES Permit No. IL0002241. 33p., July 12.

Life Cycle Geo, LLC. 2025. "Groundwater Polishing Evaluation Report, Kincaid Ash Pond (Final)." Report to Ramboll (Milwaukee, WI). 349p..

Looking for Lincoln Heritage Coalition. 2022. "Looking for Lincoln: Abraham Lincoln National Heritage Area." Accessed on March 17, 2022 at https://www.lookingforlincoln.org/.

Lydersen, K. 2017. "Citizens fill void in oversight of potentially hazardous Illinois coal ash impoundments." *Energy News Network.* January 20. Accessed on March 9, 2022 at https://energynews.us/2017/01/20/citizens-fill-void-in-oversight-of-potentially-hazardous-illinois-coal-ash-impoundments/.

Mauderly, JL; Garshick, E. 2009. "Diesel exhaust." In *Environmental Toxicants: Human Exposures and Their Health Effects (Third Edition)*. Ed.: Lippmann, M, John Wiley & Sons, Inc., Hoboken, NJ. p551-631.

Moore, B. 2020. "Kincaid power plant to close." *State J. Reg.* September 29. Accessed on March 16, 2022 at https://www.sj-r.com/story/business/economy/2020/09/30/kincaid-power-plant-to-close/114399488/.

National Research Council (NRC). 2013. "Alternatives for Managing the Nation's Complex Contaminated Groundwater Sites." Division of Earth and Life Sciences, Water Science and Technology Board, Committee on Future Options for Management in the Nation's Subsurface Remediation Effort. National Academies Press, Washington, DC. 422p. Accessed on April 17, 2014 at http://www.nap.edu/catalog.php?record_id=14668.

Power-technology.com. 2021. "Kincaid Power Station, US [Market data]." December 8.Accessed on April 18, 2022 at https://www.power-technology.com/marketdata/kincaid-power-station-us/.

Ramboll. 2021. "Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois." Report to Kincaid Generation, LLC. 422p., October 25.

Ramboll. 2022. "Groundwater Modeling Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois (Final)." Report to Kincaid Generation, LLC. 131p., July 28.

Ramboll. 2024a. "35 I.A.C. § 845 Corrective Measures Assessment, Kindcaid Power Plant, Ash Pond, IEPA ID: W0218140002-01." Report to Illinois Power Generating Co. 41p., May 12.

Ramboll. 2024b. "Nature and Extent Report, Kincaid Power Plant, Ash Pond, IEPA ID No. W0218140002-01 (Final)." Report to Kincaid Generation, LLC (Kincaid, IL). 621p., May 12.

Ramboll. 2025a. "Corrective Action Alternatives Analysis Supporting Information Report: Ash Pond, Kincaid Power Plant, IEPA ID NO. W0218140002-01 (Final)." Report to Kincaid Generation, LLC, Collinsville, IL.

Ramboll. 2025b. "Groundwater Modeling Technical Memorandum re: Ash Pond, Kincaid Power Plant."

US Dept. of Labor (US DOL). 2020a. "Fatal occupational injuries, total hours worked, and rates of fatal occupational injuries by selected worker characteristics, occupations, and industries, civilian workers, 2019." Bureau of Labor Statistics. December. Accessed on October 5, 2021 at https://www.bls.gov/iif/oshwc/cfoi/cfoi_rates_2019hb.xlsx.

US Dept. of Labor (US DOL). 2020b. "Table R100. Incidence rates for nonfatal occupational injuries and illnesses involving days away from work per 10,000 full-time workers by occupation and selected events or exposures leading to injury or illness, private industry, 2019." Bureau of Labor Statistics. October. Accessed on October 5, 2021 at https://www.bls.gov/iif/oshwc/osh/case/cd_r100_2019.xlsx.

US Dept. of Transportation (US DOT). 2023a. "Traffic Safety Facts 2021: A Compilation of Motor Vehicle Crash Data." National Highway Traffic Safety Administration (NHTSA), National Center for Statistics and Analysis (NCSA). DOT HS 813 527. 225p., December. Accessed on March 20, 2024 at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813527.

US Dept. of Transportation (US DOT). 2023b. "Large Truck and Bus Crash Facts 2021." Federal Motor Carrier Safety Administration, Analysis Division. FMCSA-RRA-23-002. 118p., November.

US EPA. 2014. "Human and Ecological Risk Assessment of Coal Combustion Residuals (Final)." Office of Solid Waste and Emergency Response (OSWER), Office of Resource Conservation and Recovery. Submitted to US EPA Docket. EPA-HQ-OLEM-2020-0107-0885. 1237p., December. Accessed on October 16, 2015 at http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-11993.

US EPA. 2015a. "Hazardous and solid waste management system; Disposal of coal combustion residuals from electric utilities (Final rule)." *Fed. Reg.* 80(74):21302-21501. 40 CFR 257, 40 CFR 261. April 17.

US EPA. 2015b. "Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites." Office of Solid Waste and Emergency Response (OSWER). OSWER Directive 9283.1-36. 83p., August.

US Fish & Wildlife Service (US FWS). 2021. "Wetlands Mapper." National Wetlands Inventory. November 30. Accessed on January 31, 2022 at https://www.fws.gov/wetlands/data/mapper.html.

Appendix A

Human Health and Ecological Risk Assessment

Human Health and Ecological Risk Assessment
Ash Pond
Kincaid Power Plant
Kincaid, Illinois

July 28, 2022

GRADIENT

www.gradientcorp.com
One Beacon Street, 17th Floor
Boston, MA 02108
617-395-5000

Table of Contents

Page

\\camfs\G_Drive\Projects\221118_Vistra-Kincaid\TextProc\a071122m.docx

List of Tables

List of Figures

Abbreviations

ADI	Acceptable Daily Intake
AP	Ash Pond
BCF	Bioconcentration Factor
BCG	Biota Concentration Guide
BCU	Bedrock Confining Unit
CCR	Coal Combustion Residuals
CEM	Conceptual Exposure Model
COI	Constituent of Interest
COPC	Constituent of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
ESV	Ecological Screening Value
GWPS	Groundwater Protection Standard
GWQS	Groundwater Quality Standards
HTC	Human Threshold Criteria
IEPA	Illinois Environmental Protection Agency
ILWATER	Illinois Water and Related Wells
ISGS	Illinois State Geological Survey
K_d	Equilibrium Partitioning Coefficient
KPP	Kincaid Power Plant
LCU	Lower Confining Unit
MCL	Maximum Contaminant Level
NID	National Inventory of Dams
NRWQC	National Recommended Water Quality Criteria
ORNL RAIS	Oak Ridge National Laboratory Risk Assessment Information System
pCi	PicoCuries
PMP	Potential Migration Pathway
PRG	Preliminary Remediation Goal
RfD	Reference Dose
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SI	Surface Impoundment
SWQC	Surface Water Quality Criteria
UA	Uppermost Aquifer
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
USCU	Upper Semi-confining Unit
USGS	United States Geological Survey

1 Introduction

The Kincaid Power Plant (KPP, or "the Site") is an electric power generating facility with coal-fired units located approximately four miles west of the Village of Kincaid in Christian County, Illinois. The KPP is owned and operated by Kincaid Generation LLC. The KPP operates as a coal-fired power plant and has a single coal combustion residuals (CCR) management unit, the Ash Pond (AP) (Vistra Identification [ID] Number [No.] 141, Illinois Environmental Protection Agency [IEPA] ID No. W0218140002-01, and National Inventory of Dams [NID] No. IL50706 (Ramboll, 2021). The Kincaid AP, the subject of this report, is a 172-acre, unlined surface impoundment (SI) used to manage CCR and non-CCR waste streams at the KPP (Ramboll, 2021).

This report presents the results of an evaluation that characterizes potential risk to human and ecological receptors that may be exposed to CCR constituents in environmental media originating from the AP. This risk evaluation was performed to support the Closure Alternatives Assessment for the AP in accordance with requirements in Title 35 Part 845 of the Illinois Administrative Code (IEPA, 2021). Human and ecological risks were evaluated for Site-specific constituents of interest (COIs). The conceptual site model (CSM) assumed that Site-related COIs in groundwater may migrate to the adjacent Sangchris Lake and affect surface water and sediment in the vicinity of the Site.

Consistent with United States Environmental Protection Agency (US EPA) guidance (US EPA, 1989), this report used a tiered approach to evaluate potential risks, which included the following steps:

1. Identify complete exposure pathways and develop a conceptual exposure model (CEM).
2. Identify Site-related COIs: Constituents detected in groundwater were considered COIs if their maximum detected concentration over the period from 2015 to 2021 exceeded a groundwater protection standard (GWPS) identified in Part 845.600 (IEPA, 2021), or a relevant surface water quality standard (IEPA, 2019; US EPA Region IV, 2018).
3. Perform screening-level risk analysis: Compare maximum measured or modeled COI concentrations in surface water and sediment to conservative, health-protective benchmarks to determine constituents of potential concern (COPCs).
4. Perform refined risk analysis: If COPCs are identified, perform a refined analysis to evaluate potential risks associated with the COPCs.
5. Formulate risk conclusions and discuss any associated uncertainties.

This assessment relies on a conservative (*i.e.*, health-protective) approach and is consistent with the risk approaches outlined in US EPA guidance. Specifically, we considered evaluation criteria detailed in IEPA guidance documents (*e.g.*, IEPA, 2013, 2019), incorporating principles and assumptions consistent with the Federal CCR Rule (US EPA, 2015a) and US EPA's "Human and Ecological Risk Assessment of Coal Combustion Residuals" (US EPA, 2014a).

US EPA has established acceptable risk metrics. Risks above these US EPA-defined metrics are termed potentially "unacceptable risks." Based on the evaluation presented in this report, no unacceptable risks to human or ecological receptors resulting from CCR exposures associated with the AP were identified. This means that the risks from the Site are likely indistinguishable from normal background risks. Specific risk assessment results include the following:

- No completed exposure pathways were identified for any groundwater receptors; consequently, no risks were identified relating to the use of groundwater.
- No unacceptable risks were identified for recreators boating in Sangchris Lake adjacent to the Site.
- No unacceptable risks were identified for recreators exposed to sediment in Sangchris Lake adjacent to the Site.
- No unacceptable risks were identified for anglers consuming locally caught fish.
- No unacceptable risks were identified for ecological receptors exposed to surface water or sediment.
- No bioaccumulative ecological risks were identified.

It should be noted that this evaluation incorporates a number of conservative assumptions that tend to overestimate exposure and risk. Moreover, it should be noted that because current conditions do not present a risk to human health or the environment, there will also be no unacceptable risk to human health or the environment for future conditions when the AP is closed. For all future closure scenarios, potential releases of CCR-related constituents will decline over time and, consequently, potential exposures to CCR-related constituents in the environment will also decline.

2 Site Overview

2.1 Site Description

The KPP is located approximately four miles west of the Village of Kincaid in Christian County, Illinois. The KPP operates as a coal-fired power plant and has a single CCR management unit, the AP (Vistra ID No. 141, IEPA ID No. W0218140002-01, and NID No. IL50706). The Kincaid AP, the subject of this report, is a 172-acre, unlined SI used to manage CCR and non-CCR waste streams at the KPP (Ramboll, 2021).

The AP is located between two lobes of Sangchris Lake (Figure 2.1), which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River. Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and the northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of AP and is connected to the eastern lobe of Sangchris Lake. The KPP property is surrounded by the lobes of Sangchris Lake and Sangchris Lake State Park to the north and east, and a combination of undeveloped land and surface support facilities associated with the former Peabody Coal Company #10 mine to the south and west (Ramboll, 2021).

Figure 2.1 Site Location Map. Source: Ramboll (2021).

2.2 Geology/Hydrogeology

The geology underlying the Site in the vicinity of the KPP consists of unlithified deposits overlying a bedrock confining unit (BCU). The unlithified materials consist of three major hydrostratigraphic units: the upper semi-confining unit (USCU), the uppermost aquifer (UA), and the lower confining unit (LCU) (Ramboll, 2021). The USCU is primarily composed of low permeability clay and silt with some clayey sand and sandy clay intervals and high permeability sand lenses of the Cahokia Formation (Ramboll, 2021). The UA is composed of low permeability clays and silts of the Upper Cahokia Formation and the underlying moderate permeability sand and gravel layers of the Lower Cahokia Formation (Ramboll, 2021). At some locations, the UA also includes the interface with the underlying Vandalia Till (Ramboll, 2021). The LCU is composed of low permeability silt and clay with minor sand layers of the Vandalia Till (Ramboll, 2021). The BCU is composed of interbedded shale and limestone and underlies the entire footprint of the AP (Ramboll, 2021).

The discontinuous sand lenses within the USCU were designated as potential migration pathways (PMPs) because there is a high probability of contaminant transport through the high permeability sandy intervals (Ramboll, 2021). The USCU/PMP has a geometric mean horizontal hydraulic conductivity of 5.4×10^{-5} cm/s (Ramboll, 2021). The UA is generally less than 4 feet (ft) thick and has a geometric mean horizontal hydraulic conductivity of 4.14×10^{-5} cm/s (Ramboll, 2021). The UA is underlain by the confining units LCU and BCU.

Groundwater elevations within the AP are higher than the surface water elevations in Sangchris Lake (Ramboll, 2021). This groundwater mound (*i.e.*, piezometric maximum) due to the hydraulic influence of the AP facilitates a radial groundwater flow pattern from the AP towards two lobes of Sangchris Lake: a predominant groundwater flow in the north/northwest direction towards the western lobe of Sangchris Lake and a flow component in the south and southeast direction towards the eastern lobe of Sangchris Lake (Figure 2.2). The horizontal hydraulic gradient for the USCU/PMP averaged 0.010 ft/ft, which corresponds to an average groundwater flow velocity of 0.010 ft/day (Ramboll, 2021). The horizontal hydraulic gradient for the UA averaged 0.013 ft/ft, which corresponds to an average groundwater flow velocity of 0.0023 ft/day (Ramboll, 2021).

2.3 Conceptual Site Model

A CSM describes sources of contamination, the hydrogeological units, and the physical processes that control the transport of water and solutes. In this case, the CSM describes how groundwater underlying the KPP migrates and interacts with surface water and sediment in the adjacent Sangchris Lake. The CSM was developed using available hydrogeologic data specific to the KPP (Ramboll, 2021), including information on groundwater flow and surface water characteristics.

CCR-related constituents may migrate vertically downward beneath the KPP and into groundwater; these constituents may subsequently migrate with groundwater in the USCU/PMP and the UA and eventually flow into Sangchris Lake (Ramboll, 2021). Groundwater flow within the UA and the USCU/PMP is mostly in the horizontal direction because these units are underlain by confining layers (*i.e.*, LCU and BCU) that may inhibit vertical flow. After groundwater flows into the lake, dissolved constituents in groundwater may partition between sediments and surface water.

2.4 Groundwater Monitoring

A total of 32 wells have been used to monitor the groundwater quality near and downgradient of the AP. Of these, 23 wells are screened in the UA, 1 well is screened in the BCU, and 8 wells are screened in the USCU (Table 2.1).

The analyses presented in this report relied on all available data from the 32 wells collected between 2015 and 2021, which is the period subsequent to the promulgation of the Federal CCR Rule. Groundwater samples were analyzed for a suite of total metals, specified in Illinois CCR Rule Part 845.600 (IEPA, 2021).[1] A summary of the groundwater data used in this risk evaluation is presented in Table 2.2. The AP-related well locations used in this risk evaluation are shown in Figure 2.2. The use of groundwater data in this risk evaluation does not imply that detected constituents are associated with the AP or that they have been identified as potential groundwater exceedances.

Figure 2.2 Monitoring Well Locations. Source: Ramboll (2021, Figure 3-1).

[1] Samples were analyzed for a longer list of inorganic constituents, but these constituents were not evaluated in the risk evaluation.

Table 2.1 Groundwater Monitoring Wells Related to Kincaid Ash Pond

Well	Hydrogeologic Unit	Date Constructed	Screen Top Depth (ft bgs)	Screen Bottom Depth (ft bgs)	Well Depth (ft bgs)
MW-1	UA	04/20/2010	15	25	25
MW-2	UA	04/21/2010	10	20	20
MW-3	UA	04/15/2010	14	24	24
MW-4	UA	04/14/2010	12	22	22
MW-5	UA	04/22/2010	30	40	40
MW-6	UA	04/16/2010	10	20	20
MW-7	UA	04/16/2010	10	20	20
MW-7S	USCU	02/02/2021	6	11	11
MW-8	UA	04/13/2010	12	22	22
MW-8S	USCU	02/02/2021	4	7	7
MW-9	UA	04/19/2010	10	20	20
MW-10	UA	04/19/2010	10	20	20
MW-11	UA	06/17/2015	11	21	21
MW-11S	USCU	01/26/2021	4	8	8
MW-12	UA	07/23/2015	15	25	25
MW-12S	USCU	01/27/2021	5	9	9
MW-12D	BCU	01/26/2021	50	55	55
MW-20	UA	01/26/2021	14	24	24
MW-20S	USCU	01/26/2021	4	10	10
MW-22	UA	02/03/2021	15	19	19
MW-23	UA	02/02/2021	23	28	28
MW-24	UA	02/02/2021	27	32	32
MW-25	USCU	02/02/2021	9	14	14
MW-26	UA	02/02/2021	7	12	12
MW-27	USCU	02/02/2021	10	15	15
MW-28	UA	02/02/2021	12	22	22
MW-29	UA	02/01/2021	14	19	19
MW-30	UA	02/03/2021	35	40	40
MW-31	UA	02/03/2021	35	40	40
MW-31S	USCU	02/03/2021	25	30	30
MW-32	UA	02/03/2021	32	37	37
PZ-4C	UA	03/30/2016	15.5	20.5	20.5

Notes:
Source: Ramboll (2021).
BCU = Bedrock Confining Unit; bgs = Below Ground Surface; UA = Uppermost Aquifer; USCU = Upper Semi-confining Unit.
(a) No groundwater data were available for MW-11S. With the exception of the May 2021 sampling event, this monitoring well was dry during all sampling events (Ramboll, 2021).

Table 2.2 Groundwater Data Summary

Constituent	Samples with Constituent Detected	Samples Analyzed	Minimum Detected Value	Maximum Detected Value	Maximum Laboratory Detection Limit
Total Metals (mg/L)					
Antimony	5	396	0.0010	0.0016	0.0050
Arsenic	133	412	0.0010	0.18	0.025
Barium	411	412	0.020	2.7	0.0050
Beryllium	4	396	0.0012	0.010	0.0050
Boron	412	412	0.044	11	0.13
Cadmium	1	388	0.0017	0.0017	0.0050
Chromium	56	412	0.0015	0.35	0.0075
Cobalt	103	412	0.0010	0.14	0.0050
Lead	38	412	0.0010	0.25	0.0075
Lithium	175	289	0.0012	0.18	0.015
Mercury	2	398	0.00023	0.00048	0.00020
Molybdenum	121	289	0.0011	0.028	0.0075
Selenium	41	412	0.0010	0.021	0.040
Thallium	4	388	0.0021	0.0025	0.010
Radionuclides (pCi/L)					
Radium-226 + 228	386	386	0	9.3	2.0
Other (mg/L, unless otherwise noted)					
Chloride	368	412	1.0	245	50
Fluoride	421	422	0.11	0.78	0.20
Sulfate	385	412	10	929	500
Total Dissolved Solids	398	398	244	1,830	50

Notes:
Source: Ramboll (2021).
pCi/L = PicoCuries Per Liter.

2.5 Surface Water Monitoring

Golder collected a total of 33 surface water samples from Sangchris Lake in the vicinity of AP in October 2021 (Golder Associates Inc., 2021). The sample locations are shown in Figure 2.3, and the sampling results are summarized in Table 2.3.

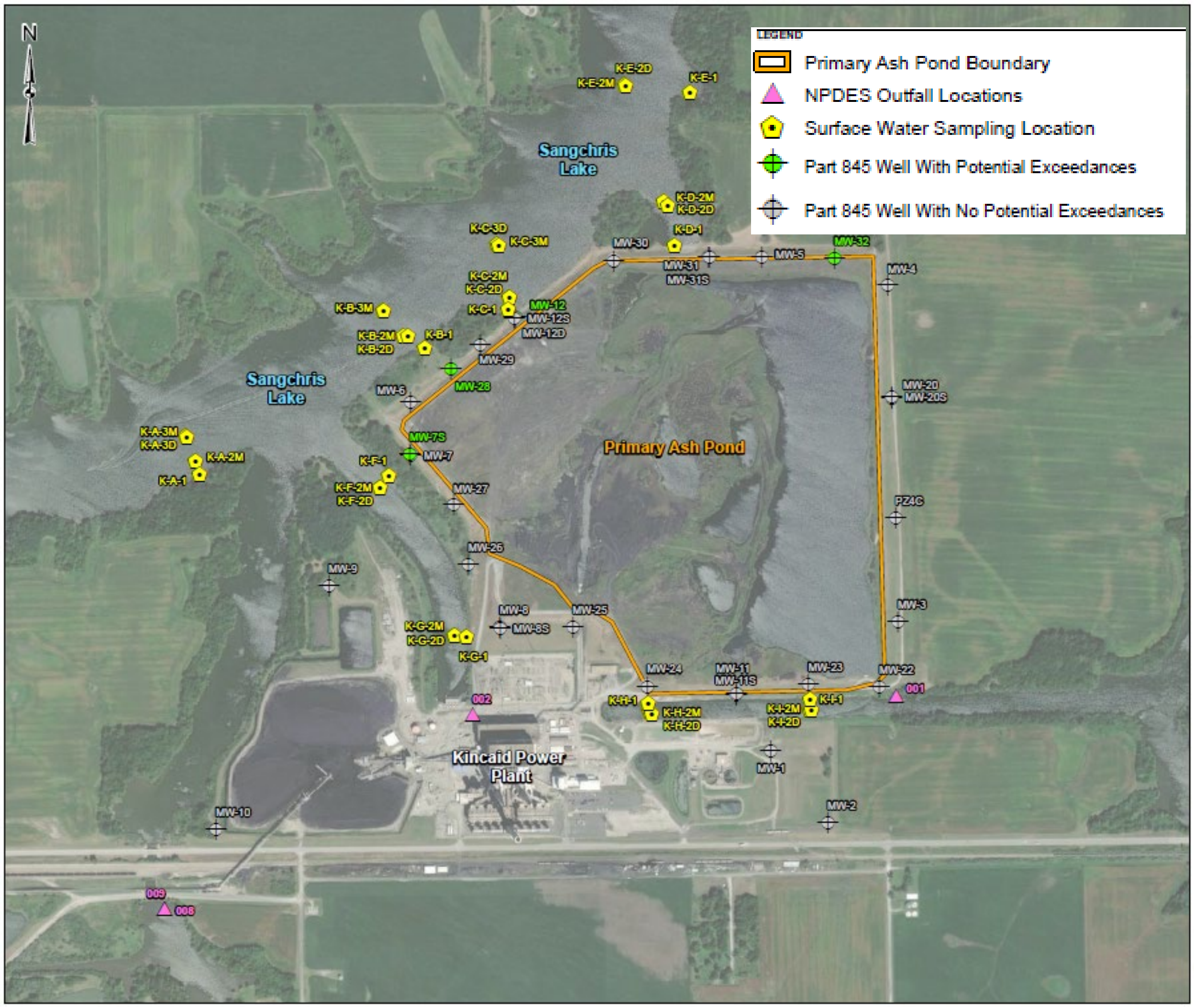


Figure 2.3 Surface Water Sampling Locations. Source: Golder Associates Inc. (2021).

Table 2.3 Surface Water Data Summary

Constituent	Samples with Constituent Detected	Samples Analyzed	Minimum Detected Value	Maximum Detected Value	Maximum Laboratory Detection Limit
Dissolved Metals (mg/L)					
Antimony	9	33	0.0012	0.0045	0.0010
Chromium	1	33	0.0024	0.0024	0.0015
Total Metals (mg/L)					
Arsenic	33	33	0.0023	0.0034	0.0010
Barium	33	33	0.063	0.084	0.0010
Beryllium	0	33	ND	ND	0.0010
Boron	33	33	0.035	0.065	0.025
Cadmium	0	33	ND	ND	0.0010
Calcium	33	33	29	34	0.10
Cobalt	0	33	ND	ND	0.0010
Iron	33	33	0.17	1.6	0.025
Lead	1	33	0.0011	0.0011	0.0010
Lithium	0	33	ND	ND	0.0030
Magnesium	33	33	18	20	0.050
Manganese	33	33	0.074	0.23	0.0020
Mercury	0	33	ND	ND	0.00020
Molybdenum	0	33	ND	ND	0.0015
Potassium	33	33	2.8	3.2	0.10
Selenium	0	33	ND	ND	0.0010
Sodium	33	33	12	13	0.050
Radionuclides (pCi/L)					
Radium-226 + 228	32	33	0.024	1.3	NA
Other (mg/L, unless otherwise noted)					
Chloride	33	33	20	21	1.0
Fluoride	33	33	0.35	0.36	0.10
Phosphorus	1	33	0.15	0.15	0.10
Sulfate	33	33	30	32	10
Total Dissolved Solids	33	33	162	218	20

Notes:

Source: Golder Associates Inc. (2021).

NA = Not Applicable; ND = Not Detected; pCi/L = PicoCuries Per Liter.

Surface water was analyzed for both total and dissolved metals. Only the total metals are reported here, because they are generally higher concentrations than dissolved metals. However, since antimony and chromium were not detected in the analysis for total metals, the results of the dissolved metals are reported for these two constituents only.

3 Risk Evaluation

3.1 Risk Evaluation Process

A risk evaluation was conducted to determine whether constituents present in groundwater underlying and downgradient of the AP have the potential to pose adverse health effects to human and ecological receptors. The risk evaluation is consistent with the principles of risk assessment established by US EPA and has considered evaluation criteria detailed in Illinois guidance documents (*e.g.*, IEPA [2013, 2019]).

The general risk evaluation approach is summarized in Figure 3.1 and discussed below.

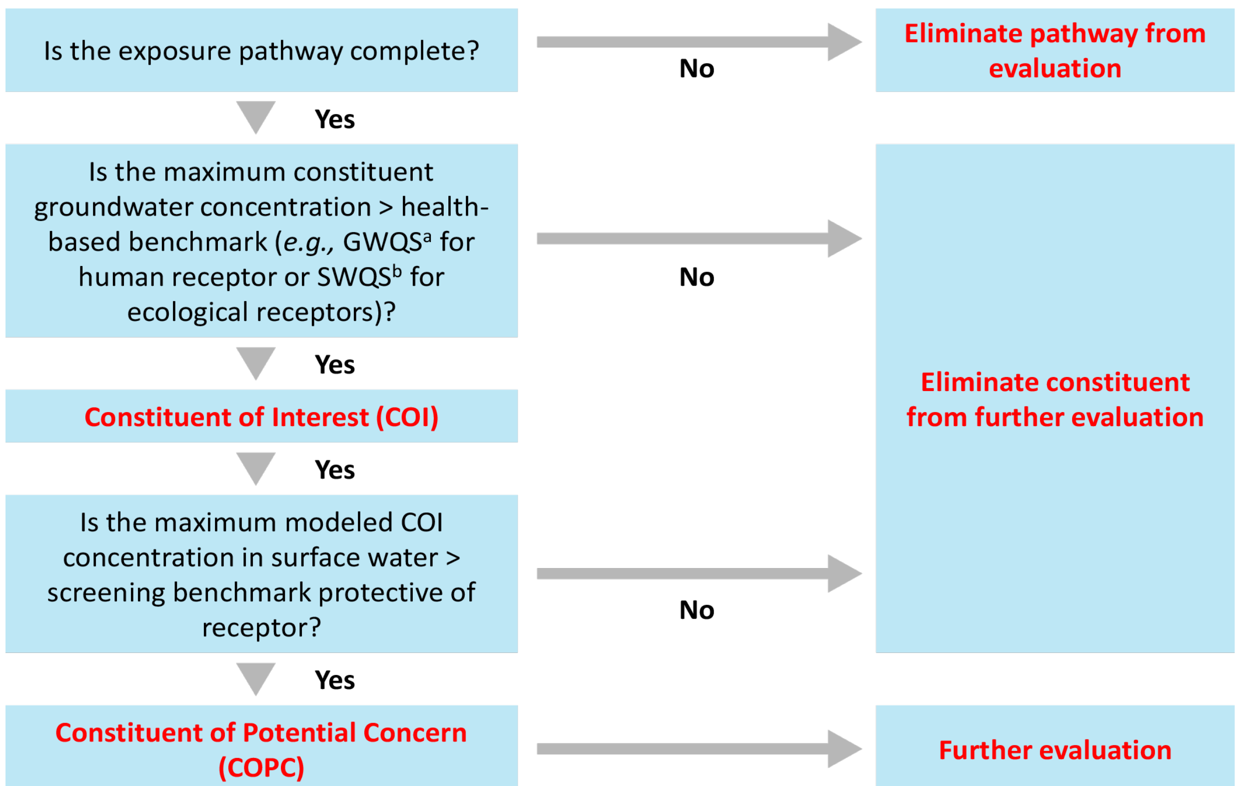


Figure 3.1 Overview of Risk Evaluation Methodology. GWQS = Groundwater Quality Standard; IEPA = Illinois Environmental Protection Agency; SWQS = Surface Water Quality Standard; US EPA = United States Environmental Protection Agency. (a) The IEPA Part 845 GWPS were used to identify COIs. (b) IEPA SWQS protective of chronic exposures to aquatic organisms were used to identify ecological COIs. In the absence of an SWQS, US EPA Region IV ecological screening values were used.

The first step in the risk evaluation was to develop the CEMs and identify complete exposure pathways. All potential receptors and exposure pathways based on groundwater use and surface water use in the vicinity of the Site were considered. Exposure pathways that are incomplete were excluded from the evaluation.

Groundwater data were used to identify COIs. COIs were identified as constituents with maximum concentrations in groundwater in excess of groundwater quality standards (GWQS)[2] for human receptors and surface water quality standards (SWQS) for ecological receptors. Based on the CSM (Section 2.3), some groundwater underlying the AP has the potential to interact with surface water in Sangchris Lake. Therefore, potential AP-related constituents in groundwater may potentially flow toward and flow into surface water in Sangchris Lake.

Surface water samples have been collected from Sangchris Lake adjacent to the Site; however, sediment samples have not been collected from the lake. Gradient modeled the potential migration of COIs from groundwater to surface water and sediment to evaluate potential risks to receptors (see Section 3.3.3).

Gradient modeled the COI concentrations in surface water and sediment based on the groundwater data from the AP-related wells. The measured and modeled COI concentrations in surface water and sediment were compared to conservative, generic risk-based screening benchmarks for human health and ecological receptors. These generic screening benchmarks rely on default assumptions with limited consideration of site-specific characteristics. Human health benchmarks are receptor-specific values calculated for each pathway and environmental medium that are designed to be protective of human health. Ecological benchmarks are medium-specific values designed to be protective of all potential ecological receptors exposed to surface water. Ecological and human health screening benchmarks are inherently conservative because they are intended to screen out chemicals that are of no concern with a high level of confidence. Therefore, a measured or modeled COI concentration exceeding a screening benchmark does not indicate an unacceptable risk, but only that further risk evaluation is warranted. COIs with maximum concentrations exceeding a conservative screening benchmark are identified as COPCs requiring further evaluation.

As described in more detail below, this evaluation relied on the screening assessment to demonstrate that constituents present in groundwater underlying the AP do not pose an unacceptable human health or ecological risk. That is, after the screening step, no COPCs were identified and further assessment was not warranted.

3.2 Human and Ecological Conceptual Exposure Models

A CEM provides an overview of the receptors and exposure pathways requiring risk evaluation. The CEM describes the source of the contamination, the mechanism that may lead to a release of contamination, the environmental media to which a receptor may be exposed, the route of exposure (exposure pathway), and the types of receptors that may be exposed to these environmental media.

3.2.1 Human Conceptual Exposure Model

The human CEM for the Site depicts the relationships between the off-Site environmental media potentially impacted by constituents in groundwater and human receptors that could be exposed to these media. Figure 3.2 presents a human CEM for the Site. It considers a human receptor who could be exposed to

[2] As discussed further in Section 3.3.2, GWQS are protective of human health and not necessarily of ecological receptors. While ecological receptors are not exposed to groundwater, groundwater can potentially enter into the adjacent surface water and impact ecological receptors. Therefore, two sets of COIs were identified: one for humans and another for ecological receptors.

COIs hypothetically released from the AP into groundwater, surface water, sediment, and fish. The following human receptors and exposure pathways were evaluated for inclusion in the Site-specific CEM.

- Residents – exposure to groundwater/surface water as drinking water
- Residents – exposure to groundwater/surface water used for irrigation
- Recreators in the lake adjacent to the Site:
  - Boaters – exposure to surface water and sediment while boating
  - Swimmers – exposure to surface water and sediment while swimming
  - Anglers – exposure to surface water and sediment and consumption of locally caught fish

All of these exposure pathways were considered to be complete, except for residential exposure to groundwater or surface water used for drinking water or irrigation, and swimming. Section 3.2.1.1 explains why the residential drinking water and irrigation pathways are incomplete, and Section 3.2.1.2 provides additional description of the recreational exposures. The permitted activities in Sangchris Lake do not include swimming, therefore this pathway was not evaluated (IDNR, 2022a).

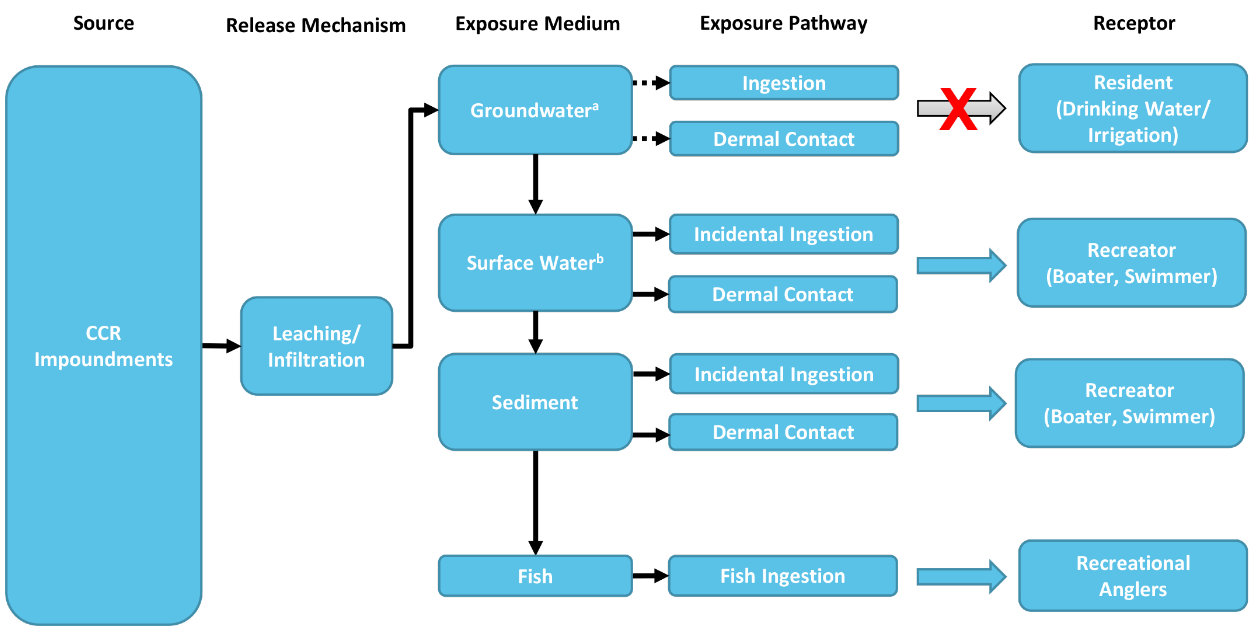


Figure 3.2 Human Conceptual Exposure Model. CCR = Coal Combustion Residuals. Dashed line/Red X = Incomplete or insignificant exposure pathway. (a) Groundwater in the vicinity of the Site is not used as a drinking water or irrigation source. (b) Surface water is not used as a drinking water source.

3.2.1.1 Groundwater or Surface Water as a Drinking Water/Irrigation Source

Groundwater as a source of drinking water and/or irrigation water is not a complete exposure pathway for CCR-related constituents originating from the KPP. As presented below, wells in the vicinity of the AP are either not used as a source of drinking water and/or irrigation water or are hydraulically separated from the AP.

Relying on federal and state databases, Ramboll completed a potable water well survey in 2021 (Ramboll, 2021). A total of nine wells were identified within a 1,000-meter radius of the AP during a comprehensive search of the Illinois State Geological Survey's (ISGS) Illinois Water and Related Wells (ILWATER) Map (ISGS, 2020). The wells that were identified included two wells that were identified as dry, one well identified as a municipal water supply well, two wells identified as private water wells, one well identified as a commercial well, and three coal mining or engineering related test wells (Ramboll, 2021, Figure 3.3). While there is no information available about the current use of these wells, they are either unlikely to be used as sources of drinking/irrigation water and/or are unlikely to be affected by potential CCR-related constituents originating from the AP. Wells that were identified in the Ramboll (2021) receptor survey are summarized below:

- The two dry wells and the coal mining test well are not used as sources of drinking or irrigation water and consequently are not shown on Figure 3.3. Moreover, the dry wells are located on opposite sides of Sangchris Lake from the AP (Ramboll, 2021); thus, there is no plausible mechanism by which they could be impacted by any potential constituents in groundwater associated with the AP. The coal mining test well, which was installed in 1911 (Ramboll, 2021) is located under the current location of Sangchris Lake (Ramboll, 2021).
- One private water well is shown on the KPP property (Ramboll, 2021). If this well exists, it likely is not used as source of drinking or irrigation water. The receptor survey also lists a private well (120212464000; Ramboll, 2021); this well is actually located south of the Town of Kincaid, far from the KPP property. Since these wells are either unlikely to be used as source of drinking/irrigation water or unaffected by potential CCR-related constituents originating from the AP they have not been shown on Figure 3.3.
- One private water well (#42) is shown within the boundaries of the AP (Ramboll, 2021; Figure 3.3). If this well actually exists, it is not used as source of drinking or irrigation water.
- There are two engineering test or test hole locations (#55 and #91). These are not likely to be used as sources of drinking or irrigation water. Moreover, the test holes are located on opposite sides of Sangchris Lake from the AP (Ramboll, 2021); thus, there is no plausible mechanism by which they could be impacted by any potential constituents in groundwater associated with the AP.
- There is one commercial well (#62) installed in 1980 by Commonwealth Edison (Ramboll, 2021, Figure 3.3). The well is located on the opposite side of Sangchris Lake from the AP; thus, there is no plausible mechanism by which it could be impacted by any potential constituents in groundwater associated with the AP.
- There is one municipal supply well (#98) installed in 1975 at Sangchris State Park. The well is located approximately 1,800 feet side-gradient of the AP along the edge of Sangchris Lake; given that there is a strong groundwater flow gradient toward the lake, it is unlikely that this well could be impacted by CCR-related constituents originating from the AP.

Additionally, as summarized below, there is no off-Site migration of CCR-related constituents in either shallow or deep groundwater and Sangchris Lake is not used as a public water supply.

- **There is no off-Site migration of CCR-related constituents in groundwater**. Groundwater from the AP flows toward two lobes of Sangchris Lake. Primary groundwater flow directions are to the north/northwest direction towards the western lobe of Sangchris Lake and to the south/southeast direction towards the eastern lobe of Sangchris Lake (Ramboll, 2021). Both lobes of Sangchris Lake in the vicinity of the AP are hydraulic boundaries that prevent shallow groundwater from flowing past or underneath them. Furthermore, Sangchris Lake is a regional "sink," which means that groundwater flows to Sangchris Lake but cannot flow past. Thus, there is no plausible mechanism by which potential constituents in groundwater associated with the AP could have impacted off-Site groundwater.
- **Sangchris Lake adjacent to AP is not used as a public water supply.** Sangchris Lake is a cooling water pond maintained by Kincaid Generation LLC, which restricts the use of the lake as a source of drinking water. Therefore, the human exposure pathway of surface water ingestion (as potable water) adjacent to the AP was not evaluated further.
- **The AP has a limited hydraulic connection to deep groundwater.** The confining units (*i.e.*, LCU and BCU) underlying the shallow water bearing units (*i.e.*, the UA and the USCU/PMP) form a hydraulic barrier between the KPP and deeper groundwater resources. Due to very low permeability of the LCU, downward migration of shallow groundwater is expected to be limited. Therefore, the likelihood of KPP AP-related impacts to deep groundwater is minimal.

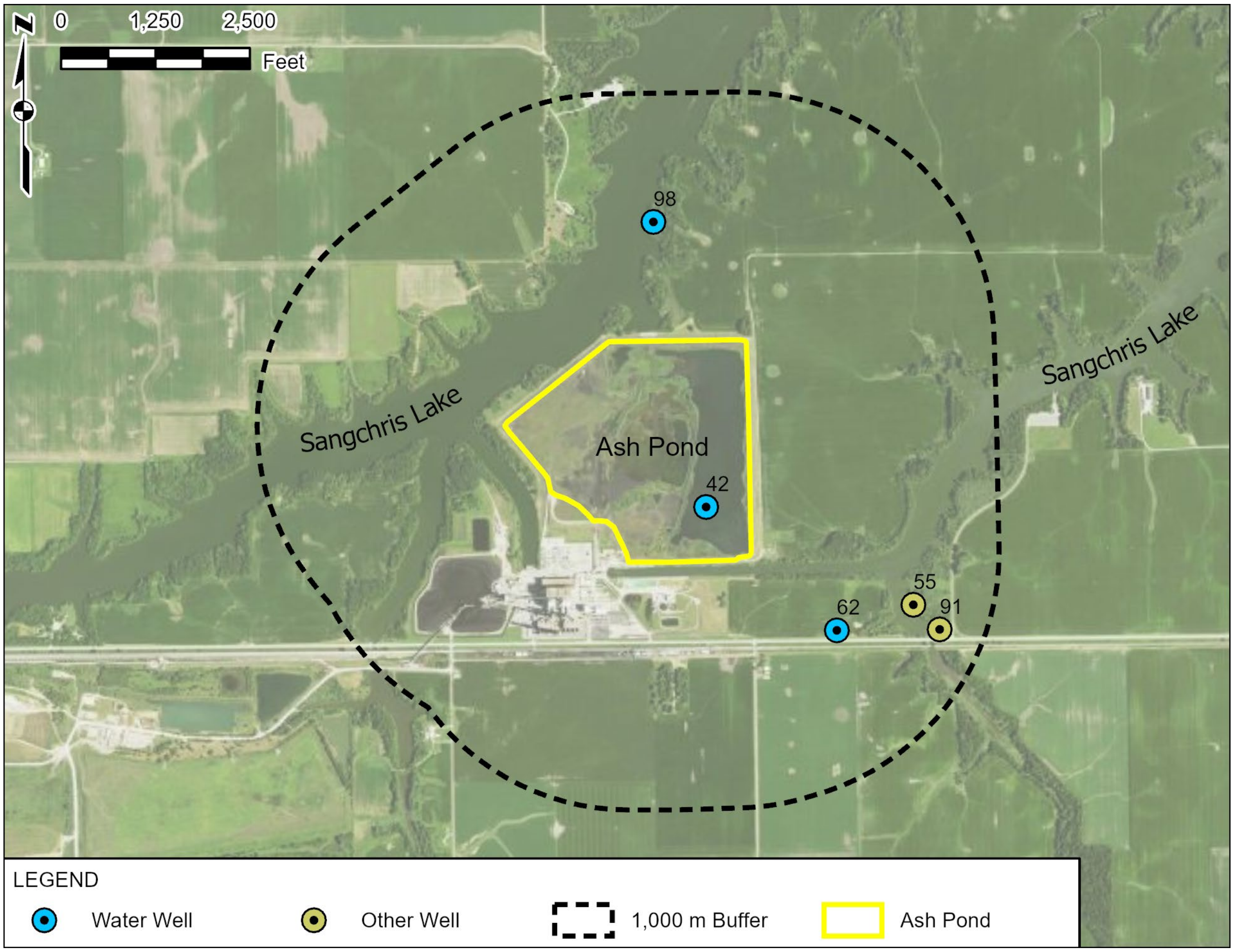


Figure 3.3 Water Wells Within 1,000 Meters of the KPP Ash Pond. KPP = Kincaid Power Plant. Reproduced from Ramboll (2021, Figure B-2).

3.2.1.2 Recreational Exposures

Sangchris Lake is located adjacent to the Site and portions of the lake are owned by Kincaid Generation LLC (Ramboll, 2021). Sangchris Lake State Park is located to the north of the Site (Ramboll, 2021), and the lake is used for recreational fishing (IDNR, 2022b). Recreational exposure to surface water and sediment may occur during activities such as boating or fishing in the lake. Recreational anglers may also consume locally caught fish from Sangchris Lake. Swimming is not listed as a permitted activity in Sangchris Lake (IDNR, 2022b).

3.2.2 Ecological Conceptual Exposure Model

The ecological CEM for the Site depicts the relationships between off-Site environmental media (surface water and sediment) potentially impacted by COIs in groundwater and ecological receptors that may be exposed to these media. The ecological risk evaluation considered both direct toxicity and secondary toxicity *via* bioaccumulation. Figure 3.4 presents the ecological CEM for the Site. The following ecological receptor groups and exposure pathways were considered:

- **Ecological Receptors Exposed to Surface Water:**
  - Aquatic plants, amphibians, reptiles, and fish.
- **Ecological Receptors Exposed to Sediment:**
  - Benthic invertebrates (*e.g.*, insects, crayfish, and mussels).
- **Ecological Receptors Exposed to Bioaccumulative COIs:**
  - Higher trophic-level wildlife (avian and mammalian) *via* direct exposures (surface water and sediment exposure) and secondary exposures through the consumption of prey (*e.g.*, plants, invertebrates, small mammals, and fish).

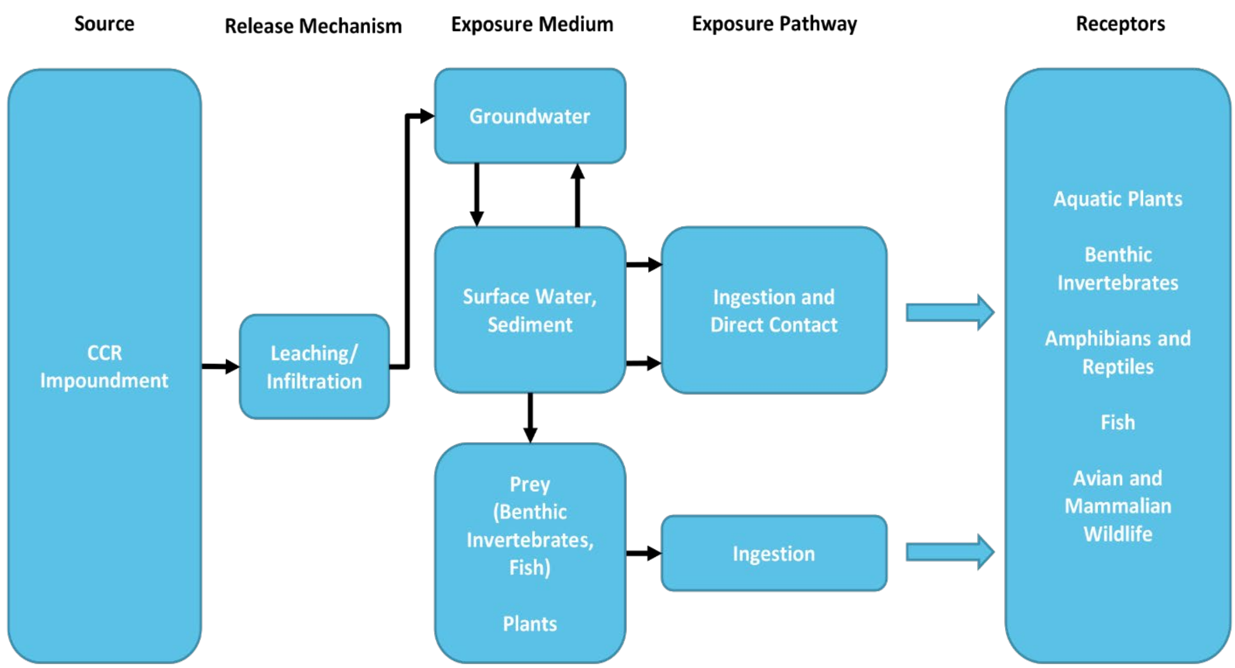


Figure 3.4 Ecological Conceptual Exposure Model. CCR = Coal Combustion Residuals.

3.3 Identification of Constituents of Interest

Risks were evaluated for COIs. A constituent was considered a COI if the maximum detected constituent concentration in groundwater exceeded a health-based benchmark. According to US EPA risk assessment guidance (US EPA, 1989), this screening step is designed to reduce the number of constituents carried through the risk evaluation that are anticipated to have a minimal contribution to the overall risk. Identified COIs are the constituents that are most likely to pose a risk concern in the surface water adjacent to the Site.

3.3.1 Human Health Constituents of Interest

For the human health risk evaluation, COIs were conservatively identified as constituents with maximum concentrations in groundwater above the GWPS listed in the Illinois CCR Rule Part 845.600 (IEPA, 2021).

Gradient used the maximum detected concentrations from groundwater samples collected from all of the AP-associated wells, regardless of hydrostratigraphic unit. The use of groundwater data in this risk evaluation does not imply that detected constituents are associated with the AP or that they have been identified as potential groundwater exceedances. Using this approach, 10 COIs (arsenic, barium, beryllium, boron, chromium, cobalt, lead, lithium, thallium, and radium-226+228) were identified for the human health risk evaluation *via* the surface water pathway (Table 3.1).

The water quality parameters that exceeded the GWPS included chloride, sulfate, and total dissolved solids; however, these constituents were not included in the risk evaluation because the GWPS are based on aesthetic quality. The US EPA secondary maximum contaminant levels (MCLs) for chloride, sulfate, and total dissolved solids are based on aesthetic quality. The secondary MCLs for chloride and sulfate (250 mg/L) are based on salty taste (US EPA, 2021a). The secondary MCL for total dissolved solids (500 mg/L) is based on hardness, deposits, colored water, staining, and salty taste (US EPA, 2021a). Given that these parameters are not likely to pose a human health risk concern in the event of exposure, they were not considered to be human health COIs.

Table 3.1 Human Health Constituents of Interest

Constituent[a]	Maximum Concentration	GWPS[b]	Human Health COI[c]
Total Metals (mg/L)			
Antimony	0.0016	0.0060	No
Arsenic	0.18	0.010	Yes
Barium	2.7	2.0	Yes
Beryllium	0.010	0.0040	Yes
Boron	11	2.0	Yes
Cadmium	0.0017	0.0050	No
Chromium	0.35	0.10	Yes
Cobalt	0.14	0.0060	Yes
Lead	0.25	0.0075	Yes
Lithium	0.18	0.040	Yes
Mercury	0.00048	0.0020	No
Molybdenum	0.028	0.10	No
Selenium	0.021	0.050	No
Thallium	0.0025	0.0020	Yes
Radionuclides (pCi/L)			
Radium-226 + 228	9.3	5.0	Yes
Other (mg/L, unless otherwise noted)			
Chloride	245	200	No[d]
Fluoride	0.78	4.0	No
Sulfate	929	400	No[d]
Total Dissolved Solids	1,830	1,200	No[d]

Notes:
COI = Constituent of Interest; GWPS = Groundwater Protection Standard; pCi/L = PicoCuries Per Liter.
Shaded = Compound identified as a COI.
(a) The constituents are those listed in the Illinois Part 845.600 GWPS (IEPA, 2021).
(b) The Illinois Part 845.600 GWPS (IEPA, 2021) were used to identify COIs.
(c) COIs are constituents for which the maximum concentration exceeds the groundwater standard.
(d) This constituent is not likely to pose a human health risk concern due to the absence of studies regarding toxicity to human health. Therefore, this constituent is not considered a COI.

3.3.2 Ecological Constituents of Interest

The Illinois GWPS, as defined in IEPA's guidance, were developed to protect human health, but not necessarily ecological receptors. While ecological receptors are not exposed to groundwater, groundwater can potentially migrate into the adjacent surface water and impact ecological receptors. Therefore, to identify ecological COIs, the maximum concentrations of constituents detected in groundwater were compared to ecological surface water benchmarks protective of aquatic life.

The surface water screening benchmarks for freshwater organisms were obtained from the following hierarchy of sources:

- IEPA (2019) surface water quality criteria (SWQC). IEPA SWQC are health-protective benchmarks for aquatic life exposed to surface water on a long-term basis (*i.e.*, chronic exposure). The SWQC for several metals are hardness-dependent (cadmium, chromium, copper, lead, manganese, nickel, and zinc). Screening benchmarks for these constituents were calculated assuming US EPA's default hardness of 100 mg/L (US EPA, 2022).[3]
- US EPA Region IV (2018) surface water Ecological Screening Values (ESVs) for hazardous waste sites.

Benchmarks from the United States Department of Energy's (US DOE) guidance document ("A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota") were used for radium (US DOE, 2019). US DOE (2019) presents benchmarks for radium-226 and radium-228 (4 and 3 picoCuries per liter [pCi/L], respectively). Given that radium concentrations are expressed as total radium (radium-226+228, *i.e.*, the sum of radium-226 and radium-228), Gradient used the lower of the two benchmarks (3 pCi/L for radium-228) to evaluate total radium concentrations.

Consistent with the human health risk evaluation, Gradient used the maximum detected concentrations from groundwater samples collected from all of the AP-associated wells (regardless of hydrostratigraphic unit) without considering spatial or temporal representativeness for ecological receptor exposures. The use of the maximum constituent concentrations in this evaluation is designed to conservatively identify COIs that warrant further investigation. Boron, cadmium, chromium, cobalt, lead, and radium-226+228 were identified as COIs for ecological receptors (Table 3.2).

[3] Hardness data were obtained from United States Geological Survey (USGS) monitoring station USGS-05575570, located at the north end of Sangchris Lake, 3.4 miles north of the AP (USGS *et al*., 2022). The available hardness data include 133 samples with a date range of 1980 to 1997. The hardness ranges from 140 to 330 mg/L, with an average of 231 mg/L. However, the US EPA (2022) default hardness of 100 mg/L was used. Use of a higher hardness value would result in less stringent screening values; thus, use of the US EPA default hardness is conservative.

Table 3.2 Ecological Constituents of Interest

Constituent[a]	Maximum Groundwater Concentration	Ecological Benchmark[b]	Basis	Ecological COI[c]
Total Metals (mg/L)				
Antimony	0.0016	0.19	US EPA R4 ESV	No
Arsenic	0.18	0.19	IEPA SWQC	No
Barium	2.7	5.0	IEPA SWQC	No
Beryllium	0.010	0.064	US EPA R4 ESV	No
Boron	11	7.6	IEPA SWQC	Yes
Cadmium	0.0017	0.0011	IEPA SWQC	Yes
Chromium	0.35	0.21	IEPA SWQC	Yes
Cobalt	0.14	0.019	US EPA R4 ESV	Yes
Lead	0.25	0.020	IEPA SWQC	Yes
Lithium	0.18	0.44	US EPA R4 ESV	No
Mercury	0.00048	0.0011	IEPA SWQC	No
Molybdenum	0.028	7.2	US EPA R4 ESV	No
Selenium	0.021	1.0	IEPA SWQC	No
Thallium	0.0025	0.0060	US EPA R4 ESV	No
Radionuclides (pCi/L)				
Radium-226 + 228	9.3	3.0	US DOE	Yes
Other (mg/L, unless otherwise noted)				
Chloride	245	500	IEPA SWQC	No
Fluoride	0.78	4.0	IEPA SWQC	No
Sulfate	929	NA	NA	NA
Total Dissolved Solids	1,830	NA	NA	NA

Notes:
COI = Constituent of Interest; ESV = Ecological Screening Value; GWPS = Groundwater Protection Standard; IEPA = Illinois Environmental Protection Agency; NA = Not Available; pCi/L = PicoCuries Per Liter; SWQC = Surface Water Quality Criteria; US DOE = United States Department of Energy; US EPA R4 = United States Environmental Protection Agency Region IV.
Shaded = Compound identified as a COI.
(a) The constituents are those listed in the Illinois Part 845.600 GWPS (IEPA, 2021).
(b) Ecological benchmarks are from the hierarchy of sources discussed in Section 3.3.2: IEPA SWQC (IEPA, 2019); US EPA Region IV "Ecological Risk Assessment Supplemental Guidance" (US EPA Region IV, 2018); and US DOE's guidance document, "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota" (US DOE, 2019).
(c) Constituents with maximum detected concentrations exceeding a benchmark protective of surface water exposure are considered ecological COIs.

3.3.3 Surface Water and Sediment Modeling

Surface water sampling has been conducted in Sangchris Lake adjacent to the Site. To estimate the potential contribution to surface water (and sediment) from groundwater specifically associated with AP, Gradient modeled concentrations in Sangchris Lake surface water and sediment from groundwater flow into the lake for the detected human and ecological COIs. This is because the constituents detected in groundwater above an ecological- or health-based benchmark are most likely to pose a risk concern in the adjacent surface water. Gradient modeled human health and ecological COI concentrations in the surface water and sediment using a mass balance calculation based on the surface water and groundwater mixing. The model assumes a well-mixed groundwater-surface water location. The maximum detected concentrations in groundwater (regardless of well location) from 2015 to 2021 were conservatively used to model COI concentrations in surface water and sediment. The groundwater data were measured as total metals. Use of the total metals concentration for these COIs may overestimate surface water concentrations because dissolved concentrations, which are lower than total concentrations, represent the mobile fractions of constituents that could likely flow into and mix with surface water.

This modeling approach does not account for geochemical transformations that may occur during groundwater mixing with surface water. Gradient assumed that predicted surface water concentrations were influenced only by the physical mixing of groundwater as it enters the surface water, and were not further influenced by the geochemical reactions in the water and sediment, such as precipitation. In addition, the model only predicts surface water and sediment concentrations as a result of the potential migration of COI concentrations in AP-related groundwater and does not account for background concentrations in surface water or sediment.

For this evaluation, Gradient adapted a simplified and conservative form of US EPA's indirect exposure assessment methodology (US EPA, 1998) that was used in US EPA's coal combustion waste risk assessment (US EPA, 2014a). The model is a mass balance calculation based on surface water and groundwater mixing and the concept that the dissolved and sorbed concentrations can be related through an equilibrium partitioning coefficient (K_d). The model assumes a well-mixed groundwater-surface water location, with partitioning among total suspended solids, dissolved water column, sediment pore water, and solid sediments.

Sorption to soil and sediment is highly dependent on the surrounding geochemical conditions. To be conservative, we ignored the natural attenuation capacity of soil and sediment and estimated the surface water concentration based only on the physical mixing of groundwater and surface water (*i.e.*, dilution) at the point of entry of groundwater to the surface water.

The aquifer and surface water properties used to estimate the volume of groundwater flowing to Sangchris Lake and surface water concentrations are presented in Table 3.3. The COI concentrations in sediment were modeled using the COI-specific sediment-to-water partitioning coefficients and the sediment properties presented in Table 3.4. In the absence of Site-specific information for Sangchris Lake, Gradient used default assumptions (*e.g.*, depth of the upper benthic layer and bed sediment porosity) to model sediment concentrations. The modeled surface water and sediment concentrations are presented in Table 3.5. These modeled concentrations reflect conservative contributions from groundwater flow. A description of the modeling and the detailed results are presented in Appendix A.

Table 3.3 Groundwater and Surface Water Properties Used in Modeling

Parameter	Unit	Values	Notes/Source
Groundwater			
COI Concentration	mg/L	Constituent-specific	Maximum detected concentration in groundwater
Cross Section Area for the UA[a]	m^2	13,942	The sum of the maximum saturated thicknesses of the USCU/PMP and the UA (*i.e.*, approximately 6 meters) multiplied by the length of the AP intersecting Sangchris lake (*i.e.*, about 2,287 meters) (Ramboll, 2021).
Hydraulic Gradient	m/m	0.012	The average of hydraulic gradients for the UA and the USCU/PMP (Ramboll, 2021).
Average Hydraulic Conductivity	cm/s	4.59×10^{-5}	Average of the geometric mean horizontal hydraulic conductivities measured for the USCU/PMP (5×10^{-5} cm/s) and the UA (4×10^{-5} cm/s) (Ramboll, 2021).
Surface Water			
Surface Water Flow Rate in Sangchris Lake	L/yr	3.8×10^{10}	Mean surface water flow in Sangchris Lake (US EPA Region V, 1975; Larimore and Tranquilli, 1981).
Total Suspended Solids	mg/L	19	Average TSS concentration in Sangchris Lake.[b]
Depth of the Water Column	m	4.6	Mean depth of Sangchris Lake (Larimore and Tranquilli, 1981).
Suspended Sediment to Water Partition Coefficient	mg/L	Constituent-specific	Values based on US EPA (2014a)

Notes:

AP = Ash Pond; COI = Constituent of Interest; PMP = Potential Migration Pathway; TSS = Total Suspended Solids; UA = Uppermost Aquifer; US EPA = United States Environmental Protection Agency; USCU = Upper Semi-confining Unit; USGS = United States Geological Survey.

(a) Cross-sectional area represents the area through which groundwater flows from the UA into Sangchris Lake (*i.e.*, the groundwater flow area that intersects with Sangchris Lake).

(b) TSS data were obtained from USGS monitoring station USGS-05575570, located at the north end of Sangchris Lake, 3.4 miles north of the AP (USGS *et al*., 2022). The available TSS data include 160 samples with a date range of 1979 to 1997. The TSS ranges from 2 to 359 mg/L, with an average of 19 mg/L.

Table 3.4 Sediment Properties Used in Modeling

Parameter	Unit	Value	Notes/Source
Sediment			
Depth of Upper Benthic Layer	m	0.03	Default (US EPA, 2014a)
Depth of Water Body	m	4.63	Sum of depth of water column (4.6 m, depth of Sangchris Lake) (Larimore and Tranquilli, 1981) and depth of upper benthic layer (0.03 m) (US EPA, 2014a)
Bed Sediment Particle Concentration	g/cm^3	1	Default (US EPA, 2014a)
Bed Sediment Porosity	-	0.6	Default (US EPA, 2014a)
TSS Mass Per Unit Area	kg/m^2	0.0874	Depth of water column × TSS × conversion factors (10^{-6} kg/mg and 1,000 L/m^3)
Sediment Mass Per Unit Area	kg/m^2	30	Depth of upper benthic layer × bed sediment particulate concentration × conversion factors (0.001 kg/g, 10^6 cm^3/m^3)
Sediment to Water Partition Coefficients	mg/L	Constituent-specific	Values based on US EPA (2014a)

Notes:
TSS = Total Suspended Solids; US EPA = United States Environmental Protection Agency.

Table 3.5 Surface Water and Sediment Modeling Results

COI	Groundwater Concentration (mg/L or pCi/L)	Mass Discharge Rate (mg/yr or pCi/yr)	Total Water Column Concentration (mg/L or pCi/L)	Concentration Sorbed to Bottom Sediments (mg/kg or pCi/kg)
Total Metals				
Arsenic	0.18	4.2E+05	1.1E-05	2.4E-03
Barium	2.7	6.4E+06	1.7E-04	4.5E-02
Beryllium	0.010	2.5E+04	6.6E-07	3.2E-04
Boron	11	2.6E+07	7.0E-04	3.8E-03
Cadmium	0.0017	4.1E+03	1.1E-07	8.6E-05
Chromium	0.35	8.5E+05	2.2E-05	5.3E-01
Cobalt	0.14	3.4E+05	8.9E-06	5.1E-03
Lead	0.25	6.2E+05	1.6E-05	6.1E-02
Lithium	0.18	4.3E+05	1.1E-05	(a)
Thallium	0.0025	6.1E+03	1.6E-07	2.6E-06
Radionuclides				
Radium-226+228	9	2.2E+07	5.9E-04	3.8E+00

Notes:
COI = Constituent of Concern; K_d = Equilibrium Partitioning Coefficient; pCi/L = PicoCuries Per Liter; pCi/kg = PicoCuries Per Kilogram; pCi/yr = PicoCuries Per Year.
(a) Lithium does not readily sorb to soil or sediment particles; a K_d value of 0 was used for the modeling, therefore the sediment concentration was zero.

3.4 Human Health Risk Evaluation

The section below presents the results of the human health risk evaluation for recreators (boaters and anglers) in Sangchris Lake adjacent to the Site. Risks were assessed using the maximum measured or modeled COIs in surface water.

3.4.1 Recreators Exposed to Surface Water

Screening Exposures: Recreators could be exposed to surface water *via* incidental ingestion and dermal contact while boating. In addition, anglers could consume fish caught in Sangchris Lake. The maximum measured or modeled COI concentrations in surface water were used as conservative upper-end estimates of the COI concentrations to which a recreator might be exposed directly (incidental ingestion of COIs in surface water while boating) and indirectly (consumption of locally caught fish exposed to COIs in surface water).

Screening Benchmarks: Illinois surface water criteria (IEPA, 2019), known as human threshold criteria (HTC), are based on incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities, as well as the consumption of fish. The HTC values were calculated from the following equation (IEPA, 2019):

$$\mathrm{HTC} = \frac{\mathrm{ADI}}{\mathrm{W} + (\mathrm{F} \times \mathrm{BCF})}$$

where:

HTC	=	Human health protection criterion in milligrams per liter (mg/L)
ADI	=	Acceptable daily intake (mg/day)
W	=	Water consumption rate (L/day)
F	=	Fish consumption rate (kg/day)
BCF	=	Bioconcentration factor (L/kg-tissue)

Illinois defines the acceptable daily intake (ADI) as the "maximum amount of a substance which, if ingested daily for a lifetime, results in no adverse effects to humans" (IEPA, 2019). US EPA defines its chronic reference dose (RfD) as an "estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure for a chronic duration (up to a lifetime) to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime" (US EPA, 2011a). Illinois lists methods to derive an ADI from the primary literature (IEPA, 2019). In accordance with Illinois guidance, Gradient derived an ADI by multiplying the MCL by the default water ingestion rate of 2 L/day (IEPA, 2019). In the absence of an MCL, Gradient applied the RfD used by US EPA to derive its Regional Screening Levels (RSLs) (US EPA, 2021b) as a conservative estimate of the ADI. The RfDs are given in mg/kg-day, while the ADIs are given in mg/day; thus, Gradient multiplied the RfD by a standard body weight of 70 kg to obtain the ADI in mg/day. The calculation of the HTC values is shown in Appendix B, Table B.1.

Gradient used bioconcentration factors (BCFs) from a hierarchy of sources. The primary BCFs were those that US EPA used to calculate the National Recommended Water Quality Criteria (NRWQC) for human health (US EPA, 2002). Other sources included BCFs used in the US EPA coal combustion ash risk assessment (US EPA, 2014a) and BCFs reported by Oak Ridge National Laboratory's Risk Assessment

Information System (ORNL RAIS) (ORNL, 2020).[4] Lithium did not have a BCF value available from any authoritative source; therefore, the water quality criterion for lithium was calculated assuming a BCF of 1. This is a conservative assumption, as lithium does not readily bioaccumulate in the aquatic environment (ECHA, 2020).

Illinois recommends a fish consumption rate of 0.020 kg/day (20 g/day) for an adult weighing 70 kg (IEPA, 2019). Illinois recommends a water consumption rate of 0.01 L/day for "incidental exposure through contact or ingestion of small volumes of water while swimming or during other recreational activities" (IEPA, 2019). Appendix B, Table B.1 presents the calculated HTC for fish consumption and water ingestion, and for fish consumption only.

The HTC for fish consumption for radium-226+228 was calculated as follows:

$$\mathrm{HTC} = \frac{\mathrm{TCR}}{(\mathrm{SF} \times \mathrm{BAF} \times \mathrm{F})}$$

where:

HTC = Human health protection criterion in picoCuries per liter (pCi/L)
TCR = Target cancer risk (1×10^{-5})
SF = Food ingestion slope factor (risk/pCi)
BAF = Bioaccumulation factor (L/kg-tissue)
F = Fish consumption rate (kg/day)

The food ingestion slope factor (lifetime excess total cancer risk per unit exposure, in risk/pCi) used to calculate the HTC was the highest value of those for radium-226 (Ra-226), radium-228 (Ra-228), and "Ra-228+D" (US EPA, 2001). According to US EPA (2001), "+D" indicates that "the risks from associated short-lived radioactive decay products (*i.e.,* those decay products with radioactive half-lives less than or equal to 6 months) are also included."

Screening Risk Evaluation: The maximum modeled and measured COI concentrations in surface water were compared to the calculated Illinois HTC values (Table 3.6). All surface water concentrations were below their respective benchmarks. The HTC values are protective of recreational exposure *via* water and/or fish ingestion and do not account for dermal exposures to COIs in surface water while boating. However, given that the measured and modeled COI surface water concentrations are orders of magnitude below an HTC protective of water and/or fish ingestion, dermal exposures to COIs are not expected to be a risk concern. Moreover, the dermal uptake of metals is considered to be minimal and only a small proportion of ingestion exposures. Thus, none of the COIs evaluated would be expected to pose an unacceptable risk to recreators exposed to surface water while boating or anglers consuming fish caught in Sangchris Lake.

[4] Although recommended by US EPA (2015c), US EPA EpiSuite 4.1 (US EPA, 2019) was not used as a source of BCFs because inorganic compounds are outside the estimation domain of the program.

Table 3.6 Risk Evaluation for Recreators Exposed to Surface Water

COI	Maximum Surface Water Concentration		HTC for Water and Fish	HTC for Water Only	HTC for Fish Only	COPC	
	Modeled	Measured[a]				Based on Modeled Concentrations	Based on Measured Concentrations
Total Metals (mg/L)							
Arsenic	1.1E-05	0.0034	0.022	2.0	0.023	No	No
Barium	1.7E-04	0.084	1.5	400	1.5	No	No
Beryllium	6.6E-07	ND	0.021	0.80	0.021	No	NA
Boron	7.0E-04	0.065	467	1,400	700	No	No
Chromium	2.2E-05	0.0024	0.61	20	0.63	No	No
Cobalt	8.9E-06	ND	0.0035	2.1	0.0035	No	NA
Lead	1.6E-05	0.0011	0.015	0.015	0.015	No	No
Lithium	1.1E-05	ND	4.7	14	7.0	No	NA
Thallium	1.6E-07	ND	0.0017	0.40	0.0017	No	NA
Radionuclides (pCi/L)							
Radium-226+228	5.9E-04	1.3	1,000	1,000	87,413	No	No

Notes:
COI = Constituent of Interest; COPC = Constituent of Potential Concern; HTC = Human Threshold Criteria; NA = Not Applicable; ND = Not Detected; pCi/L = PicoCuries Per Liter.
(a) Measured concentrations are listed only for the constituents identified as COIs. Measured surface water concentrations may be different from modeled concentrations because measured data include the effects of background and other industrial sources. Modeled concentrations only represent the potential effect on surface water quality resulting from the measured groundwater concentrations.

3.4.2 Recreators Exposed to Sediment

Recreational exposure to sediment may occur during boating activity in Sangchris Lake; exposure to sediment may occur through incidental ingestion and dermal contact.

Screening Exposures: COIs in impacted groundwater flowing to the river can sorb to sediments. In the absence of sediment data, sediment concentrations were modeled using maximum detected groundwater concentrations.

Screening Benchmarks: There are no established recreator RSLs that are protective of recreational exposures to sediment (US EPA, 2021c). Therefore, benchmarks that are protective of recreational exposures to sediment *via* incidental ingestion and dermal contact were calculated using US EPA's RSL guidance (US EPA, 2021c). These benchmarks were calculated using the recommended assumptions (*i.e.*, oral bioavailability, body weights, and averaging time) and toxicity reference values (*i.e.*, RfD and cancer slope factor [CSF]), with the following changes: recreators were assumed to be exposed to sediment while recreating 60 days per year (or 2 weekend days per week for 30 weeks per year, from April to October). The exposure duration was assumed for a child 6 years of age and an adult 20 years of age, per US EPA guidance (US EPA, 2014b). The daily recommended residential soil ingestion rates of 200 mg/day for a child and 100 mg/day for an adult are based on an all-day exposure to residential soils (US EPA, 2014b, 2011b). Since recreational exposures to sediment are assumed to occur for less than 4 hours per day, one-third of the daily residential soil ingestion (67 mg/day for a child and 33 mg/day for an adult) was used as a conservative assumption. For dermal exposures, recreators were assumed to be exposed to sediment on their lower legs and feet (1,026 cm^2 for the child and 3,026 cm^2 for the adult, based on the age-weighted surface areas reported in US EPA [2011b]). While other body parts may be exposed to sediment, the contact time is likely to be very short, as the sediment would wash off in the surface water. Gradient used US EPA's recommended adherence factor of 0.2 mg/cm^2 based on child exposure to wet soil (US EPA, 2004, 2014b), which was used in the US EPA RSL User's Guide for a child recreator exposed to soil or sediment (US EPA, 2021c). The sediment screening benchmarks were calculated based on a target hazard quotient of 1, or a target cancer risk of 1×10^{-5}. Appendix B, Table B.2 presents the calculation of screening benchmarks protective of recreational exposures to sediment. A recreator sediment screening benchmark for radium-226+228 was based on soil Preliminary Remediation Goals (PRGs) calculated for radium-226 and radium-228 using US EPA's PRG calculator (US EPA, 2020). The lower of the two values was used as the recreator sediment screening benchmark for radium-226+228 (Appendix B).

Screening Risk Evaluation: The modeled sediment concentrations were well below the recreational sediment screening benchmarks (Table 3.7). Therefore, exposure to sediment is not expected to pose an unacceptable risk to recreators in Sangchris Lake.

Table 3.7 Risk Evaluation for Recreators Exposed to Sediment

COI	Modeled Sediment Concentration (mg/kg)	Recreator Sediment Screening Benchmark (mg/kg)	COPC
Total Metals (mg/kg)			
Arsenic	2.4E-03	6.8E+01	No
Barium	4.5E-02	2.7E+05	No
Beryllium	3.2E-04	2.7E+03	No
Boron	3.8E-03	2.7E+05	No
Chromium	5.3E-01	2.1E+06	No
Cobalt	5.1E-03	4.1E+02	No
Lead	6.1E-02	4.0E+02	No
Lithium	(a)	2.7E+03	NA
Thallium	2.6E-06	1.4E+01	No
Radionuclides (pCi/kg)			
Radium-226+228	3.8E+00	7.9E+03	No

Notes:
COI = Constituent of Interest; COPC = Constituent of Potential Concern; K_d = Equilibrium Partitioning Coefficient; NA = Not Applicable; pCi/kg = PicoCuries Per Kilogram.
(a) Lithium does not readily sorb to soil or sediment particles; a K_d value of 0 was used for the modeling.

3.5 Ecological Risk Evaluation

Based on the ecological CEM (Figure 3.4), ecological receptors could be exposed to surface water and dietary items (*i.e.*, prey and plants) potentially impacted by identified COIs (*i.e.*, boron, cadmium, chromium, cobalt, lead, and radium-226+228).

3.5.1 Ecological Receptors Exposed to Surface Water

Screening Exposures: The ecological evaluation considered aquatic communities in Sangchris Lake potentially impacted by identified ecological COIs. Measured and modeled surface water concentrations were compared to risk-based ecological screening benchmarks.

Screening Benchmarks: Surface water screening benchmarks protective of aquatic life were obtained from the following hierarchy of sources:

- IEPA SWQC (IEPA, 2019), regulatory standards that are intended to protect aquatic life exposed to surface water on a long-term basis (*i.e.*, chronic exposure). For cadmium, the surface water benchmark is hardness-dependent and calculated using a default hardness of 100 mg/L (US EPA, 2022);[5]
- US EPA Region IV (2018) surface water ESVs for hazardous waste sites; and
- US DOE benchmarks from the guidance document, "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota" (US DOE, 2019).

Risk Evaluation: The maximum measured and modeled COI concentrations in surface water were compared to the benchmarks protective of aquatic life (Table 3.8). The measured and modeled surface water concentrations for the COIs were below their respective benchmarks. Thus, none of the COIs evaluated are expected to pose an unacceptable risk to aquatic life in Sangchris Lake.

Table 3.8 Risk Evaluation for Ecological Receptors Exposed to Surface Water

COI	Maximum Surface Water Concentration		Ecological Freshwater Benchmark	Basis	COPC	
	Modeled	Measured			Based on Modeled Concentrations	Based on Measured Concentrations
Total Metals (mg/L)						
Boron	7.0E-04	6.5E-02	7.6	IEPA SWQC	No	No
Cadmium	1.1E-07	ND	0.0011	IEPA SWQC	No	NA
Chromium	2.2E-05	2.4E-03[a]	0.18[b]	IEPA SWQC	No	No
Cobalt	8.9E-06	ND	0.019	US EPA R4 ESV	No	NA
Lead	1.6E-05	1.1E-03	0.020	IEPA SWQC	No	No
Radionuclides (pCi/L)						
Radium-226+228	5.9E-04	1.3E+00	3.0	US DOE	No	No

Notes:
COI = Constituent of Interest; COPC = Constituent of Potential Concern; ESV = Ecological Screening Value; IEPA = Illinois Environmental Protection Agency; NA = Not Applicable; ND = Not Detected; pCi/L = PicoCuries Per Liter; SWQC = Surface Water Quality Criteria; US DOE = United States Department of Energy; US EPA R4 = United States Environmental Protection Agency Region IV.
(a) Chromium was not detected in the total metals analysis, but had one detect in the dissolved metals analysis. Therefore, the chromium concentration shown in this table is for dissolved metals.
(b) IEPA SWQC for dissolved chromium.

[5] Conservatisms associated with using a default hardness value are discussed in Section 3.6.

3.5.2 Ecological Receptors Exposed to Sediment

Screening Exposures: COIs in impacted groundwater flowing to Sangchris Lake can sorb to sediments *via* chemical partitioning. In the absence of sediment data, sediment concentrations were modeled using maximum detected groundwater concentrations. Therefore, the modeled COI sediment concentrations reflect the potential maximum Site-related sediment concentration from groundwater discharge.

Screening Benchmarks: Sediment screening benchmarks were obtained from US EPA Region IV (2018). The majority of the sediment ESVs are based on threshold effect concentrations from MacDonald *et al.* (2000), which provides consensus values that identify concentrations below which harmful effects on sediment-dwelling organisms are unlikely to be observed. In the absence of an ESV for radium-226+228, a sediment screening value of 90,000 pCi/kg was used, based on the biota concentration guide (BCG) for radium-228 (US DOE, 2019).[6] The benchmarks used in this evaluation are listed in Table 3.9.

Screening Risk Results: The maximum modeled COI sediment concentrations were below their respective sediment screening benchmarks (Table 3.9). The modeled sediment concentrations attributed to potential contributions from Site groundwater for all COIs were less than or equal to 1% of the sediment screening benchmark. Therefore, the modeled sediment concentrations attributed to potential contributions from Site groundwater are not expected to significantly contribute to ecological exposures in Sangchris Lake adjacent to the Site.

Table 3.9 Risk Evaluation for Ecological Receptors Exposed to Sediment

COI	Modeled Sediment Concentration	ESV[a]	COPC	% of Benchmark
Total Metals (mg/kg)				
Boron	3.8E-03	38[b]	No	0.01%
Cadmium	8.6E-05	0.99	No	0.009%
Chromium	5.3E-01	43	No	1.2%
Cobalt	5.1E-03	50	No	0.01%
Lead	6.1E-02	35.8	No	0.2%
Radionuclides (pCi/kg)				
Radium-226+228	3.8E+00	90,000[c]	No	0.004%

Notes:
COI = Constituent of Interest; COPC = Constituent of Potential Concern; ESV = Ecological Screening Value; NOEC = No Observed Effect Concentration; pCi/g = PicoCuries Per Gram; pCi/kg = PicoCuries Per Kilogram; US DOE = United States Department of Energy; US EPA = United States Environmental Protection Agency.
(a) ESV is from US EPA Region IV (2018).
(b) NOEC of 38 mg/kg was used as a conservative benchmark for boron in the absence of an ESV (ECHA, 2019).
(c) ESV is from US DOE (2019); value converted from 90 pCi/g to 90,000 pCi/kg.

3.5.3 Ecological Receptors Exposed to Bioaccumulative Constituents of Interest

Screening Exposures: COIs with bioaccumulative properties can impact higher-trophic-level wildlife exposed to these COIs *via* direct exposures (surface water and sediment exposure) and secondary exposures through the consumption of dietary items (*e.g.*, plants, invertebrates, small mammals, and fish).

[6] US DOE (2019) reported the BCG for sediment as 90 pCi/g for Ra-228 and 100 pCi/g for Ra-226; the lower of the two values was used for Ra-226+228, and converted to pCi/kg.

Screening Benchmark: US EPA Region IV (2018) and IEPA SWQC (IEPA, 2019) guidance documents were used to identify constituents with potential bioaccumulative effects.

Risk Evaluation: The ecological COIs (*i.e.*, boron, cadmium, chromium, cobalt, lead, and radium-226+228) were not identified as having potential bioaccumulative effects. Therefore, these COIs are not considered to pose an ecological risk *via* bioaccumulation.

3.6 Uncertainties and Conservatisms

A number of uncertainties and their potential impact on the risk evaluation are discussed below. Wherever possible, conservative assumptions were used in an effort to minimize uncertainties and overestimate rather than underestimate risks.

Exposure Estimates:

- The risk evaluation included the Illinois Part 845.600 constituents detected in groundwater samples (above GWPS) collected from wells associated with the AP. However, it is possible that not all of the detected constituents are related specifically to the AP.
- The human health and ecological risk characterizations were based on the maximum measured or modeled COI concentrations, rather than on averages. Thus, the variability in exposure concentrations was not considered. Assuming continuous exposure to the maximum concentration overestimates human and ecological exposures, given that receptors are mobile and concentrations change over time. For example, US EPA guidance states that risks should be estimated using average exposure concentrations as represented by the 95% upper confidence limit on the mean (US EPA, 1992). Given that exposure estimates based on the maximum concentrations did not exceed risk benchmarks, Gradient has greater confidence that there is no risk concern.
- Only constituents detected in groundwater were used to identify COIs and model COI concentrations in surface water and sediment. For the constituents that were not detected in the AP groundwater, the detection limits were below the Illinois Part 845.600 GWPS and thus do not require further evaluation.
- COI concentrations in surface water were modeled using the maximum detected total COI concentrations in groundwater. Modeling surface water concentrations using total metal concentrations may overestimate surface water concentrations because dissolved concentrations, which are lower than total concentrations, represent the mobile fractions of constituents that could likely flow into and mix with surface water.
- The COIs identified in this evaluation also occur naturally in the environment. Contributions to exposure from natural or other non-AP-related sources were not considered in the evaluation of modeled concentrations; only exposure contributions potentially attributable to Site groundwater mixing with surface water were evaluated. While not quantified, exposures from potential AP-related groundwater contributions are likely to represent only a small fraction of the overall human and ecological exposure to COIs that also have natural or non-AP-related sources.
- Screening benchmarks for human health were developed using exposure inputs based on US EPA's recommended values for reasonable maximum exposure (RME) assessments (US EPA, 2014b). RME is defined as "the highest exposure that is reasonably expected to occur at a site but that is still within the range of possible exposures" (US EPA, 2004). US EPA states the "intent of the RME is to estimate a conservative exposure case (*i.e.*, well above the average case) that is still within the range of possible exposures" (US EPA, 1989). US EPA also notes this high-end exposure "is the highest dose estimated to be experienced by some individuals, commonly stated

as approximately equal to the 90th percentile exposure category for individuals" (US EPA, 2015b). Thus, most individuals will have lower exposures than those presented in this risk assessment.

Toxicity Benchmarks:

- Screening-level ecological benchmarks were compiled from IEPA and US EPA guidance and designed to be protective of the majority of Site conditions, leaving the option for Site-specific refinement. In some cases, these benchmarks may not be representative of the Site-specific conditions or receptors found at the Site, or may not accurately reflect concentration-response relationships encountered at the Site. For example, the ecological benchmark for cadmium is hardness-dependent. However, hardness data are not available for Sangchris Lake; therefore, Gradient relied on US EPA's default hardness of 100 mg/L. Use of a higher hardness value would increase the cadmium SWQC because benchmarks become less stringent with higher levels of hardness. Regardless of the hardness, the maximum modeled cadmium concentration is orders of magnitude below the SWQC.
- In addition, for the ecological evaluation, Gradient conservatively assumed all constituents to be 100% bioavailable. Modeled COI concentrations in surface water are considered total COI concentrations. In addition, the measured surface water data used in this report represent total concentrations. US EPA recommends using dissolved metals as a measure of exposure to ecological receptors because it represents the bioavailable fraction of metal in water (US EPA, 1993). Therefore, the modeled surface water COI concentrations may be an overestimation of exposure concentrations to ecological receptors.
- In general, it is important to appreciate that the human health toxicity factors used in this risk evaluation are developed to account for uncertainties, such that safe exposure levels used as benchmarks are often many times lower (even orders of magnitude lower) than the levels that cause effects which have been observed in human or animal studies. For example, toxicity factors incorporate a 10-fold safety factor to protect sensitive subpopulations. This means that a risk exceedance does not necessarily equate to actual harm.

4 Summary and Conclusions

A screening-level risk evaluation was performed for potential Site-related constituents in groundwater at the KPP in Kincaid, Illinois. The CSM developed for the Site indicates that groundwater beneath the AP flows into Sangchris Lake adjacent to the Site and may potentially impact surface water and sediment.

CEMs were developed for human and ecological receptors. The complete exposure pathways for humans include recreators (boaters) in Sangchris Lake who are exposed to surface water and sediment, and anglers who consume locally caught fish. Based on the local hydrogeology, residential exposure to groundwater used for drinking water or irrigation is not a complete pathway and was not evaluated. The complete exposure pathways for ecological receptors include aquatic life (including aquatic and marsh plants, amphibians, reptiles, and fish) exposed to surface water; benthic invertebrates exposed to sediment; and avian and mammalian wildlife exposed to bioaccumulative COIs in surface water, sediment, and dietary items.

Groundwater data collected from 2015 to 2021 were used to estimate exposures. Surface water data collected from Sangchris Lake in 2021 were also evaluated. For groundwater constituents retained as COIs, surface water and sediment concentrations were modeled using the maximum detected groundwater concentration. Surface water and sediment exposure estimates were screened against benchmarks protective of human health and ecological receptors for this risk evaluation.

US EPA has established acceptable risk metrics. Risks above these US EPA-defined metrics are termed potentially "unacceptable risks." Based on the evaluation presented in this report, no unacceptable risks to human or ecological receptors resulting from CCR exposures associated with the AP were identified. This means that the risks from the Site are likely indistinguishable from normal background risks. Specific risk assessment results include the following:

- For recreators exposed to surface water, all COIs were below the conservative risk-based screening benchmarks. Therefore, none of the COIs evaluated in surface water are expected to pose an unacceptable risk to recreators in Sangchris Lake adjacent to the Site.
- For recreators exposed to sediment *via* incidental ingestion and dermal contact, the modeled sediment concentrations were below health-protective sediment benchmarks. Therefore, the modeled sediment concentrations are not expected to pose an unacceptable risk to recreators exposed to sediment in Sangchris Lake adjacent to the Site.
- For anglers consuming locally caught fish, the modeled concentrations of all COIs in surface water (as well as the measured data) were below conservative benchmarks protective of fish consumption. Therefore, none of the COIs evaluated are expected to pose an unacceptable risk to recreators consuming fish caught in Sangchris Lake.
- Ecological receptors exposed to surface water include aquatic and marsh plants, amphibians, reptiles, and fish. The risk evaluation showed that none of the modeled or measured COIs in surface water exceeded protective screening benchmarks. Ecological receptors exposed to sediment include benthic invertebrates. The modeled sediment COIs did not exceed the conservative screening benchmarks; therefore, none of the COIs evaluated in sediment are expected to pose an unacceptable risk to ecological receptors.

- Ecological receptors were also evaluated for exposure to bioaccumulative COIs. This evaluation considered higher-trophic-level wildlife with direct exposure to surface water and sediment and secondary exposure through the consumption of dietary items (*e.g.*, plants, invertebrates, small mammals, and fish). None of the ecological COIs were identified as having potential bioaccumulative effects. Overall, this evaluation demonstrated that none of the COIs evaluated are expected to pose an unacceptable risk to ecological receptors.

It should be noted that this evaluation incorporates a number of conservative assumptions that tend to overestimate exposure and risk. The risk evaluation was based on the maximum detected COI concentration for each constituent; however, US EPA guidance states that risks should be based on a representative average concentration such as the 95% upper confidence limit on the mean. Thus, using the maximum concentration tends to overestimate exposure. Although the COIs identified in this evaluation also occur naturally in the environment, the contributions to exposure from natural background sources and nearby industry were not considered; thus, CCR-related exposures were likely overestimated. In addition, exposure estimates assumed 100% metal bioavailability, which likely results in overestimates of exposure and risks. Further, exposure estimates were based on inputs to evaluate the "reasonable maximum exposure"; thus, most individuals will have lower exposures than those estimated in this risk assessment.

Finally, it should be noted that because current conditions do not present a risk to human health or the environment, there will also be no unacceptable risk to human health or the environment for future conditions when the AP is closed. For all future closure scenarios, potential releases of CCR-related constituents will decline over time and, consequently, potential exposures to CCR-related constituents in the environment will also decline.

References

European Chemicals Agency (ECHA). 2019. "Ecotoxicological information: Sediment toxicity: 001 Weight of evidence." In *REACH dossier for Boron (CAS No. 7740-42-8)*. Accessed at https://echa.europa.eu/registration-dossier/-/registered-dossier/14776/6/3.

European Chemicals Agency (ECHA). 2020. "REACH dossier for lithium (CAS No. 7439-93-2)." Accessed at https://echa.europa.eu/registration-dossier/-/registered-dossier/14178.

Golder Associates Inc. 2021. Technical Memorandum to D. Mitchell, *et al*. (Kincaid Generation, LLC) re: Surface Water Sampling Summary, Kincaid Power Plant, Christian County, Illinois. 320p., December 16.

Illinois Dept. of Natural Resources (IDNR). 2022a. "Sangchris Lake State Park." Accessed at https://www2.illinois.gov/dnr/Parks/Pages/SangchrisLake.aspx.

Illinois Dept. of Natural Resources (IDNR). 2022b. "Activities at Sangchris Lake SRA." Accessed at https://www2.illinois.gov/dnr/Parks/Activity/Pages/SangchrisLake.aspx.

Illinois Environmental Protection Agency (IEPA). 2013. "Title 35: Environmental Protection, Subtitle F: Public Water Supplies, Chapter I: Pollution Control Board, Part 620: Ground Water Quality." 60p. Accessed at https://www.ilga.gov/commission/jcar/admincode/035/035006200D04200R.html.

Illinois Environmental Protection Agency (IEPA). 2019. "Title 35: Environmental Protection, Subtitle C: Water Pollution, Chapter I: Pollution Control Board, Part 302: Water Quality Standards." 194p. Accessed at https://www.epa.gov/sites/production/files/2019-11/documents/ilwqs-title35-part302.pdf.

Illinois Environmental Protection Agency (IEPA). 2021. "Standards for the disposal of coal combustion residuals in surface impoundments." Accessed at https://www.ilga.gov/commission/jcar/admincode/035/03500845sections.html.

Illinois State Geological Survey (ISGS). 2020. "Illinois Water Well (ILWATER) Interactive Map." December 31. Accessed at https://prairie-research.maps.arcgis.com/apps/webappviewer/index.html?id=e06b64ae0c814ef3a4e43a191cb57f87.

Larimore, RW; Tranquilli, JA. 1981. "The Lake Sangchris Project." *Illinois Nat. Hist. Survey Bull.* 32(4):279-289.

MacDonald, DD; Ingersoll, CG; Berger, TA. 2000. "Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems." *Arch. Environ. Contam. Toxicol.* 39:20-31. doi: 10.1007/s002440010075.

Oak Ridge National Laboratory (ORNL). 2018. "Risk Assessment Information System (RAIS) Toxicity Values and Chemical Parameters: Chemical Toxicity Values." Accessed at https://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem.

Oak Ridge National Laboratory (ORNL). 2020. "Risk Assessment Information System (RAIS) Toxicity Values and Physical Parameters Search." Accessed at https://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem.

Ramboll. 2021. "Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois." Report to Kincaid Generation, LLC. 422p., October 25.

US Dept. of Energy (US DOE). 2019. "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota." DOE-STD-1153-2019, 169p. Accessed at https://www.standards.doe.gov/standards-documents/1100/1153-astd-2019/@@images/file.

US EPA. 1989. "Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (Part A) (Interim final)." Office of Emergency and Remedial Response, NTIS PB90-155581; EPA-540/1-89-002, 287p., December.

US EPA. 1992. "Risk Assessment Guidance for Superfund: Supplemental Guidance to RAGS: Calculating the Concentration Term." Office of Emergency and Remedial Response, OSWER Directive 9285.7-08I; NTIS PB92-963373, 8p., May.

US EPA. 1993. Memorandum to US EPA Directors and Regions re: Office of Water policy and technical guidance on interpretation and implementation of aquatic life metals criteria. Office of Water, EPA-822-F93-009, October 1.

US EPA. 1998. "Methodology for assessing health risks associated with multiple pathways of exposure to combustor emissions." National Center for Environmental Assessment (NCEA), EPA 600/R-98/137, December. http://www.epa.gov/nceawww1/combust.htm.

US EPA. 2001. "Radionuclide Table: Radionuclide Carcinogenicity – Slope Factors (Federal Guidance Report No. 13 Morbidity Risk Coefficients, in Units of Picocuries)." Health Effects Assessment Summary Tables (HEAST), 72p. Accessed at https://www.epa.gov/radiation/radionuclide-table-radionuclide-carcinogenicity-slope-factors.

US EPA. 2002. "National Recommended Water Quality Criteria: 2002. Human Health Criteria Calculation Matrix." Office of Water, EPA-822-R-02-012, 23p., November.

US EPA. 2004. "Risk Assessment Guidance for Superfund (RAGS). Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) (Final)." Office of Superfund Remediation and Technology Innovation, EPA/540/R/99/005; OSWER 9285.7-02EP; PB99-963312, 156p., July. Accessed at http://www.epa.gov/oswer/riskassessment/ragse/pdf/part_e_final_revision_10-03-07.pdf.

US EPA. 2011a. "IRIS Glossary." 17p., August 31. Accessed at https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=IRIS%20Glossary#formTop.

US EPA. 2011b. "Exposure Factors Handbook: 2011 Edition." Office of Research and Development, National Center for Environmental Assessment (NCEA), EPA/600/R-090/052F, 1436p., September. Accessed at https://www.epa.gov/expobox/about-exposure-factors-handbook.

US EPA. 2014a. "Human and Ecological Risk Assessment of Coal Combustion Residuals (Final)." Office of Solid Waste and Emergency Response (OSWER), Office of Resource Conservation and Recovery, 1237p., December. Accessed http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-11993.

US EPA. 2014b. Memorandum to Superfund National Policy Managers, Regions 1-10 re: Human Health Evaluation Manual, Supplemental Guidance: Update of standard default exposure factors. Office of Solid Waste and Emergency Response (OSWER), OSWER Directive 9200.1-120, 7p., February 6. Accessed at https://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposure factors_corrected2.pdf.

US EPA. 2015a. "Hazardous and solid waste management system; Disposal of coal combustion residuals from electric utilities (Final rule)." *Fed. Reg.* 80(74):21302-21501, 40 CFR 257; 40 CFR 261, April 17

US EPA. 2015b. "Conducting a Human Health Risk Assessment." October 14. Accessed at http://www2.epa.gov/risk/conducting-human-health-risk-assessment#tab-4.

US EPA. 2015c. "Human Health Ambient Water Quality Criteria: 2015 Update." Office of Water, EPA 820-F-15-001, 3p., June.

US EPA. 2019. "EPI Suite™ - Estimation Program Interface." March 12. Accessed at https://www.epa.gov/tsca-screening-tools/epi-suitetm-estimation-program-interface.

US EPA. 2020. "Preliminary Remediation Goals for Radionuclides (PRG): PRG Calculator." July 24. Accessed at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search.

US EPA. 2021a. "Secondary drinking water standards: Guidance for nuisance chemicals." January 7. Accessed at https://www.epa.gov/sdwa/secondary-drinking-water-standards-guidance-nuisance-chemicals.

US EPA. 2021b. "Regional Screening Level (RSL) Summary Table (TR=1E-06, HQ=1)." 11p., November. Accessed at https://semspub.epa.gov/work/HQ/401635.pdf.

US EPA. 2021c. "Regional Screening Levels (RSLs) - User's Guide." 82p., November. Accessed at https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide.

US EPA. 2022. "National Recommended Water Quality Criteria - Aquatic Life Criteria Table." February 25. Accessed at https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

US EPA Region IV. 2018. "Region 4 Ecological Risk Assessment Supplemental Guidance (March 2018 Update)." Superfund Division, Scientific Support Section, 98p., March. Accessed at https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_ report-march-2018_update.pdf.

US EPA Region V. 1975. "Report on Sangchris Lake, Christian County, Illinois." Working Paper No. 314. 47p., June.

US Geological Survey (USGS); US EPA; National Water Quality Monitoring Council (NWQMC). 2022. "Sangchris Lake Near New City, IL (USGS-05575570) site data in the Water Quality Portal." April 26. Accessed at https://www.waterqualitydata.us/provider/NWIS/USGS-IL/USGS-05575570/

Appendix A

Surface Water and Sediment Modeling

Gradient modeled concentrations in Sangchris Lake surface water and sediment based on available groundwater data. First, Gradient estimated the flow rate of constituents of interest (COIs) that may flow into Sangchris Lake *via* groundwater. Then, Gradient adapted United States Environmental Protection Agency's (US EPA) indirect exposure assessment methodology (US EPA, 1998) in order to model surface water and sediment water concentrations in Sangchris Lake.

Model Overview

Groundwater flow into Sangchris Lake is represented by a one-dimensional steady-state model. In this model, the groundwater plume migrates horizontally in the uppermost aquifer (UA) and the upper semi-confining unit (USCU) (*i.e.*, potential migration pathway [PMP]) prior to discharging into Sangchris Lake. The groundwater flow entering the lake is the flow going through a cross-sectional area with a length equal to the length of the lake adjacent to the Ash Pond (AP) with potential coal combustion residuals (CCR)-related impacts and a height equal to the maximum saturated thicknesses of the UA and the PMP/USCU. It was assumed that groundwater flowing through the shallow water bearing zones (*i.e.*, the UA and the USCU/PMP) may flow into Sangchris Lake.

Groundwater flow entering Sangchris Lake mixes with the surface water in the lake. The COIs entering the lake *via* groundwater can dissolve into the water column, sorb to suspended sediments, or sorb to benthic sediments. Using US EPA's indirect exposure assessment methodology (US EPA, 1998), the model evaluates the surface water and sediment concentrations at a location downstream of the groundwater discharge, assuming a well-mixed water column.

Groundwater Discharge Rate

The groundwater discharge rate was evaluated using conservative assumptions. Gradient conservatively assumed that the groundwater concentrations were uniformly equal to the maximum detected concentration for each individual COI. Gradient ignored adsorption by subsurface soil and assumed that groundwater flowing through the shallow aquifers discharges into the lake.

For each groundwater unit, the groundwater flow rate into Sangchris Lake was derived using Darcy's Law:

$$Q = K \times i \times A$$

where:

- Q = Groundwater flow rate (m^3/s)
- K = Hydraulic conductivity (m/s)
- i = Hydraulic gradient (m/m)
- A = Cross-sectional area (m^2)

For each COI, the mass discharge rate into the lake was then calculated by:

$$m_c = C_c \times Q \times CF$$

where:

- m_c = Mass discharge rate of the COI (mg/year)
- C_c = Maximum groundwater concentration of the COI (mg/L)
- Q = Groundwater flow rate (m^3/s)
- CF = Conversion factors: 1,000 L/m^3; 31,557,600 s/year

The values of the aquifer parameters used for these calculations are provided in Table A.1. The calculated mass discharge rates were then used as inputs for the surface water and sediment partitioning model.

The cross-sectional area for the shallow water bearing units (*i.e.*, the UA and the USCU/PMP) was 13,942 m^2. The length of the discharge zone was estimated to be approximately 2,287 m. The height of the discharge zone was assumed to be the sum of the thicknesses of the USCU/PMP and the UA (*i.e.*, approximately 6 m) (Ramboll, 2021). The length of the groundwater discharge zone was estimated using Google Earth Pro (Google LLC, 2022).

The hydraulic gradient was 0.012 m/m, based on the average of the horizontal hydraulic gradients determined for the UA (0.015, 0.008, and 0.015 m/m) and the USCU/PMP (*i.e.*, 0.01 m/m) (Ramboll, 2021).

The hydraulic conductivity was 0.000046 cm/s, based on the average of the geometric mean horizontal hydraulic conductivity measured for the USCU/PMP (0.0000504 cm/s) and the UA (0.0000414 cm/s) (Ramboll, 2021).

Surface Water and Sediment Concentration

Groundwater that flows into Sangchris Lake will be diluted in the surface water flow. Constituents transported by groundwater into the surface water migrate into the water column and the bed sediments. The surface water model Gradient used to estimate the surface water and sediment concentrations is a steady-state model described in US EPA's indirect exposure assessment methodology (US EPA, 1998), and also used in US EPA's "Human and Ecological Risk Assessment of Coal Combustion Residuals" (US EPA, 2014). This model describes the partitioning of constituents between surface water, suspended sediments, and benthic sediments based on equilibrium partition coefficients. It estimates the concentrations of constituents in surface water, suspended sediments, and benthic sediments at steady-state equilibrium at a theoretical location downstream of the discharge point after complete mixing of the water column. In the analysis, Gradient used the partitioning coefficients given in Table J-1 of the US EPA CCR Risk Assessment for all COIs (US EPA, 2014). The partition coefficients are presented in Table A.2.

To be conservative, Gradient assumed that the constituents were not affected by dissipation or degradation once they entered the water body. The total water body concentration of the COI was calculated as (US EPA, 1998):

$$C_{wtot} = \frac{m_c}{V_f \times f_{water}}$$

where:

C_{wtot} = Total water body concentration of the constituent (mg/L)
m_c = Mass discharge rate of the COI (mg/year)
V_f = Water body annual flow (L/year)
f_{water} = Fraction of COI in the water column (unitless)

A mean flow rate of about 43 cubic feet per second (cfs) was determined for Sangchris Lake in 1975, almost ten years after the lake was formed by damming Clear Creek (US EPA Region V, 1975; Larimore and Tranquilli, 1981). The surface water parameters are presented in Table A.3.

The fraction of COIs in the water column was calculated for each COI using the sediment/water and suspended solids/water partition coefficients (US EPA, 2014, Table J-1). The fraction of COIs in the water column is defined as (US EPA, 2014):

$$f_{water} = \frac{(1 + [K_{dsw} \times TSS \times 0.000001]) \times \frac{d_w}{d_z}}{\left([1 + (K_{dsw} \times TSS \times 0.000001)] \times \frac{d_w}{d_z}\right) + ([bsp + K_{dbs} \times bsc] \times \frac{d_b}{d_z})}$$

where:

K_{dsw}	=	Suspended sediment-water partition coefficient (mL/g)
K_{dbs}	=	Sediment-water partition coefficient (mL/g)
TSS	=	Total suspended solids in the surface water body (mg/L), set equal to a representative average concentration of 19 mg/L for Sangchris Lake (USGS *et al*., 2022)
0.000001	=	Units conversion factor
d_w	=	Depth of the water column (m). The depth of the water column was estimated as 4.6 m (Larimore and Tranquilli, 1981)
d_b	=	Depth of the upper benthic layer (m), set equal to 0.03 m (US EPA, 2014)
$d_z = d_w + d_b$	=	Depth of the water body (m) = 4.63 m
bsp	=	Bed sediment porosity (unitless), set equal to 0.6 (US EPA, 2014)
bsc	=	Bed sediment particle concentration (g/cm^3), set equal to 1.0 g/cm^3 (US EPA, 2014)

The fraction of COIs dissolved in the water column (f_d) is calculated as (US EPA, 2014):

$$f_d = \frac{1}{1 + K_{dsw} \times TSS \times 0.000001}$$

The values of the fraction of COIs in the water column and other calculated parameters are presented in Table A.4.

The total water column concentration (C_{wcTot}) of the COIs, comprising both the dissolved and suspended sediment phases, is then calculated as (US EPA, 2014):

$$C_{wcTot} = C_{wtot} \times f_{water} \times \frac{d_z}{d_w}$$

Finally, the dissolved water column concentration (C_{dw}) for the COIs is calculated as (US EPA, 2014):

$$C_{dw} = f_d \times C_{wcTot}$$

The dissolved water column concentration was then used to calculate the concentration of COIs sorbed to suspended solids in the water column (US EPA, 1998):

$$C_{sw} = C_{dw} \times K_{dsw}$$

where:

C_{sw}	=	Concentration sorbed to suspended solids (mg/kg)
C_{dw}	=	Concentration dissolved in the water column (mg/L)
K_{dsw}	=	Suspended solids/water partition coefficient (mL/g)

In the same way, using the total water body concentration and the fraction of COIs in the benthic sediments, the model derives the total concentration in benthic sediments (US EPA, 2014, Table J-1-12):

$$C_{bstot} = f_{benth} \times C_{wtot} \times \frac{d_z}{d_b}$$

where:

C_{bstot}	=	Total concentration in bed sediment (mg/L or g/m^3)
C_{wtot}	=	Total water body concentration of the constituent (mg/L)
f_{benth}	=	Fraction of contaminant in benthic sediments (unitless)
d_b	=	Depth of the upper benthic layer (m)
$d_z = d_w + d_b$	=	Depth of the water body (m)

This value can be used to calculate dry weight sediment concentration as follows:

$$C_{sed-dw} = \frac{C_{bstot}}{bsc}$$

where:

C_{sed-dw}	=	Dry weight sediment concentration (mg/kg)
C_{bstot}	=	Total sediment concentration (mg/L)
bsc	=	Bed sediment bulk density (default value of 1 g/cm^3 from US EPA [2014])

The total sediment concentration is composed of the concentration dissolved in the bed sediment pore water (equal to the concentration dissolved in the water column) and the concentration sorbed to benthic sediments (US EPA, 1998).

The concentration sorbed to benthic sediments was calculated from (US EPA, 1998):

$$C_{sb} = C_{dbs} \times K_{dbs}$$

where:

C_{sb}	=	Concentration sorbed to bottom sediments (mg/kg)
C_{dbs}	=	Concentration dissolved in the sediment pore water (mg/L)
K_{dbs}	=	Sediments/water partition coefficient (mL/kg)

For each COI, the modeled total water column concentration, the modeled dry weight sediment concentration, and the modeled concentration sorbed to sediment are presented in Table A.5.

Table A.1 Parameters Used to Estimate Groundwater Discharge to Surface Water

Groundwater Unit	Parameter	Name	Value	Unit
UA and USCU/PMP	A	Cross-Sectional Area[a]	13,942	m^2
UA and PMP	i	Hydraulic Gradient[b]	0.012	m/m
UA and PMP	K	Hydraulic Conductivity[c]	0.000046	cm/s

Notes:
Source: Hydraulic gradient and hydraulic conductivity values from Ramboll (2021).
Cross-sectional area was estimated from Ramboll (2021).
PMP = Potential Migration Pathway; UA = Uppermost Aquifer; USCU = Upper Semi-Confined Unit.
(a) The sum of the thicknesses of the USCU/PMP and the UA (*i.e.*, approximately 6 m) multiplied by the length of the ash pond intersecting Sangchris lake (*i.e.*, about 2,287 m).
(b) The average of the horizontal hydraulic gradients determined for the UA (0.015, 0.008, and 0.015 m/m) and the USCU/PMP (*i.e.*, 0.01 m/m).
(c) The average of the geometric mean horizontal hydraulic conductivities measured for the USCU/PMP (0.0000504 cm/s) and the UA (0.0000414 cm/s).

Table A.2 Partition Coefficients

Constituent	Sediment-Water, Mean, K_{dbs}		Suspended Sediment-Water, Mean, K_{dsw}	
	Value (log_{10}) (mL/g)	Value (mL/g)	Value (log_{10}) (mL/g)	Value (mL/g)
Metals				
Arsenic	2.4	2.51E+02	3.9	7.94E+03
Barium	2.5	3.16E+02	4.0	1.00E+04
Beryllium	2.8	6.31E+02	4.2	1.58E+04
Boron	0.8	6.31E+00	3.9	7.94E+03
Cadmium	3.3	2.00E+03	4.9	7.94E+04
Chromium	4.9	7.94E+04	5.1	1.26E+05
Cobalt	3.1	1.26E+03	4.8	6.31E+04
Lead	4.6	3.98E+04	5.7	5.01E+05
Lithium	-	0	-	0
Thallium	1.3	2.00E+01	4.1	1.26E+04
Radionuclides				
Radium-226+228	-	7.40E+03	-	7.40E+03

Notes:
Source: US EPA (2014).
K_d = Equilibrium Partition Coefficient.
Lithium does not readily sorb to soils and sediments. Consequently, sediment concentrations were not modeled for this constituent (K_d was assumed to be 0).

Table A.3 Surface Water Parameters

Parameter	Name	Value	Unit
TSS	Total Suspended Solids	19	mg/L
V_{fx}	Surface Water Flow Rate	3.82×10^{10}	L/yr
d_b	Depth of Upper Benthic Layer (default)	0.03	m
d_w	Depth of Water Column	4.6	m
d_z	Depth of Water Body	4.63	m
bsc	Bed Sediment Bulk Density (default)	1	g/cm^3
bsp	Bed Sediment Porosity (default)	0.6	-
M_{TSS}	TSS Mass per Unit Area[a]	0.0874	kg/m^2
M_S	Sediment Mass per Unit Area[b]	30	kg/m^2

Notes:
Source of default values: US EPA (2014).
(a) Determined by multiplying total suspended solids, TSS by the depth of water column, d_w.
(b) Determined by multiplying depth of upper benthic layer, d_b, with sediment bed particle concentration of 1 g/cc.

Table A.4 Calculated Parameters

COI	Fraction of Constituent in the Water Column f_{water}	Fraction of Constituent in the Benthic Sediments $f_{benthic}$	Fraction of Constituent Dissolved in the Water Column $f_{dissolved}$
Arsenic	0.412	0.588	0.869
Barium	0.339	0.661	0.943
Beryllium	0.210	0.790	0.913
Boron	0.959	0.041	0.955
Cadmium	0.1616	0.8384	0.3985
Chromium	0.0065	0.9935	0.2948
Cobalt	0.211	0.789	0.455
Lead	0.039	0.961	0.095
Lithium	0.996	0.004	
Thallium	0.902	0.098	0.807
Radionuclides			
Radium-226+228	0.023	0.977	0.877

Note:
COI = Constituent of Interest.

Table A.5 Surface Water and Sediment Modeling Results

COI	Groundwater Concentration (mg/L or pCi/L)	Mass Discharge Rate (mg/yr or pCi/yr)	Total Water Column Concentration (mg/L or pCi/L)	Concentration Sorbed to Bottom Sediments (mg/kg or pCi/kg)
Total Metals				
Arsenic	0.18	4.2E+05	1.1E-05	2.4E-03
Barium	2.7	6.4E+06	1.7E-04	4.5E-02
Beryllium	0.010	2.5E+04	6.6E-07	3.2E-04
Boron	11	2.6E+07	7.0E-04	3.8E-03
Cadmium	0.0017	4.1E+03	1.1E-07	8.6E-05
Chromium	0.35	8.5E+05	2.2E-05	5.3E-01
Cobalt	0.14	3.4E+05	8.9E-06	5.1E-03
Lead	0.25	6.2E+05	1.6E-05	6.1E-02
Lithium	0.18	4.3E+05	1.1E-05	(a)
Thallium	0.0025	6.1E+03	1.6E-07	2.6E-06
Radionuclides				
Radium-226+228	9.25	2.2E+07	5.9E-04	3.8E+00

Notes:
COI = Constituent of Concern; K_d = Equilibrium Partition Coefficient; pCi/L = PicoCuries Per Liter; pCi/kg = PicoCuries Per Kilogram.
(a) Lithium does not readily sorb to soil or sediment particles; a K_d value of 0 was used for the modeling.

References

Google LLC. 2022. "Google Earth Pro." Accessed on March 8, 2022 at https://www.google.com/earth/versions/#earth-pro.

Larimore, RW; Tranquilli, JA. 1981. "The Lake Sangchris Project." *Illinois Nat. Hist. Survey Bull.* 32(4):279-289.

Ramboll. 2021. "Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois." Report to Kincaid Generation, LLC. 422p., October 25.

US EPA. 1998. "Methodology for assessing health risks associated with multiple pathways of exposure to combustor emissions." National Center for Environmental Assessment (NCEA), EPA 600/R-98/137, December. http://www.epa.gov/nceawww1/combust.htm.

US EPA. 2014. "Human and Ecological Risk Assessment of Coal Combustion Residuals (Final)." Office of Solid Waste and Emergency Response (OSWER), Office of Resource Conservation and Recovery, 1237p., December. Accessed http://www.regulations.gov/#!documentDetail;D=EPA-HQ-RCRA-2009-0640-11993.

US EPA Region V. 1975. "Report on Sangchris Lake, Christian County, Illinois." Working Paper No. 314. 47p., June.

US Geological Survey (USGS); US EPA; National Water Quality Monitoring Council (NWQMC). 2022. "Sangchris Lake Near New City, IL (USGS-05575570) site data in the Water Quality Portal." April 26. Accessed at https://www.waterqualitydata.us/provider/NWIS/USGS-IL/USGS-05575570/

Appendix B

Screening Benchmarks

Table B.1 Calculated Water Quality Standards Protective of Incidental Ingestion and Fish Consumption

Human Health COI	BCF[a] (L/kg-tissue)	Basis	MCL (mg/L)	RfD (mg/kg-day)	ADI[b] (mg/day)	Human Threshold Criteria		
						Water & Fish (mg/L)	Water Only (mg/L)	Fish Only (mg/L)
Total Metals								
Arsenic	44	NRWQC (2002)	0.010	0.00030	0.020	0.022	2.0	0.023
Barium	130	US EPA (2014)	2.0	0.20	4.0	1.5	400	1.5
Beryllium	19	NRWQC (2002)	0.0040	0.0020	0.0080	0.021	0.80	0.021
Boron	1	(c)	NC	0.20	14	467	1,400	700
Chromium	16	NRWQC (2002)	0.10	1.5	0.20	0.61	20	0.63
Cobalt	300	ORNL (2020)	NC	0.00030	0.021	0.0035	2.1	0.0035
Lead	46	US EPA (2014)	0.015	NC	0.030	0.015	0.015	0.015
Lithium	1	(c)	NC	0.002	0.14	4.7	14	7.0
Thallium	116	NRWQC (2002)	0.0020	0.000010	0.0040	0.0017	0.40	0.0017
Human Health COI	**BAF (L/kg-tissue)**		**MCL (pCi/L)**	**ADI (pCi/day)**	**Food Ingestion Slope Factor[d] (risk/pCi)**	**Human Threshold Criteria**		
	SW-Fish	**Basis**				**Water & Fish (pCi/L)**	**Water Only (pCi/L)**	**Fish Only (pCi/L)**
Radium-226+228	4.0	ORNL (2020)	5	10	1.43E-09	1,000	1,000	87,413

Notes:

ADI = Acceptable Daily Intake; BAF = Bioaccumulation Factor; BCF = Bioconcentration Factor; COI = Constituent of Interest; IEPA = Illinois Environmental Protection Agency; MCL = Maximum Contaminant Level; NC = No Criterion Available; NRWQC = National Recommended Water Quality Criteria; ORNL = Oak Ridge National Laboratory; pCi = PicoCurie; Ra = Radium; RfD = Reference Dose; US EPA = United States Environmental Protection Agency.

(a) BCFs from the following hierarchy of sources:

NRWQC (US EPA, 2002). National Recommended Water Quality Criteria: 2002. Human Health Criteria Calculation Matrix.

US EPA (2014a). Human and Ecological Risk Assessment of Coal Combustion Residuals.

ORNL RAIS (ORNL, 2020). Risk Assessment Information System (RAIS) Toxicity Values and Chemical Parameters.

(b) ADI based on the MCL is calculated as the MCL (mg/L) multiplied by a water ingestion rate of 2 L/day. In the absence of an MCL, the ADI was calculated as the RfD (mg/kg-day) multiplied by the body weight (70 kg).

(c) BCF of 1 was used as a conservative assumption, due to lack of published BCF.

(d) Food ingestion slope factors for Ra-226+D and Ra-228+D were compared and the higher factor (Ra-228+D) was selected. The "+D" indicates that the risks from "associated short-lived radioactive decay products are also included" (US EPA, 2001).

Equations from IEPA (2019):

Consumption of Water and Fish

$$HTC = \frac{ADI}{W + (F \times BCF)}$$

Incidental Consumption of Water Only

$$HTC = \frac{ADI}{W}$$

Consumption of Fish Only

$$HTC = \frac{ADI}{F \times BCF}$$

Where:

Human Threshold Criteria (HTC)	Chemical-specific	mg/L
Acceptable Daily Intake (ADI)	Chemical-specific	mg/day
Fish Consumption Rate (F)	0.02	kg/day
Bioconcentration Factor (BCF)/ Bioaccumulation Factor (BAF)	Chemical-specific	L/kg-tissue
Water Consumption Rate (W)	0.01	L/day
Body Weight	70	kg
Target Cancer Risk (TCR)	1.0E-05	

Radium-226+228

$$HTC = \frac{TCR}{(SF \times BAF \times F)}$$

Table B.2 Recreator Exposure to Sediment

COI	Relative Bioavailability (unitless)	Dermal Absorption Fraction (unitless)	Cancer: TRV: CSF $(mg/kg\text{-}day)^{-1}$	Cancer: TRV: Dermal CSF $(mg/kg\text{-}day)^{-1}$	Cancer: Child + Adult: Incidental Ingestion SL (mg/kg)	Cancer: Child + Adult: Dermal Contact SL (mg/kg)	Cancer SL (mg/kg)	Non-Cancer: TRV: RfD (mg/kg-day)	Non-Cancer: TRV: Dermal RfD (mg/kg-day)	Non-Cancer: Child: Incidental Ingestion SL (mg/kg)	Non-Cancer: Child: Dermal Contact SL (mg/kg)	Non-Cancer: Adult: Incidental Ingestion SL (mg/kg)	Non-Cancer: Adult: Dermal Contact SL (mg/kg)	Non-cancer SL (mg/kg): Child	Non-cancer SL (mg/kg): Adult	Recreator RSL Sediment (mg/kg)	Basis[a]
Total Metals																	
Arsenic	1	3.0E-02	1.5E+00	1.5E+00	8.1E+01	4.1E+02	6.8E+01	3.0E-04	3.0E-04	4.1E+02	4.4E+03	4.4E+03	8.0E+03	3.8E+02	2.8E+03	6.8E+01	c
Barium	1	NA	NC	NC	NC	NC	NC	2.0E-01	1.4E-02	2.7E+05	NA	2.9E+06	NA	2.7E+05	2.9E+06	2.7E+05	nc
Beryllium	1	NA	NC	NC	NC	NC	NC	2.0E-03	1.4E-05	2.7E+03	NA	2.9E+04	NA	2.7E+03	2.9E+04	2.7E+03	nc
Boron	1	NA	NC	NC	NC	NC	NC	2.0E-01	2.0E-01	2.7E+05	NA	2.9E+06	NA	2.7E+05	2.9E+06	2.7E+05	nc
Chromium	1	NA	NC	NC	NC	NC	NC	1.5E+00	2.0E-02	2.1E+06	NA	2.2E+07	NA	2.1E+06	2.2E+07	2.1E+06	nc
Cobalt	1	NA	NC	NC	NC	NC	NC	3.0E-04	3.0E-04	4.1E+02	NA	4.4E+03	NA	4.1E+02	4.4E+03	4.1E+02	nc
Lead	1	NA	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	4.0E+02	L
Lithium	1	NA	NC	NC	NC	NC	NC	2.0E-03	2.0E-03	2.7E+03	NA	2.9E+04	NA	2.7E+03	2.9E+04	2.7E+03	nc
Thallium	1	NA	NC	NC	NC	NC	NC	1.0E-05	1.0E-05	1.4E+01	NA	1.5E+02	NA	1.4E+01	1.5E+02	1.4E+01	nc
Radionuclides																**Total Soil PRG (pCi/kg)**	
Radium-226+228																7.9E+03	

Notes:

COI = Constituent of Interest; CSF = Cancer Slope Factor; NC = No Criterion Available; pCi = PicoCurie; PRG = Preliminary Remediation Goal; RfD = Reference Dose; RSL = Regional Screening Level; SL = Screening Level; TRV = Toxicity Reference Value; US EPA = United States Environmental Protection Agency.

(a) Screening benchmark defined as the lower of the Screening Levels for cancer and non-cancer. The basis of the benchmark presented as c = based on cancer endpoint, nc = based on non-cancer endpoint, or L = based on blood lead levels.

Equations for Screening Benchmark and Screening Levels:

$$\text{Screening Benchmark} = \frac{1}{\frac{1}{SL_{ing}} + \frac{1}{SL_{derm}}}$$

$$\text{Non-cancer } SL_{ing} = \frac{THQ * RfD}{Intake} \qquad \text{Cancer } SL_{ing} = \frac{TR}{Intake * CSF}$$

$$\text{Non-cancer } SL_{derm} = \frac{THQ * RfD}{Intake * ABS} \qquad \text{Cancer } SL_{derm} = \frac{TR}{Intake * ABS * CSF}$$

Where:

Target Risk (TR)	1E-05	
Target Hazard Quotient (THQ)	1	
Reference Dose (RfD)	Chemical-specific	mg/kg-day
Dermal Absorption Fraction (ABS)	Chemical-specific	
Cancer Slope Factor (CSF)	Chemical-specific	mg/kg
Incidental Ingestions Screening Level (SL_{ing})	Chemical-specific	mg/kg
Dermal Contact Screening Level (SL_{derm})	Chemical-specific	mg/kg

Sediment – Ingestion (Chemical)

$$\text{Intake Factor (IF)} = \frac{IR \times EF \times ED \times CF}{BW \times AT}$$

Parameter	Description	Non-Cancer: Child	Non-Cancer: Adult	Cancer: Child	Cancer: Adult	Basis
Intake Factor (IF)	=	7.3E-07	6.8E-08	6.3E-08	2.0E-08	
IR	Ingestion Rate (mg/day)	67	33	67	33	One-third of US EPA residential soil ingestion rate (Professional Judgment)
EF	Sediment Exposure Frequency (days/year)	60	60	60	60	2 days/week between April and October when air temperature > 70°F (Professional Judgment)
ED	Exposure Duration (years)	6	20	6	20	Default value for Resident (US EPA, 2021b)
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001	
BW	Body Weight (kg)	15	80	15	80	Default value for Resident (US EPA, 2021b)
AT	Averaging Time (days)	2,190	7,300	25,550	25,550	Default value for Resident (US EPA, 2021b)

Sediment – Dermal Contact (Chemical)

$$\text{Intake Factor (IF)} = \frac{SA \times AF \times EF \times ED \times CF}{BW \times AT}$$

Parameter	Description	Non-Cancer: Child	Non-Cancer: Adult	Cancer: Child	Cancer: Adult	Basis
Intake Factor (IF)	=	2.2E-06	1.2E-06	1.9E-07	3.6E-07	
SA	Surface Area Exposed to Sediment (cm^2/day)	1,026	3,026	1,026	3,026	Age weighted SA for lower legs and feet (US EPA, 2011b)
AF	Sediment Skin Adherence Factor (mg/cm^2)	0.2	0.2	0.2	0.2	Age weighted AF for children exposed to sediment (US EPA, 2011b)
EF	Sediment Exposure Frequency (days/year)	60	60	60	60	2 days/week between April and October when air temperature > 70°F (Professional Judgment)
ED	Exposure Duration (years)	6	20	6	20	Default value for Resident (US EPA, 2021b)
CF	Conversion Factor (kg/mg)	0.000001	0.000001	0.000001	0.000001	
BW	Body Weight (kg)	15	80	15	80	Default value for Resident (US EPA, 2021b)
AT	Averaging Time (days)	2,190	7,300	25,550	25,550	Default value for Resident (US EPA, 2021b)

Table B.3.1 Recreator PRGs for Soil, Input Values

Variable	Recreator Soil Default Value	Form-Input Value
A (PEF Dispersion Constant)	16.2302	16.8653
B (PEF Dispersion Constant)	18.7762	18.7848
City (Climate Zone)	Default	Chicago, IL (7)
C (PEF Dispersion Constant)	216.108	215.0624
Cover layer thickness for GSF (gamma shielding factor) cm	0 cm	0 cm
$CF_{rec\text{-}fowl}$ (fowl contaminated fraction) unitless	1	1
$CF_{rec\text{-}game}$ (game contaminated fraction) unitless	1	1
ED_{rec} (exposure duration - recreator) yr		26
EF_{rec} (exposure frequency - recreator) day/yr		60
$f_{p\text{-}fowl}$ (fowl on-site fraction) unitless	1	1
$f_{p\text{-}game}$ (land game on-site fraction) unitless	1	1
$f_{s\text{-}fowl}$ (fraction of year fowl is on site) unitless	1	1
$f_{s\text{-}game}$ (fraction of year land game is on site) unitless	1	1
$MLF_{pasture}$ (pasture plant mass loading factor) unitless	0.25	0.25
t_{rec} (time - recreator) yr		26
TR (target risk) unitless	0.000001	0.000001
F(x) (function dependent on U_m/U_t) unitless	0.194	0.182
PEF (particulate emission factor) m^3/kg	1,359,344,438	1,560,521,177
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	98.431
A_s (acres)	0.5	0.5
Site area for ACF (area correction factor) m^2	1,000,000 m^2	1,000 m^2
ED_{rec} (exposure duration - recreator) yr		26
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr		20
$ED_{resc\text{-}c}$ (exposure duration - recreator child) yr		6
EF_{rec} (exposure frequency - recreator) day/yr		60
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr		60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr		60
ET_{rec} (exposure time - recreator) hr/day		8
$ET_{rec\text{-}a}$ (exposure time - recreator) hr/day		8
$ET_{rec\text{-}c}$ (exposure time - recreator) hr/day		8
$IFA_{rec\text{-}adj}$ (age-adjusted inhalation rate - recreator) m^3		9,200
$IFS_{rec\text{-}adj}$ (age-adjusted soil intake rate - recreator) mg		63,720
$IRA_{rec\text{-}a}$ (inhalation rate - recreator adult) m^3/day	20	20
$IRA_{rec\text{-}c}$ (inhalation rate - recreator child) m^3/day	10	10
$IRS_{rec\text{-}a}$ (soil intake rate - recreator adult) mg/day	100	33
$IRS_{rec\text{-}c}$ (soil intake rate - recreator child) mg/day	200	67
t_{rec} (time - recreator) yr		26
TR (target risk) unitless	0.000001	0.000001
U_m (mean annual wind speed) m/s	4.69	4.65
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Notes:

IL = Illinois; PRG = Preliminary Remediation Goal; yr = Year.

Table B.3.2 Recreator PRGs for Soil, Ra-226

Isotope	ICRP Lung Absorption Type	Soil Ingestion Slope Factor (risk/pCi)	Inhalation Slope Factor (risk/pCi)	External Exposure Slope Factor (risk/yr per pCi/g)	Food Ingestion Slope Factor (risk/pCi)	Lambda (1/yr)	Half-life (yr)	1,000 m^2 Soil Volume Area Correction Factor	0 cm Soil Volume Gamma Shielding Factor	Particulate Emission Factor (m^3/kg)	Dry Soil-to-Plant Transfer Factor (pCi/g-fresh plant per pCi/g-dry soil)	Beef Transfer Factor (pCi/kg per pCi/d)	Poultry Transfer Factor (pCi/kg per pCi/d)	Ingestion PRG TR = 1.0E-06 (pCi/g)	Inhalation PRG TR = 1.0E-06 (pCi/g)	External Exposure PRG TR = 1.0E-06 (pCi/g)	Total PRG TR = 1.0E-06 (pCi/g)	Total PRG TR = 1.0E-06 (mg/kg)	Total PRG TR = 1.0E-06 (pCi/kg)
Ra-226	S	6.77E-10	2.82E-08	2.50E-08	5.14E-10	4.33E-04	1.60E+03	6.85E-01	1.00E+00	1.56E+09	1.95E-02	1.70E-03	-	2.32E+01	6.02E+03	4.10E+01	1.48E+01	1.50E-05	1.48E+04

Notes:

d = Day; ICRP = International Commission on Radiological Protection; pCi = PicoCurie; PRG = Preliminary Remediation Goal; Ra = Radium; S = Slow; TR = Target Risk; yr = Year.

Table B.3.3 Recreator PRGs for Soil, Ra-228

Isotope	ICRP Lung Absorption Type	Soil Ingestion Slope Factor (risk/pCi)	Inhalation Slope Factor (risk/pCi)	External Exposure Slope Factor (risk/yr per pCi/g)	Food Ingestion Slope Factor (risk/pCi)	Lambda (1/yr)	Half-life (yr)	1,000 m^2 Soil Volume Area Correction Factor	0 cm Soil Volume Gamma Shielding Factor	Particulate Emission Factor (m^3/kg)	Dry Soil-to-Plant Transfer Factor (pCi/g-fresh plant per pCi/g-dry soil)	Beef Transfer Factor (pCi/kg per pCi/d)	Poultry Transfer Factor (pCi/kg per pCi/d)	Ingestion PRG TR = 1.0E-06 (pCi/g)	Inhalation PRG TR = 1.0E-06 (pCi/g)	External Exposure PRG TR = 1.0E-06 (pCi/g)	Total PRG TR = 1.0E-06 (pCi/g)	Total PRG TR = 1.0E-06 (mg/kg)	Total PRG TR = 1.0E-06 (pCi/kg)
Ra-228	S	1.98E-09	4.37E-08	3.43E-11	1.42E-09	1.21E-01	5.75E+00	1.00E+00	1.00E+00	1.56E+09	1.95E-02	1.70E-03	-	7.93E+00	3.89E+03	2.04E+04	7.91E+00	2.90E-08	7.91E+03

Notes:

d = Day; ICRP = International Commission on Radiological Protection; pCi = PicoCurie; PRG = Preliminary Remediation Goal; Ra = Radium; S = Slow; TR = Target Risk; yr = Year.

Appendix B

Corrective Action Alternatives Analysis – Supporting Information Report

Intended for

Kincaid Generation, LLC
1500 Eastport Plaza Drive
Collinsville, IL 62234

Date

May 8, 2025

Project No.

1940110241-007

CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT

ASH POND
KINCAID POWER PLANT
IEPA ID NO. W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT KINCAID POWER PLANT ASH POND IEPA ID NO. W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940110241-007**
Recipient	**Kincaid Generation, LLC**
Document type	**Supporting Information Report**
Revision	**FINAL**
Date	**May 8, 2025**
Prepared by	**Sarah Jo Martens**
Checked by	**J. Austin Bond, PE**
Approved by	**Brian G. Hennings, PG**
Description	**Corrective Action Alternatives Analysis Supporting Information Report**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Brian G. Hennings, PG
Project Officer Hydrogeology

I, J. Austin Bond, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this report has been prepared in accordance with the accepted practice of engineering. 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.

J. Austin Bond, PE
Qualified Professional Engineer

062-075181	IL	11/30/25
License Number	**State**	**Exp. Date**

Affix Seal

CONTENTS

TABLES (WITHIN TEXT)

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
AP	Ash Pond, also referred to as site
bgs	below ground surface
BMP	best management practices
CAAA	Corrective Action Alternatives Analysis
CAAA-SIR	Corrective Action Alternatives Analysis Supporting Information Report
CAGMP	Corrective Action Groundwater Monitoring Plan
CAP	Corrective Action Plan
CBR	closure-by-removal
CCR	coal combustion residuals
CCR Rule	40 C.F.R. § 257 Subpart D
CIP	closure-in-place
CMA	Corrective Measures Assessment
COC	constituents of concern
CSM	conceptual site model
GMR	Groundwater Modeling Report
gpm	gallons per minute
Gradient	Gradient Corporation
GWE	groundwater extraction
GWET	groundwater extraction trench
GWP	groundwater polishing
GWPS	groundwater protection standard(s)
HDPE	high-density polyethylene
ID	identification
IEPA	Illinois Environmental Protection Agency
Kd	soil adsorption coefficient
KPP	Kincaid Power Plant
LCU	lower confining unit
mL/g	milliliters per gram
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PDI	pre-design investigation
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RS Means	RS Means Heavy Construction Cost Data
SI	surface impoundment
TDS	total dissolved solids
UA	uppermost aquifer
USEPA	United States Environmental Protection Agency

1. INTRODUCTION AND BACKGROUND

1.1 Plant and Site Information

Kincaid Generation, LLC is the operator of the coal-fired Kincaid Power Plant (KPP), located in Christian County, Illinois. Kincaid Generation, LLC intends to complete groundwater corrective action for the coal combustion residuals (CCR) surface impoundment (SI), referred to as the Ash Pond (AP), which is identified by Illinois Environmental Protection Agency (IEPA) identification (ID) number (No.) W0218140002-01, CCR Unit ID of 141, and National Inventory of Dams (NID) No. IL50706. Groundwater corrective action for the AP will be performed under the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments [1] and the requirements of Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 Subpart D, herein referred to as the Federal CCR Rule [2].

1.2 CAAA-SIR Background and Scope

35 I.A.C. § 845 requires a Corrective Action Alternatives Analysis (CAAA) to be completed as part of remedy selection, pursuant to the requirements of 35 I.A.C. § 845.670(e). The CAAA for the AP was prepared by Gradient Corporation (Gradient). Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Corrective Action Alternatives Analysis Supporting Information Report (CAAA-SIR) to provide information requested by Gradient to support the CAAA for the AP.

This CAAA-SIR is a feasibility-level assessment utilized to evaluate multiple groundwater corrective action alternatives. The remedy that is ultimately selected within the CAAA, to which this CAAA-SIR is attached, was then further developed into a permit-level remedy within the Corrective Action Plan (CAP), to which the CAAA is attached. Therefore, there may be minor differences in information presented for the selected remedy between this CAAA-SIR and the CAP. Information that may be different includes, but is not limited to, groundwater quality data, groundwater modeling inputs and results, implementation schedules, and time to reach groundwater protection standards (GWPS), physical dimensions and scope of the remedy, engineering design parameters, and number and location of wells included in the monitoring system. These differences are due to the further refinement of the remedial design that is inherent with advancing the selected remedy into the permit-level remedial design that is included within the CAP.

1.2.1 Identified Corrective Action Alternatives

Corrective action remedies selected for evaluation within this CAAA-SIR were identified as potentially feasible for the AP in the Corrective Measures Assessment (CMA), prepared by Ramboll and attached to the CAAA prepared by Gradient. The remedies identified as potentially feasible included:

- Alternative 1: Source control with groundwater polishing (GWP);
- Alternative 2: Source control with groundwater extraction (GWE).

Other remedies, including source control with groundwater cutoff wall, and source control with in-situ treatment (permeable reactive barrier or in-situ chemical treatment) were determined to be infeasible for the site during the CMA process.

Additionally, source control with phytoremediation was retained for further evaluation in the CMA and was evaluated in the groundwater modeling process described in the attached Groundwater Modeling Technical Memorandum (**Appendix A1**). However, the groundwater modeling indicated minimal to no impact on the time to achieve GWPS relative to Alternative 1 and a substantially longer time to achieve GWPS than Alternative 2. Therefore, phytoremediation was omitted for further consideration as a CAAA-SIR alternative as it did not provide tangible benefits in time to reach GWPS times over Alternatives 1 and 2, relative to the degree of construction difficulty and operational reliability.

1.2.2 Scope of CAAA-SIR

Ramboll completed the following tasks and documented the tasks within this CAAA-SIR, for each of the corrective action alternative remedies listed in **Section 1.2.1**:

- Feasibility-level design drawings were developed to show the approximate extents and typical sections/details of the Alternative 2 remedy (source control with GWE) (**Appendix B**). Drawings were not prepared for the Alternative 1 remedy as it does not involve construction at the site.
- Narratives describing the implementation of each remedy were developed, including the pre-design, design, construction, operations and maintenance (O&M), and closeout phases.
- Feasibility-level schedules providing the estimated time to implement the remedy were developed, including design, permitting, construction, and post-construction O&M.
- Feasibility-level plans for the management of extracted groundwater were developed for alternatives where groundwater extraction is a component of the potential corrective action.
- Information required to evaluate specific portions of 35 I.A.C. § 845.670(e) requirements were prepared, as requested by Gradient, including 35 I.A.C. § 845.670(e)(1)(H) and 35 I.A.C. § 845.670(e)(3).
- Estimates of implementation-based equipment mileage, vehicle delivery mileage, labor hours, and labor commuting mileage, were developed for each remedy alternative where physical construction and/or O&M activities are expected to occur.

All remedies presented within this CAAA-SIR assume that the source control for the AP would also be implemented as described in the Final Closure Plan included in the Construction Permit Application [3]. Source control is the primary corrective action for the AP and would include removing free liquids from the CCR and completing a hybrid closure-in-place (CIP) by consolidating the current AP footprint from 172 acres down to 84 acres (the CIP area) and installing a geomembrane final cover system.

Groundwater modeling (**Appendix A1**) estimates that source control alone would result in GWPS being achieved approximately 17 years after closure completion without implementing other forms of corrective action. The potential remedies evaluated in this CAAA-SIR are intended to work in conjunction with the primary remedy, which is source control.

1.2.3 Criterion for Estimating Time to Achieve GWPS

Times to achieve GWPS for each of the remedial alternatives were estimated for the wells within the existing AP compliance monitoring system with average observed boron concentrations exceeding the GWPS of 2 milligrams per liter (mg/L). This approach was utilized to provide a consistent comparison of the estimated time to reach GWPS for each remedy, as required by 35 I.A.C. § 845.670(e)(f).

1.3 Report Contents

The following information is included within this report:

- **Section 1** includes the introduction and background;
- **Section 2** includes information for the Alternative 1 remedy: source control with GWP;
- **Section 3** includes information for the Alternative 2 remedy: source control with GWE;
- **Section 4** includes information used to develop estimates of material quantities, labor hours, and mileage; and
- **Section 5** includes reference documents used in the development of this CAAA-SIR.

2. ALTERNATIVE 1 REMEDY: SOURCE CONTROL WITH GWP

The Alternative 1 remedy, source control with GWP, would include a consolidate-and-cap approach for source control, after which GWP would be implemented. GWP is a remedial alternative that relies on natural geochemical processes and may be appropriate as recognized by the United States Environmental Protection Agency (USEPA) in a final policy directive for groundwater remediation [4].

2.1 Supporting Groundwater Modeling and Time to Reach GWPS

The constituents of concern (COCs) currently exceeding the GWPSs at compliance groundwater monitoring wells as of the 2024 Annual Report [5] are boron, sulfate, and total dissolved solids (TDS). Boron was selected for modeling source control presented in the Final Closure Plan and was identified as a surrogate for the exceedances[1] of sulfate and TDS, as described in the Groundwater Modeling Report (GMR) which is also attached as **Appendix A2** [6]. For modeling purposes, it was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil adsorption coefficient [Kd] was set to 0 milliliters per gram [mL/g]) which is a conservative estimate for predicting contaminant transport times in the model. Boron transport is likely to be affected by both chemical and physical attenuation mechanisms (*i.e.*, adsorption and/or precipitation reactions as well as dilution and dispersion) [6]. Physical attenuation (dilution and dispersion) of contaminants in groundwater is simulated in the groundwater computer models. Chemical attenuation mechanisms and their effect on modeled times for exceedances to reach the GWPS are discussed in the Groundwater Polishing Evaluation Report [7] attached to the CAAA and discussed herein.

Groundwater modeling for the Alternative 1 remedy performed to support the closure plan for the AP and further refined in 2024 (**Appendix A1**), estimated that GWPS would be met in 17 years after the implementation of source control for all wells within the existing AP monitoring system.

2.2 Remedy Implementation

Implementation of GWP would be initiated after source control (*e.g.,* final closure of the AP) is completed. Implementation would include performing corrective action groundwater monitoring, enacting an adaptive management strategy, and, after GWPS have been met, performing corrective action closure and completion activities. Information associated with each of these activities is described below.

- Corrective Action Monitoring
  - Regular corrective action groundwater monitoring would be conducted using a corrective action groundwater monitoring system designed in accordance with 35 I.A.C. § 845.680(c), which specified that wells must be installed within the plume of contamination that lies beyond the waste boundary.

[1] Throughout this document, "exceedance" or "exceedances" is intended to refer only to potential exceedances of proposed applicable background statistics or GWPSs as described in the proposed groundwater monitoring program, which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC operating permit application for the KPP AP. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and, therefore, Kincaid Generation, LLC has not identified any actual exceedances.

- Samples would be collected for each COC required by 35 I.A.C. § 845.600(a)(1). Samples would be collected on a quarterly basis initially and potentially reduced to a semiannual basis once five years of monitoring have occurred, in accordance with 35 I.A.C. § 845.650(b)(4).
- Monitoring results would be submitted to IEPA after each monitoring event, in addition to an annual groundwater monitoring and corrective action report, in accordance with 35 I.A.C. § 845.640(e).
- Routine maintenance of the monitoring system would be conducted during the monitoring period. This would include inspection of the wells, making repairs to the wells (as and if needed), and rehabilitation and/or replacing the wells to improve performance (as and if needed).

- Adaptive Management during Monitoring
  - Groundwater monitoring results would be evaluated and documented in the monitoring reports submitted to IEPA, in accordance with 35 I.A.C. 845.610(e).
  - Remedy progress evaluation as part of adaptive site management may include additional investigation to inform updates to the conceptual site model (CSM), groundwater, and geochemical models.
  - If remedy progress does not correspond with expectations, additional methods or techniques to achieve compliance with GWPS could be evaluated and, if feasible, implemented in accordance with 35 I.A.C. 845.680(b).
- Corrective Action Confirmation Monitoring and Completion
  - After GWPS have been met for all corrective action monitoring wells, corrective action confirmation groundwater monitoring would be implemented. This would include monitoring each well for three additional years to confirm that GWPS have been achieved, in accordance 35 I.A.C. § 845.680(c).
    - It should be noted that post-closure care groundwater monitoring required for a 30-year period by 35 I.A.C. § 845.780(c) would continue to occur after corrective action groundwater monitoring is completed.
  - After completion of the corrective action confirmation monitoring period, a Corrective Action Completion Report and Certification would be prepared and submitted to IEPA, in accordance with 35 I.A.C. § 845.680(e).

2.2.1 Remedy Implementation Schedule

A feasibility-level implementation schedule for the Alternative 1 source control with GWP remedy is provided in **Table A** below.

Table A. Feasibility-Level Implementation Schedule – Alternative 1: Source Control with GWP

Implementation Phase	Implementation Task	Timeframe (Preliminary Estimates)
Corrective Action Implementation	Corrective Action Monitoring (Time to Meet GWPSs)	204 months*
	Corrective Action Confirmation Monitoring	36 months*
	Corrective Action Completion	6 months*
	Timeframe to Complete Corrective Action Implementation	246 months*
	Total Timeline to Complete Corrective Action (after completion of source control)	246 months* (20.5 years*)

*All timeframes are assumed to start after source control (*e.g.,* final closure of the SI) is complete and a corrective action permit has been issued by IEPA, whichever is later.

2.2.2 Management of Extracted Groundwater

No groundwater extraction would occur under this remedy.

2.2.3 35 I.A.C. § 845.670(e)(1)(H) and 35 I.A.C. § 845.670(e)(3) Information

As requested by Gradient, the following information required by 35 I.A.C. § 845.670(e)(1)(H) and 35 I.A.C. § 845.670(e)(3) has been developed for the remedy. The information was developed based on preliminary-level information contained within the CMA for the KPP AP and then refined based on additional feasibility-level design activities performed as part of the development of this CAAA-SIR.

- Potential Need for Replacement of the Remedy – 35 I.A.C. § 845.670(e)(1)(H)
  - No replacement of the remedy would be required for source control with GWP, as a physical remedy would not be constructed.
- Degree of Difficulty Associated with Constructing the Remedy – 35 I.A.C. § 845.670(e)(3)(A)
  - No construction would be required with the source control with GWP remedy; therefore, there is no difficulty in construction of the remedy.
- Expected Operational Reliability of the Remedy - 35 I.A.C. § 845.670(e)(3)(B)
  - As documented in the Groundwater Polishing Evaluation Report [7], groundwater geochemical processes anticipated to occur as downgradient groundwater approaches ambient background conditions are not expected to alter the chemical mechanisms of GWP and are not expected to delay the modeled time to achieve GWPS compliance.
  - GWP would begin once source control has been completed without delays and continuously function during the corrective action period.
- Need to Coordinate with and Obtain Necessary Approvals and permits from Other Agencies - 35 I.A.C. § 845.670(e)(3)(C)
  - No permits from other agencies would be required outside of permits issued by IEPA for source control (Closure Plan and Construction Permit Application, submitted to IEPA in 2022 [3]).

- Availability of Necessary Equipment and Specialists - 35 I.A.C. § 845.670(e)(3)(D)
  - Equipment and specialists for field data collection and groundwater sampling are required for the GWP alternative. Laboratory equipment and specialists would also be required to assess groundwater concentrations of site constituents. Groundwater professionals (i.e., geologists, hydrogeologists, statisticians, geochemists) would be required to perform statistical analysis and other assessments to confirm that GWP is functioning as-intended and prepare corrective-action related groundwater monitoring and progress reports.
  - The equipment and specialists required for site groundwater monitoring and analysis are currently performing this work as part of the routine groundwater monitoring program in accordance with 35 I.A.C. § 845.220(c)(4). Therefore, no new equipment or specialists are required for groundwater monitoring for this alternative.
- Available Capacity and Location of Needed Treatment, Storage, and Disposal Services – 35 I.A.C. § 845.670(e)(3)(E)
  - No treatment, storage, or disposal services would be required with the source control with GWP remedy, as GWP would not generate any appreciable volume of waste or wastewater.

3. ALTERNATIVE 2 REMEDY: SOURCE CONTROL WITH GWET

The Alternative 2 remedy, source control with GWET, would include the GWP elements described in Alternative 1 with the addition of two groundwater extraction trenches (GWETs) located within the AP and installed in conjunction with the CIP of the CCR (*e.g.,* source control implementation). The purpose of the GWETs would be to provide active removal of CCR-impacted groundwater in order to accelerate the timeline for achieving GWPS in all AP monitoring wells.

The trenches would be installed to depths which intercept the uppermost aquifer (UA) and extend 1 to 2 feet into the lower confining unit (LCU). The GWETs would be constructed by excavation of existing subgrade soils, installation of a horizontal collection pipe at the bottom of the trench, backfilling with clean granular fill, and placement of a compacted clay cap over the trench to reduce surface water infiltration. The horizontal collection pipe would drain to sumps spaced throughout the trench with an extraction pump installed within each sump. The trenches are described as follows:

- Northern Trench
  - Located along the interior (southern) toe of the existing northern perimeter berm between the former AP and Sangchris Lake, upgradient and approximately along the alignment of MW-6, MW-28, MW-29, MW-12, MW-30, MW-31, MW-5, and MW-32, and within the closure-by-removal (CBR) area of the AP, where no CCR would remain under post-closure conditions.
  - A total length of approximately 3,400 feet and width of approximately 2 to 3 feet.
  - Extend from the AP post-closure ground surface (approximate elevation of 600 feet2) to approximately 22 feet below ground surface (bgs), with an approximate drain stage elevation of 578 feet.
  - Estimated extraction rate of approximately 30 gallons per minute (gpm) with vertical extraction sumps spaced approximately 700 feet apart along the alignment, equating to approximately 5 sumps.
- Southern Trench
  - Located along the northern and northwestern toe of the planned new berm for the CIP area of the AP where CCR would be consolidated and remain in place after closure.
  - A total length of approximately 2,700 feet and width of 2 feet.
  - Extend from post source control implementation ground surface (approximate elevation of 600 feet) to approximately 25 feet bgs, with an approximate drain stage elevation of 575 feet.
  - Estimated extraction rate of approximately 80 gpm with vertical extraction sumps spaced 700 feet apart along the alignment, equating to approximately 4 sumps.

[2] All elevations in this report are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

The preliminary depth and extents of the trenches are based on available groundwater and lithology information and may be adjusted during future design phases. Extracted groundwater would be collected and routed via pneumatic pumps and air compressors to a new on-site lined settling pond and discharged through a new outfall, where it would be managed in accordance with the National Pollutant Discharge Elimination System (NPDES) permits for the site.

Feasibility-level design drawings of the Alternative 2 source control with GWET remedy are provided as **Figure 1** in **Appendix B**.

3.1 Remedy Scoping and Groundwater Modeling Results

The extent of the remedy (*i.e.,* size and location of trenches) were selected using iterative, three-dimensional groundwater fate and transport modeling. This approach was supplemented by reviewing physical constraints around the AP and designating locations on KPP property where the trenches could feasibly be constructed with limited impacts to other site features. The locations were additionally selected to avoid sensitive areas such as floodplains [8], while limiting adverse impacts or conflicts with the AP final closure construction, Sangchris Lake, future solar redevelopment, and incorporating existing and new site drainage features (*i.e.*, drainage channel allowing stormwater to drain away from the AP after closure).

Assessment of physical constraints resulted in the extraction trenches being located within the footprint of the CBR area of the AP, within the northern and western section, provides generally straight and level alignment for the construction of the trench, and would reduce conflicts with the AP final closure. The location of the GWETs is generally perpendicular to existing groundwater flow patterns.

As indicated in **Section 1.2.2**, all remedies presented within this CAAA-SIR assume that the CIP of CCR source control presented in the Final Closure Plan [3] for the AP would also be implemented. Groundwater modeling estimates that GWET would result in GWPS being met in 8 years for all wells within the existing AP monitoring well system.

Groundwater modeling for the Alternative 2 remedy (**Appendix A1**) estimated that GWPS would be met approximately 16 years after the implementation of source control for all wells within the existing AP monitoring well system.

3.2 Remedy Implementation

Implementation of the Alternative 2 source control with GWET remedy is expected to include multiple tasks spread out over three phases, including pre-construction activities (Phase 1), corrective action construction (Phase 2), and corrective action operations, maintenance, and closeout (Phase 3). Information for each phase is described in this section.

3.2.1 Phase 1: Pre-Construction Activities

Pre-construction activities would include a pre-design investigation (PDI), obtaining permits from other agencies, completing the final design of the remedy, and selecting a remedy implementation contractor via a bidding process. Information associated with each of these activities is described below.

- Completing a PDI, final design and bid activities, including:
  - Completion of final pre-design subsurface investigations, laboratory soil testing, engineering calculations, design drawings, specifications, and a construction quality assurance plan.
  - Bidding and selection of a GWET construction contractor.
- Obtaining permits from other agencies including:
  - A general stormwater permit for construction site activities through IEPA, including construction of stormwater controls and other best management practices (BMPs) such as silt fences and other measures.
  - An amendment to the submitted AP Closure Plan and Construction Permit Application to allow for the disposal of spoils beneath the AP final cover system.
  - A NPDES permit modification would be obtained to allow for surface water discharge of extracted groundwater for the operational lifetime of the GWETs.

3.2.2 Phase 2: Corrective Action Construction

Corrective action construction would be initiated after pre-construction activities are complete and concurrently with the closure construction activities. This would include mobilizing construction equipment to the site, preparing the site, construction of the GWETs, deployment of the groundwater extraction pumping system and associated piping, installation of the settling pond, and performing post-construction and site restoration activities.

Construction of the GWETs is assumed to occur concurrently with AP closure construction; this is to allow all spoils generated during construction to be disposed of beneath the final cover system in the AP closure, rather than disposing of them in another onsite location or in an offsite landfill. This would likely mean that the GWETs would be constructed after CCR has been removed from the northern and western portions of the AP, but before the final cover system for the consolidation area has been completed. It was assumed that a construction contractor independent from the closure construction contractor would complete installation of the GWETs.

Information associated with each of these activities is described below.

- The contractor would mobilize equipment and materials to the site, install stormwater BMPs around the construction area, construct a staging and laydown area, and construct a level working pad and/or temporary construction access roads along the GWET alignments.
- The GWETs are assumed to be constructed using one-pass trenching methods. This method involves the use of a specialized one-pass trencher that would excavate subgrade soils, place collection piping and vertical sumps, and backfill the trench with granular fill in a single operation. Other construction methods could be utilized if later determined to be appropriate based on site-specific subsurface conditions and constructability considerations.
  - The trenches would be excavated along the design alignment on the interior side of the former containment berm for the northern trench and along the toe of the slope of the consolidation area for the southern trench. Excavation would be conducted to the design depth, which terminates below the UA. Perforated groundwater collection pipe would be laid in the trench base at an approximate 0.5 to 2 percent grade to slope towards the sump. The constructed trench is expected to be on the order of 2 feet wide.

  - Vertical sumps would be installed roughly 575 to 700 feet apart along the trench. Sumps will each be fitted with a pneumatic pump to pump water to a common discharge header. Pneumatic pumps would be powered by a common air compressor, one for each GWET.
- The trench would be backfilled with clean granular material and capped with low-permeability clay and topsoil at the surface, or a more erosion-resistant material (*i.e.,* a turf-reinforced mat or gravel), if needed to prevent stormwater erosion and infiltration of the trench.
- Excavated soils (*e.g.,* spoils) would be placed into off-road dump trucks and hauled to the southern consolidation area of the AP for use as contouring (*i.e.,* subgrade) fill beneath the final cover system. The material would be moisture-conditioned by spreading it in thin lifts and compacting in accordance with the subgrade fill specifications for the final closure.
- An approximately 1-acre, geomembrane-lined settling pond for management of extracted groundwater would be constructed using conventional construction equipment.
  - The location of the settling pond would be sited to limit adverse impacts or conflicts with the AP final closure construction and future solar redevelopment. The precise location of the pond would be evaluated during later phases of design. A preliminary location was selected based on known information for the AP final closure grades and optimized conveyance piping system.
  - The settling pond was assumed to be approximately 1-acre in size and 5 feet deep. Soils from the settling pond excavation would be used to create 10-foot-wide berms around the perimeter of the settling pond to contain extracted groundwater. Excess excavated soils from the settling pond would be managed under the final cover system in the CIP area.
- High density polyethylene (HDPE) piping would be installed below grade to convey extracted groundwater from the GWETs to the settling pond and from the settling pond to a new NPDES outfall to Sangchris Lake. Additional transfer pumps may be required for discharge of extracted groundwater from the GWETs to the settling pond and from the settling pond to the NPDES outfall.
- Site restoration would be completed following the installation of the GWETs. This would include repairing site infrastructure that was relocated or damaged during construction and minor regrading and seeding of disturbed areas.
- Temporary BMPs would also be installed during the site restoration period, if required in accordance with site land disturbance permits. The BMPs would be removed once vegetation is established.

3.2.3 Phase 3: Corrective Action Operations, Maintenance, and Closeout

Corrective action operations, maintenance, and closeout would be initiated after construction is completed. It would include performing corrective action groundwater monitoring and, after GWPS have been met, performing corrective action closeout and completion activities. Information associated with each of these activities is described below.

- Corrective Action O&M
  - Continued operation of the GWETs would require routine scheduled inspections and associated maintenance including, but not limited to, totalizer data collection and maintenance of extraction pumps as well as other system components.

  - Non-routine maintenance that may occur during extended operation of the GWET may include tasks such as repair or replacement of the extraction pumps, repair or replacement of the system air compressor, and flushing or jetting of water conveyance lines in the event organic or inorganic solids accumulate on the interior walls.
  - Routine monitoring and compliance activities associated with the treatment and discharge of extracted water via the site's NPDES permit [9] would also be completed during this phase.
- Corrective Action Monitoring
  - Regular corrective action groundwater monitoring would be conducted using a corrective action groundwater monitoring system designed in accordance with 35 I.A.C. § 845.680(c), which specified that wells must be installed within the plume of contamination that lies beyond the waste boundary.
    - Samples would be collected for each COC required by 35 I.A.C. § 845.600(a)(1). Samples would be collected on a quarterly basis initially and potentially reduced to a semiannual basis once five years of monitoring have occurred, in accordance with 35 I.A.C. § 845.650(b)(4).
    - Monitoring results would be submitted to IEPA after each monitoring event, in addition to an annual groundwater monitoring and corrective action report, in accordance with 35 I.A.C. § 845.640(e). The annual corrective action report would include an evaluation of the actual performance of the remedy relative to the remedy's expected performance.
    - Routine maintenance of the monitoring system would be conducted during the monitoring period. This would include inspection of the wells, making repairs to the wells (as and if needed), and rehabilitation and/or replacing the wells to improve performance (as and if needed).
  - If the remedy does not achieve its expected performance, additional methods or techniques to achieve compliance with GWPS would be evaluated and, if feasible, implemented in accordance with 35 I.A.C. § 845.680(b).
- Adaptive Management during Monitoring
  - Groundwater monitoring results would be evaluated and documented in in the monitoring reports submitted to IEPA, in accordance with 35 I.A.C. 845.610(e)
  - Remedy progress evaluation as part of adaptive site management may include additional investigation to inform updates to the CSM, groundwater, and geochemical models.
  - If remedy progress does not correspond with expectations, additional methods or techniques to achieve compliance with GWPS would be evaluated and, if feasible, implemented in accordance with 35 I.A.C. 845.680(b).
- Corrective Action Completion
  - After GWPS have been met for all compliance wells for a period of three years, corrective action would be considered complete, per 35 I.A.C. § 845.680(c).

  - It should be noted that post-closure care groundwater monitoring required for a 30-year period by 35 I.A.C. § 845.780(c) would continue to occur after corrective action groundwater monitoring is expected to be completed.
- After completion of the corrective action confirmation monitoring period, a Corrective Action Completion Report and Certification would then be submitted to IEPA, in accordance with 35 I.A.C. § 845.680(e).

3.2.4 Remedy Implementation Schedule

A feasibility-level implementation schedule for the Alternative 2 source control with GWET is provided in **Table B** below.

Table B. Feasibility-Level Implementation Schedule – Alternative 2: Source Control with GWET

Implementation Phase	Implementation Task	Timeframe (Preliminary Estimates)
1: Pre-Construction Activities	Agency Coordination, Approvals, and Permitting	8 to 12 months
	Final Design and Bid Process	24 to 36 months
	Timeframe to Complete Corrective Pre-Construction Activities	32 to 48 months after CAP Approval
2: Corrective Action Construction	Corrective Action Construction	3 to 4 months
	Timeframe to Complete Corrective Action Construction	3 to 4 months
3: Corrective Action O&M and Closeout	Corrective Action Monitoring (Time to Meet GWPS)	192 months*
	Corrective Action Confirmation Monitoring	36 months*
	Corrective Action Completion	6 months*
	Timeframe to Complete Corrective Action O&M and Closeout	234 months*
	Total Timeline to Complete Corrective Action	269 to 286 months (22.4 to 23.8 years)
	Timeline to Complete Corrective Action (after completion of source control)	234 months* (19.5 years*)

*Denotes a timeframe that is assumed to start after source control (*e.g.,* final closure of the SI) is complete and approval of the corrective action construction permit application has been issued by IEPA, whichever is longer.

It should be noted that Phases 1 and 2 were assumed to occur concurrently with closure construction, to allow spoils to be disposed of beneath the AP final cover system. Therefore, the start of Phase 3 (Corrective Action O&M and closeout) was assumed to begin at the completion of source control (final closure of the AP). In the event that Phases 1 and 2 could not be completed concurrently with source control, due to a delay in receiving permits or construction-related conflicts, the total schedule would likely increase.

3.2.5 Management of Extracted Groundwater

Extracted groundwater from the GWETs is assumed to be managed and treated by a newly constructed on-site settling pond, although other methods for treated extracted groundwater may be evaluated at later phases of designs. The settling pond would need to be sited to avoid conflict with planned solar redevelopment, other site infrastructure, and closure activities related to the AP and other SIs at the KPP. A settling pond of approximately 1 acre was assumed to be sufficient to allow sediments to settle from extracted groundwater prior to discharge. Groundwater collected from the extraction well network would be sent to the settling pond via the pneumatic extraction pumps and conveyance piping. Treated water would discharge via a new NPDES outfall as presented in the Closure Construction Permit discharging via a riprap stormwater outlet to Lake Sangchris. All groundwater would be discharged in accordance with site-specific NPDES permit requirements [9].

3.2.6 35 I.A.C. § 845.670(e)(1)(H) and 35 I.A.C. § 845.670(e)(3) Information

As requested by Gradient, the following information required by 35 I.A.C. § 845.670(e)(1)(H) and 35 I.A.C. § 845.670(e)(3) has been developed for the remedy. The information was developed based on preliminary-level information contained within the CMA for the AP and then refined based on additional feasibility-level design activities performed as part of the development of this CAAA-SIR.

- Potential Need for Replacement of the Remedy – 35 I.A.C. § 845.670(e)(1)(H)
  - No replacement of the remedy is expected to be required during the relatively short design life, although the remedy would require ongoing monitoring and maintenance to retain its effectiveness.
- Degree of Difficulty Associated with Constructing the Remedy – 35 I.A.C. § 845.670(e)(3)(A)
  - The remedy would require mobilizing specialty equipment to the site (i.e., one-pass trenching equipment) in addition to other supporting equipment (i.e., excavation and grading equipment).
  - While GWETs are routinely constructed to similar depths in similar geologic environments, they may encounter difficulties during construction. The difficulties could include encountering obstructions that require specialized techniques and/or equipment.
  - The performance of the GWETs would be dependent on the construction techniques. Continuous quality control monitoring would be required during construction as part of construction quality control and quality assurance activities.
  - The performance of the GWETs would also be dependent on the actual hydraulic conductivity of the geologic units surrounding the trench. This may require additional PDI activities to confirm existing hydrogeologic conditions of the proposed trench locations.
- Expected Operational Reliability of the Remedy - 35 I.A.C. § 845.670(e)(3)(B)
  - The GWETs are expected to have high operational reliability if constructed in accordance with the design and specifications; however, the GWET is a mechanical system that would require routine maintenance in order to reliably operate, as outlined in **Section 3.2.3**.
- Need to Coordinate with and Obtain Necessary Approvals and permits from Other Agencies - 35 I.A.C. § 845.670(e)(3)(C)
  - Agency permits would need to be obtained from IEPA for discharge of extracted groundwater, construction stormwater controls and BMPs. These permits typically take

18 to 24 months to obtain, with the NPDES permit modification taking longer to obtain than the other permits.

  - While some of these permits may also be obtained for the AP final closure, it is uncertain at this time of the schedule for approval of both the final closure plan and the eventual CAP; therefore, it has been assumed that separate permit applications for both the closure and corrective action construction would be submitted.

- Availability of Necessary Equipment and Specialists - 35 I.A.C. § 845.670(e)(3)(D)
  - Construction of the GWETs would require a specialized contractor experienced with construction of similar types of trenches in similar geologic environments. Relatively few construction contractors with this experience, particularly using one-pass equipment, are available. The contractor would likely need specialized and often custom-built equipment, such as one-pass construction equipment.
  - Specialists in one-pass trenching methods would also need to be utilized during the design and construction phase. The specialists would include design engineers, construction managers, and contractor staff experienced with trench construction and equipment operation.
  - These types of equipment and specialists have been utilized in the past for other similar types of GWET design and construction projects. However, there may be backlogs for specialty ground improvement contractors and design specialists who are supporting similar types of projects in the electric utility, dam/levee, and other market sectors. These backlogs could add additional delay to the project schedule above current assumptions.
  - Specialists would be needed to maintain the GWE system during the operational timeframe and are currently being utilized as part of GWE O&M. System components that require maintenance include totalizers, instrumentation, and the extraction and transfer pumps.
    - Additionally, specialists are occasionally needed for non-routine O&M which may include flushing or jetting of the conveyance lines, replacement of faulty system components, replacement of pumps or pump controllers, and replacement of faulty system instrumentation.
    - Specialists and replacement equipment are generally available within proximity (100 to 300 miles) of the site but some of the more complex equipment, including the transfer pumps and transfer pump controller, may have extended lead times for replacement or servicing.
  - Equipment and specialists for field data collection and groundwater sampling would be required for the remedy. Laboratory equipment and specialists would also be required to assess groundwater concentrations of site constituents. Groundwater professionals (*i.e.,* geologists, hydrogeologists, statisticians, geochemists) would be required to perform statistical analysis and other assessments to confirm that the remedy is functioning as intended and prepare corrective action-related groundwater monitoring and progress reports.
    - The equipment and specialists required to support these activities are currently performing routine groundwater monitoring in accordance with 35 I.A.C. § 845.220(c)(4). Therefore, no new equipment or specialists are required for groundwater monitoring in this alternative.

- Available Capacity and Location of Needed Treatment, Storage, and Disposal Services – 35 I.A.C. § 845.670(e)(3)(E)
  - Wastes generated during GWET construction would be limited to spoils; these would be placed beneath the final cover system in the southern CIP area, during closure construction. Completing the GWET construction at the same time as the AP closure would provide sufficient onsite capacity for the disposal of generated spoils.
  - The GWETs would convey extracted groundwater to a lined settling pond. This settling pond would be a new impoundment that would need to be sited, designed, constructed, and maintained.
    - The settling pond would need to be sited to not conflict with planned solar redevelopment, wetlands, floodplains, or other site infrastructure.
  - Continued NPDES permit renewals may be required, depending on the timeline of corrective action implementation relative to completion of source control activities.

4. MATERIAL QUANTITY, LABOR, AND MILEAGE ESTIMATES

Estimates of material quantities, total labor hours, and mileage were prepared for Alternative 2 source control with GWE, to support Gradient in preparing a CAAA. Estimates were prepared for the construction and O&M. Estimates were not prepared for Alternative 1 source control with GWP as the alternative does not require remedial construction or O&M of a physical remedy.

Estimates were prepared utilizing the following approach:

- Major implementation (*e.g.,* construction) components and line items were identified, in accordance with the remedy implementation narratives contained within this CAAA-SIR.
- Construction quantities were estimated based on quantity estimates for volumes, areas, and units, as obtained from the feasibility-level engineering drawings and schedules included within this CAAA-SIR.
- RS Means Heavy Construction Cost Data (RS Means) [10] was utilized to estimate the crew size, equipment description, and daily output associated with each line item.
- For line items where RS Means data was not available, the crew size, equipment description, and daily output were estimated based on Ramboll's experience, information from contractors, and/or information from material suppliers.
- Daily construction and O&M labor mobilization miles were estimated assuming a weekly mobilization/demobilization from Chicago (220 miles round trip) and a local commute of 70 miles round trip per day. The number of working days and hours per week were estimated from the construction schedule developed for each remedy.
- Estimates of material delivery miles were prepared based on Ramboll's experience.

The detailed material quantity, labor, and mileage estimates are provided in **Appendix C**.

5. REFERENCES

[1] "Illinois Administrative Code, Title 35, Subtitle G, Chapter I, Subchapter J, Part 845: Standards for The Disposal Of Coal Combustion Residuals In Surface Impoundments," effective April 21, 2021.

[2] Code of Federal Regulations, "Title 40, Chapter I, Subchapter I, Part 257, Subpart D, Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," April 17, 2015.

[3] Burns & McDonnell Engineering Company, Inc, "Construction Permit Application, Kincaid Power Plant Ash Pond, (IEPA ID W0218140002-01), Kincaid, Illinois," Burns & McDonnell, Kincaid, Illinois, July 28, 2022.

[4] United States Environmental Protection Agency, "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites," OSWER Directive Number 9200.4-17P, April 21, 1999.

[5] Ramboll, "2024 35 I.A.C. § 845 Annual Groundwater Monitoring and Corrective Action Report, Ash Pond, Kincaid Power Plant, IEPA ID No. W0218140002-01," January 2025.

[6] Ramboll, "Groundwater Modeling Report Ash Pond, Kincaid Power Plant, Kincaid, Illinois," Ramboll, Kincaid, Illinois, July 28, 2022.

[7] Life Cycle Geo, LLC, "Groundwater Polishing Evaluation Report. Kincaid Ash Pond," 2025.

[8] Federal Emergency Management Agency, "Flood Insurance Rate Map, Jasper County, Illinois (Unincorporated Areas)"," National Flood Insurance Program, 1985.

[9] Illinois Environmental Protection Agency, "NPDES Permit No. IL0002241," Illinois Environmental Protection Agency, Kincaid, Illinois, 2017.

[10] Gordian, RS Means Data version 8.7, Springfield, Illinois: Gordian, 2024.

APPENDIX A1
GROUNDWATER MODELING TECHNICAL MEMORANDUM

Intended for
Kincaid Generation, LLC.
199 IL 104
Kincaid, IL 62540

Date
May 8, 2025

Project No.
1940110241-007

GROUNDWATER MODELING TECHNICAL MEMORANDUM

KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

Bright ideas. Sustainable change.

GROUNDWATER MODELING TECHNICAL MEMORANDUM KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940110241-007**
Recipient	**Kincaid Generation, LLC.**
Document type	**Technical Memorandum**
Revision	**Final**
Date	**May 8, 2025**
Prepared by	**Pejman Rasouli, PhD**
Checked by	**Sung-Woo Lee, PhD**
Approved by	**Brian G. Hennings, PG**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Pejman Rasouli

Pejman Rasouli, PhD
Managing Consultant

Brian G. Hennings, PG
Project Officer, Hydrogeology

CONTENTS

TABLES

TABLES IN TEXT

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
ASD	Alternative Source Demonstration
CAAA	Corrective Action Alternatives Analysis
CBR	closure-by-removal
CCR	coal combustion residuals
CIP	closure-in-place
cm/sec	centimeters per second
CMA	Corrective Measures Assessment
COC	constituent of concern
ft/day	feet per day
ft^2/day	square feet per day
GMP	Groundwater Monitoring Plan
GMR	Groundwater Modeling Report
gpd	gallons per day
gpm	gallons per minute
GPR	Groundwater Polishing Evaluation Report
Gradient	Gradient Corporation
GWP	groundwater polishing
GWPS	groundwater protection standard(s)
HELP	Hydrologic Evaluation of Landfill Performance
ID	identification
IEPA	Illinois Environmental Protection Agency
IPCB	Illinois Pollution Control Board
Kd	soil absorption coefficient
KPP	Kincaid Power Plant
LCU	lower confining unit
Life Cycle Geo	Life Cycle Geo, LLC
mg/L	milligrams per liter
mL/g	milliliters per gram
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
PMP	potential migration pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
TDS	total dissolved solids
UA	uppermost aquifer
USCU	upper semi-confining unit

EXECUTIVE SUMMARY

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Modeling Technical Memorandum on behalf of the Kincaid Power Plant (KPP), operated by Kincaid Generation, LLC, in accordance with requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845. This document presents the results of additional predictive groundwater modeling simulations in support of three potential remedies identified in the Corrective Measures Assessment (CMA) required by 35 I.A.C. § 845.660 for the Ash Pond (AP) in Kincaid, Illinois, identified by Illinois Environmental Protection Agency (IEPA) identification (ID) number (No.) W0218140002-01 and National Inventory of Dams (NID) No. IL50706. The potential corrective action alternatives evaluated in this technical memorandum include source control by consolidating coal combustion residuals (CCR) and closing the unit in place as described in the Final Closure Plan. In each alternative, "source control" refers to the closure-in-place (CIP) consolidation of CCR that had been selected as the closure alternative for the AP in 2022 and modeled in the Groundwater Modeling Report (GMR) (Ramboll, 2022). For consistency, the closure-in-place (CIP) scenario is presented here as Alternative 1. The groundwater corrective action alternatives evaluated in this memorandum include:

- Alternative 1. Source control with groundwater polishing (GWP); CIP Scenario 1 presented in the GMR (Ramboll, 2022).
- Alternative 2. Source control with operation of two groundwater extraction trenches.
- Alternative 3. Source control with phytoremediation; Alternative 1 was modified to simulate implementation of phytoremediation (groundwater uptake by plants).

Groundwater monitoring in accordance with the proposed Groundwater Monitoring Plan (GMP) and sampling methodologies provided in the operating permit application for the AP began in the second quarter of 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), statistically derived values were compared to the groundwater protection standards (GWPS) summarized in 35 I.A.C. § 845.600 to determine exceedances[1] of the GWPS. The statistical determination identified the following GWPS exceedances that are attributable to the AP: boron, sulfate, and total dissolved solids (TDS). Boron was identified as an acceptable surrogate for groundwater impacts originating from the AP in the GMR (Ramboll, 2022). Modeling surrogate constituents for the purposes of evaluating groundwater corrective action alternatives is an appropriate approach which was further supported in the Gradient Corporation (Gradient) January 2024 expert report (Gradient, 2024). The groundwater modeling efforts in this technical memorandum include flow and transport modeling using MODFLOW and MT3DMS to evaluate when proposed corrective action will achieve compliance with the applicable GWPS; and describe fate and transport of contaminants in accordance with 35 I.A.C. § 845.220 (c)(2).

The effects of groundwater extraction were evaluated at 27 monitoring wells in the vicinity of the AP with specific focus on 10 wells (MW-5, MW-7, MW-7S, MW-12, MW-12S, MW-24, MW-27, MW-

[1] Throughout this document, "exceedance" or "exceedances" is intended to refer only to potential exceedances of proposed applicable background statistics or GWPSs as described in the proposed groundwater monitoring program, which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC operating permit application for the KPP AP. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and, therefore, Kincaid Generation, LLC has not identified any actual exceedances.

28, MW-29, and MW-31S) with observed boron concentrations exceeding the GWPS of 2 milligrams per liter (mg/L).

The GWP scenario for CIP presented in the GMR (Ramboll, 2022), Alternative 1, indicates the GWPS will be reached within 17 years, with average time of 8 years for all wells with GWPS exceedances, with a mean time of 8 years. MW-28 and MW-12S are the last wells at the site to reach GWPS at approximately 17 years and 16 years, respectively.

The transport modeling results for Alternative 2 (source control with groundwater extraction) indicated groundwater concentrations would attain the GWPS of 2 mg/L for all monitoring wells in approximately 16 years, following installation of the extraction trenches, with a mean time of 5 years. The approximate extraction rates are 30 and 80 gallons per minute (gpm) for the northern and southern trenches, respectively.

Alternative 3 involved the construction of phytoremediation in three zones within portions of the AP where CCR will be removed for consolidation into the CIP footprint. Simulation results for the phytoremediation alternative did not show any significant change in the time to reach the GWPS compared to the Alternative 1 source control remedy with GWP, and a longer time to achieve GWPS than Alternative 2 source control with operation of two groundwater extraction trenches. Therefore, phytoremediation was omitted for further consideration as an alternative as it did not provide tangible benefits in time to reach GWPS times over Alternatives 1 and 2.

1. INTRODUCTION

1.1 Background

This technical memorandum was prepared to evaluate how the potential corrective action alternatives would achieve compliance with the applicable GWPS; and to describe fate and transport of contaminants in accordance with 35 I.A.C. § 845.220 (c)(2). The groundwater modeling efforts consist of predictive fate and transport modeling to assess the long-term effectiveness and time for achieving GWPS for three corrective action alternatives:

- Alternative 1. Source control with GWP; this alternative was presented as CIP Scenario 1 in the GMR (Ramboll, 2022); and is being presented with other alternatives for comparison (**Figure 1**).
- Alternative 2. Source Control with operation of two groundwater extraction trenches; a 3,400-foot northern trench with drain stage at 578 feet[2]; and a 2,700-foot southern trench with drain stage at 575 feet. The trenches drain stages (bottom elevations) penetrate the uppermost aquifer (UA) and in some areas reach the lower confining unit (LCU) (**Figure 2**).
- Alternative 3. Source Control with phytoremediation; Alternative 1 was modified to simulate implementation of phytoremediation (groundwater uptake by plants) in three zones. Zone 1 is located along the western limit of the closure by removal area; and, zones 2 and 3 are located along the northern limit of the CIP footprint (**Figure 3**).

In alternative 2 and 3, source control is the CIP scenario (Alternative 1) that was selected as the closure alternative for the AP in 2022 (Burns & McDonnell, 2022).

1.2 Previous Groundwater Modeling Reports

In accordance with the requirements of 35 I.A.C. § 845, Ramboll developed the MODFLOW and MT3DMS Groundwater flow and transport models in 2022 and submitted a GMR (Ramboll, 2022). The MODFLOW and MT3DMS models were used to evaluate two closure scenarios: Scenario 1, CCR consolidation and CIP consisting of CCR removal from the northern and western areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR; and, Scenario 2, closure-by-removal (CBR) consisting of CCR removal from the entire footprint of the AP. CIP was selected as the preferred alternative to meet regulatory requirements for closure of the AP. The groundwater corrective action alternatives detailed in this memo are an extension of the 2022 model simulations developed for the CIP scenario (source control CIP scenario) (Ramboll, 2022).

Based on prior hydrogeological and modeling studies (Ramboll, 2021) and the downgradient location and proximity of Sangchris Lake to the AP, Sangchris Lake is likely to be hydraulically connected to the UA. Groundwater flow from the KPP to Sangchris Lake through the UA is the primary migration pathway, with groundwater flowing radially from the AP toward the lobes of Sangchris Lake.

Horizontal groundwater flow in the upper semi-confining unit USCU, which consists of low-permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses, in the area of the AP has two principal flow directions: (i) flow on the north side of the AP

[2] All elevations in this report are referenced to North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

is north and northwest toward the western lobe of Sangchris Lake; and, (ii) flow on the southern side of the AP has components of groundwater flow to the south and east toward the discharge flume, which flows to the eastern lobe of Sangchris Lake. These two components of groundwater flow suggest a groundwater divide beneath the AP, which is further supported by horizontal groundwater flow in the UA, which is to the northwest and southeast toward the western and eastern lobes of Sangchris Lake, respectively. Groundwater elevations are primarily controlled by the surface water level in Sangchris Lake, and the water level within the AP. Overall, groundwater flow from the AP is from east to west toward Sangchris Lake. Vertical gradient calculations suggest an upward gradient from the underlying bedrock to the UA.

2. PREDICTIVE SIMULATION OF ALTERNATIVE 1: SOURCE CONTROL WITH GROUNDWATER POLISHING

The Alternative 1 remedy, source control with GWP, will include a consolidate-and-cap approach for source control, after which GWP will be implemented.

2.1 Model Description

The modeling activities documented in this technical memorandum utilized the following software and model codes:

- Groundwater flow was simulated in three dimensions using the original MODFLOW version 2005.
- Contaminant transport was simulated in three dimensions using MT3DMS; and
- Groundwater Vistas was used as a pre- and post-processing tool for MODFLOW and MT3DMS.

The input and output files, as well as the model executables, are provided in **Appendix A**. As described in the GMR (Ramboll, 2022), the groundwater flow and transport model was calibrated to represent the conceptual flow system described above. Initial modeling was performed for a sufficient period (27.5 years) to allow modeled boron concentrations in the primary transport layer (*i.e.,* UA) to achieve steady concentrations. The MODFLOW model was calibrated to mean groundwater elevations collected from June 2015 to September 2021. MT3DMS was run on the calibrated flow model, and model-simulated concentrations were calibrated to the median observed boron concentration values at the monitoring wells calculated from boron concentrations results from March to July 2021. CIP was simulated using the calibrated model for the AP (Ramboll, 2022) and used as the starting point for prediction modeling. Prediction models simulate three explicit periods of closure: current conditions (Period 1), dewatering and construction (Period 2), and post-closure (Period 3) (Ramboll, 2022).

The CIP model simulates the removal of CCR from the north and west of the AP and consolidation of CCR into the southeast of the AP as illustrated on **Figure 1(A)**. Boron was identified as an acceptable surrogate for groundwater impacts originating from the AP in the GMR (Ramboll, 2022). Modeling surrogate constituents for the purposes of evaluating corrective action alternatives is an appropriate approach which was further supported in the January 2024 expert report (Gradient, 2024). Consistent with the GMR, it was assumed that boron would not significantly sorb or chemically react with aquifer solids which is a conservative estimate for predicting contaminant transport times, this is further discussed in **Section 5**. Boron concentrations at 27 AP monitoring wells were used as targets to evaluate adequacy of model simulated boron concentrations. Ten of the 27 AP monitoring wells were simulated within the model to exceed the GWPS of 2 mg/L for boron and are presented in (**Table 1**).

2.2 Simulation Results

Figure 1(B) presents concentrations of boron following closure at 27 of the AP monitoring wells. Predicted concentrations start to decline within approximately 2 years. These declines occur as recharge is reduced during the dewatering and construction period. As a result of dewatering, downward percolation of CCR porewater from the AP is reduced, which decreases the boron concentration entering the model domain. The southern CCR consolidation area of the AP was completed with a cover system, further reducing recharge and thereby decreasing the amount of boron entering the model domain. Following source control, boron concentrations at all downgradient wells in the UA and USCU were predicted to decrease rapidly following dewatering and completion of closure construction. MW-12S shows the longest time to reach GWPS at 17 years, at which time concentrations in all wells are predicted to be below the GWPS (**Table 1**).

3. PREDICTIVE SIMULATION OF ALTERNATIVE 2: SOURCE CONTROL WITH GROUNDWATER EXTRACTION

Source control with groundwater extraction includes the construction of two groundwater extraction trenches: northern and southern alignments (**Figure 2(A)**). The goal of groundwater extraction trenches is to provide active removal of CCR-impacted groundwater in order to accelerate the timeline for achieving GWPS in all AP monitoring wells.

3.1 Overview

The northern trench would be located along the north and west boundary of the AP (**Figure 2(A)**) between the AP and the adjacent Sangchris Lake. The northern trench would extend from ground surface to an approximate elevation of 578 feet. The total length of the northern groundwater extraction trench will be approximately 3,400 feet, extending along the exterior toe of the perimeter berm of the AP in an east-west direction.

The southern trench, located near the middle of the AP would extend from ground surface to an approximate elevation of 575 feet. The total length of the southern groundwater extraction trench will be approximately 2,700 feet, extending across the middle of the AP in an east-west direction.

Both trenches would intersect the USCU and the underlying UA in order to intercept the main groundwater flow pathways beneath the AP. The estimated steady-state extraction rates from the northern and southern trenches are 30 and 80 gpm, respectively. The fate and transport model was used to predict the time (post-closure) to reach GWPS for boron in the compliance monitoring wells under a continuous extraction scenario (*i.e.,* long-term groundwater extraction). MODFLOW and MT3DMS were used to optimize the trench design specifications (horizontal and vertical extents and extraction rates) and to confirm capture of groundwater from the AP.

3.2 Model Approach

Alternative 1 was modified to include extraction trenches situated along the north and west boundary of the AP (northern trench) and the middle section of the AP (southern trench) as described above. To determine the optimal configuration of the two trenches, multiple configurations were simulated, considering variables such as the water elevations within the trench (drain stage) relative to Sangchris Lake elevation (lake stage).

In the model, extraction trenches are represented using the Drain package of MODFLOW, with conductance values set to 10,000 square feet per day (ft^2/d) that corresponds to concrete sand hydraulic conductivity (2.2×10^{-2} centimeter per second [cm/sec] or 62.4 feet per day [ft/day]), to facilitate adequate water flow. The drain stage is assumed to be 1 foot above the bottom of the drain cell, providing sufficient space for the placement of the perforated extraction pipe. The drain stage at 578 and 575 feet intersects mostly layer 3 of the model, corresponding to the UA, and occasionally layer 5, corresponding to the LCU, which is a dense grey clay till that underlies both the UA and the USCU. Continuous extraction was simulated for 30 years.

3.3 Simulation Results

The optimized trench configuration comprises the northern and southern extraction trenches. The steady-state extraction rate is estimated at approximately 30 gpm for the northern trench and about 80 gpm for the southern trench. The northern trench stage was set at an elevation 578 feet. The southern extraction trench stage was set at elevation 575 feet.

3.4 Transport Model Results

Boron transport modeling results for the 30-year groundwater extraction scenario indicated GWPS of 2 mg/L would be achieved for all monitoring wells between 1 and 16 years following installation of the extraction trenches, with a mean time of 5 years (**Figure 2(B)**, **Table 1**). In this prediction simulation boron concentrations at well MW-28 take the longest time to reach the GWPS. Implementing extraction trenches has the most significant impact on decreasing concentrations at monitoring wells MW-12s, MW-12 and MW5, where it reduces time to reach the GWPS from 16, 12, and 10 years to 7, 1, and 1 years, respectively.

4. PREDICTIVE SIMULATION OF ALTERNATIVE 3: SOURCE CONTROL WITH PHYTOREMEDIATION

Source control with phytoremediation includes the implementation of phytoremediation in three zones. Zone 1 is located along the western limit of the closure by removal area; and, zones 2 and 3 are located along the northern limit of the CIP footprint (**Figure 3(A)**). The goal of phytoremediation is also to provide active removal of CCR-impacted groundwater in order to accelerate the timeline for achieving GWPS in all AP monitoring wells.

4.1 Overview

The northern area would be located in the northern boundary of the AP (**Figure 3(A)**) between the AP and the adjacent Sangchris Lake. The area will be approximately 7.8 acres, extending along the exterior toe of the perimeter berm of the AP. The southern area includes two areas near the middle of the AP shown in **Figure 3(A)** totaling approximately 5.2 acres. In total, 13 acres would be utilized for phytoremediation across the three zones.

Phytoremediation would intersect the USCU and the underlying UA. The steady-state groundwater uptake rates by roots was assumed to be 50 gallons per day (gpd) with the maximum extinction root depth[3] of 25 feet. These are conservatively very high estimates of root uptake parameters for plants like hybrid poplars selected to evaluate maximum potential extraction for comparison to the other alternatives. The modeling also assumed the groundwater uptake happens throughout the entire year, when in actuality there will be seasonal variation in the rate of uptake. The flow and transport models were used to predict the time (post-closure) to reach GWPS for boron in the compliance monitoring wells under a continuous plant uptake scenario for maximum potential extraction.

4.2 Model Approach

Alternative 1 was modified to include the phytoremediation areas situated along the northern boundary and the middle section of the AP. Zone 1 is located along the western limit of the closure by removal area; and, zones 2 and 3 are located along the northern limit of the CIP footprint (**Figure 3(A)**). In the model, phytoremediation zones are represented using the Evapotranspiration package of MODFLOW, with evapotranspiration rate and extinction depth values set to 50 gpd and 25 feet, respectively. The groundwater uptake scenario that was simulated was continuous uptake for 30 years. The Evapotranspiration package was used for this simulation because the target zone for groundwater uptake overlaps with the estimated extinction depth of the plants.

4.3 Simulation Results

The results of boron transport modeling for the phytoremediation groundwater uptake scenario indicate that GWPS of 2 mg/L would be achieved for all 27 monitoring wells between 1 and 17 years following implementation of phytoremediation, with a mean time of 8 years (**Figure 3(B)**, **Table 1**). Despite using highly conservative estimates of groundwater extraction rates using phytoremediation, simulation results for the phytoremediation alternative did not show any significant change in the time to reach the GWPS compared to the Alternative 1 source control

[3] The extinction depth defines the lower boundary of the root zone for water uptake modeling. It is the maximum soil depth below which root water uptake is assumed to be zero.

remedy with GWP and a longer time to achieve GWPS than Alternative 2 source control with operation of two groundwater extraction trenches. Therefore, phytoremediation was omitted from further consideration as an alternative as it did not provide tangible benefits in time to reach GWPS times over Alternatives 1 and 2.

5. ASSESSMENT OF GEOCHEMICAL PROCESSES

The groundwater flow and transport model estimates the time for boron to reach the GWPS under different potential corrective actions based on physical components of GWP. As described in the GMR submitted with the construction permit, it was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil absorption coefficient [Kd] was set to 0 milliliters per gram [mL/g]), which is a conservative estimate for contaminant transport times.

A Groundwater Polishing Evaluation Report (GPR) was prepared as an attachment to the Corrective Actions Alternative Analysis (CAAA) prepared by Gradient for the KPP AP. The geochemical modeling presented in the GPR supports the assessment of GWP as a component of the proposed corrective action by evaluating the potential for chemical attenuation of constituents of concern (COCs) before and after source control as a means of contextualizing the times estimated in the flow and transport model. The GPR also provides an initial foundation for understanding groundwater chemistry to inform adaptive site management as a key component of the Corrective Action Groundwater Monitoring Program (Life Cycle Geo, 2025).

Results from the speciation modeling show that a substantial proportion of boron and sulfate are retained on the solid phase under current conditions. Reaction modeling results indicate that substantial remobilization of COCs back to the groundwater phase is unlikely as conditions return to background. Simulations show a minor increase in adsorbent mineral masses is possible and solid sorbing phases are anticipated to be stable. Notably the precipitation of barite, a barium sulfate mineral, is also simulated, which provides a further sink for sulfate. These data suggest that the changing geochemical conditions that come with the "return to background", such as a more oxidized redox condition, are overall unlikely to cause a longer observed time to reach the GWPS. These results will inform corrective action groundwater monitoring and adaptive management, critical components of every corrective action considered in the CAAA (Life Cycle Geo, 2025).

The results of the geochemical assessment indicate that the times to reach the GWPS predicted by the groundwater model are representative of site conditions, including potential geochemical changes as groundwater quality returns to background conditions.

6. CONCLUSIONS

Boron transport modeling results for Alternative 1 (source control with GWP) indicated groundwater concentrations would achieve the applicable GWPS of 2 mg/L for all 10 monitoring wells with simulated exceedances in the calibrated baseline model in approximately 17 years, following CIP, with a mean time of 8 years.

The transport modeling results for Alternative 2 (source control with groundwater extraction) indicated groundwater concentrations would achieve the applicable GWPS of 2 mg/L for those 10 monitoring wells in approximately 16 years, following installation of the extraction trenches, with a mean time of 5 years. The approximate extraction rates are 30 and 80 gpm for the northern and southern trenches, respectively.

Timeframes to attain GWPS in the groundwater monitoring wells, summarized in **Table A,** indicate that Alternatives 1 and 2 are expected to result in similar rates of progress.

Table A. Estimated Timeframes to Attain GWPS in Groundwater Monitoring Wells

	2 years**	5 years**	10 years**	16 years**	17 years**
Alternative 1: Percentage of Wells predicted to attain GWPS*	30 %	40 %	60 %	90 %	100 %
Alternative 2: Percentage of Wells predicted to attain GWPS*	50 %	60 %	90 %	100 %	100 %

*: 10 wells with simulated boron exceedances were used to estimate time to reach GWPS.
**: Years counted starting from completion of source control.

Alternative 3 involved the construction of three phytoremediation zones in the northern and middle portions of the AP in post-closure CCR removal areas. Simulation results for the phytoremediation alternative did not show any significant change in the time to reach the GWPS compared to the Alternative 1 source control remedy with GWP and a longer time to achieve GWPS than Alternative 2 source control with operation of two groundwater extraction trenches. Therefore, phytoremediation was omitted from further consideration as an alternative as it did not provide tangible benefits in time to reach GWPS times over Alternatives 1 and 2.

7. REFERENCES

Burns & McDonnell, 2022. CCR Surface Impoundment Final Closure Plan, Kincaid Power Plant Ash Pond, Kincaid, Illinois. July 2022.

Gradient Corporation (Gradient), 2024. Closure Alternatives Analysis Groundwater Modeling Review at the Coffeen Power Plant, Edwards Power Plant, Newton Power Plant, and Hennepin Power Plant. Expert Report. January 24.

Life Cycle Geo, LLC (Life Cycle Geo), 2025. Groundwater Polishing Evaluation Report, Kincaid Ash Pond, Kincaid, Illinois. May 8, 2025

Ramboll Americas Engineering Solutions, Inc (Ramboll), 2021. Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois. October 25.

Ramboll Americas Engineering Solutions, Inc (Ramboll), 2022. Groundwater Modeling Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois. July 28.

TABLES

TABLE 1. SIMULATED TIME TO ACHIEVE COMPLIANCE

GROUNDWATER MODELING TECHNICAL MEMORANDUM

KINCAID POWER PLANT

ASH POND

KINCAID, ILLINOIS

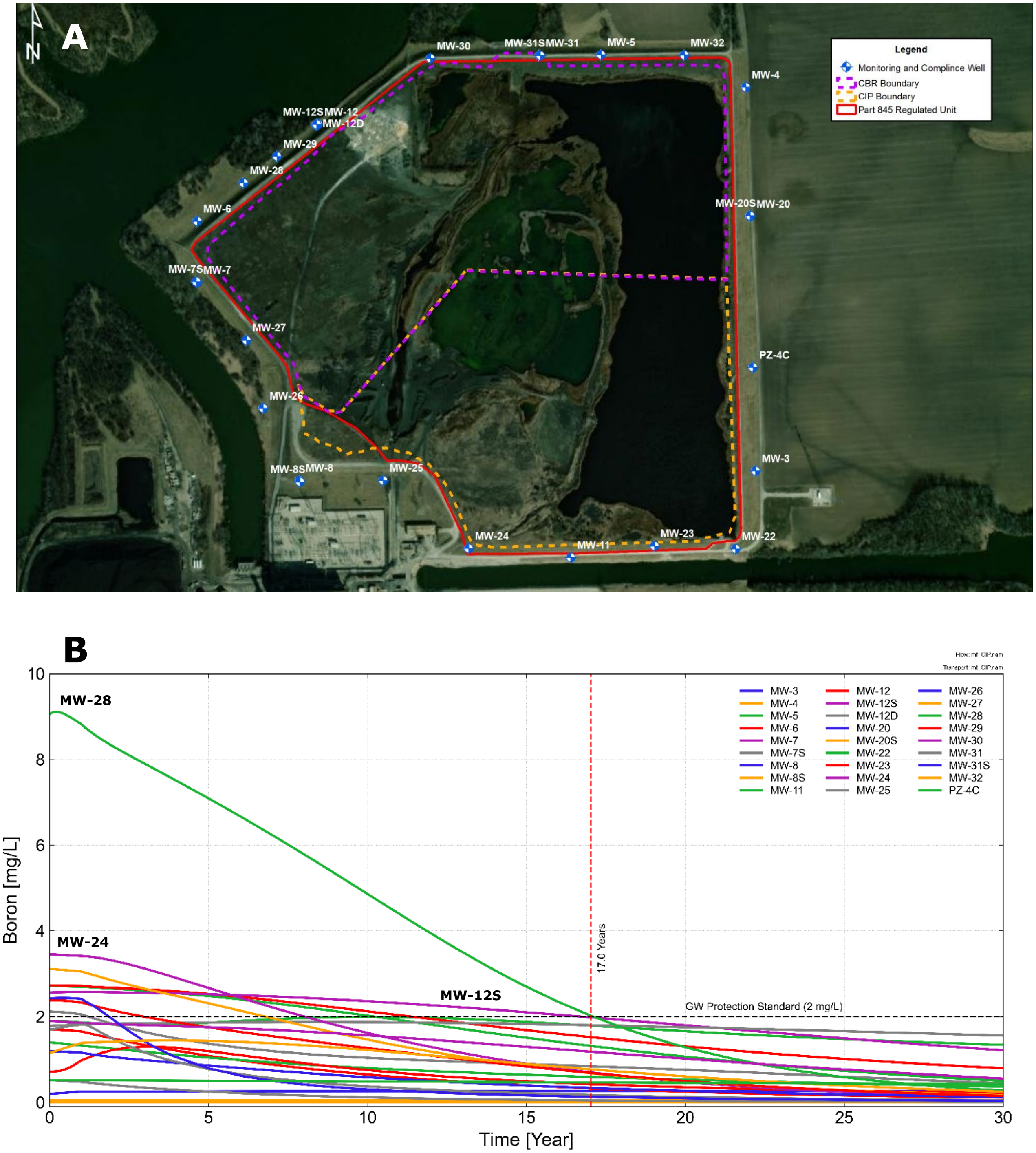
Monitoring Well			
	Alternative 1 (CIP)	**Alternative 2 (trenches)**	**Alternative 3 (phytoremediation)**
MW-24*	8	8	8
MW-12S	16	7	16
MW-27	7	6	7
MW-31S	2	3	1
MW-28	17	16	17
MW-12	12	1	12
MW-5	10	1	13
MW-7	1	1	1
MW-7S	1	1	1
MW-29	3	2	3
Minimum	**1**	**1**	**1**
Maximum	**17**	**16**	**17**
Mean	**8**	**5**	**8**

Notes:
CIP: Closure-In-Place
* The calibrated model overestimates the concentration at MW-24, and it has not exceeded GWPS.

RAMBOLL

FIGURES

FIGURE 1

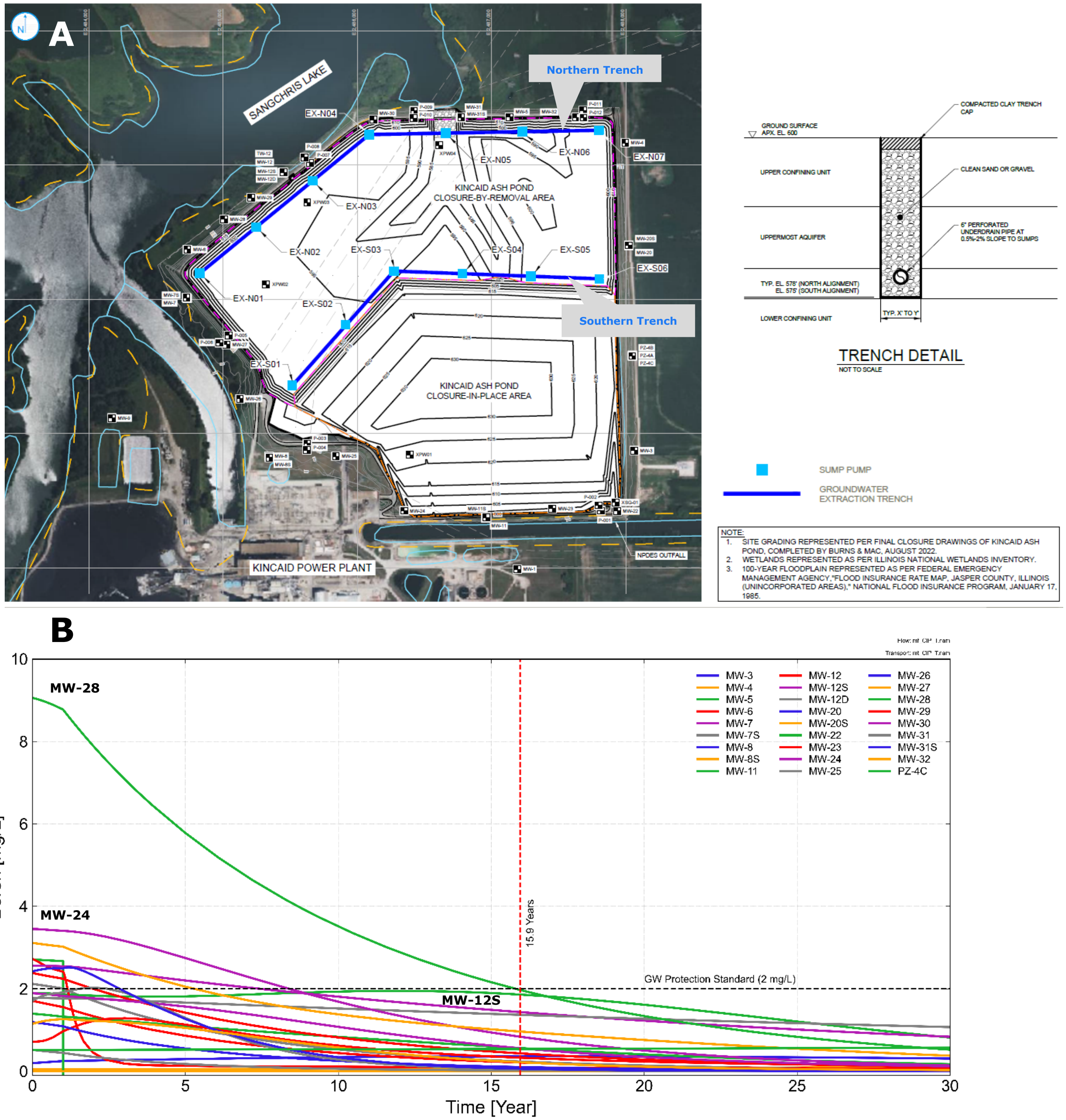


(A) LOCATION OF MONITORING WELLS; (B) BORON CONCENTRATION IN MONITORING WELLS FOLLOWING SOURCE CONTROL WITH GWP

GROUNDWATER MODELING TECHNICAL MEMORANDUM
ASH POND, KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

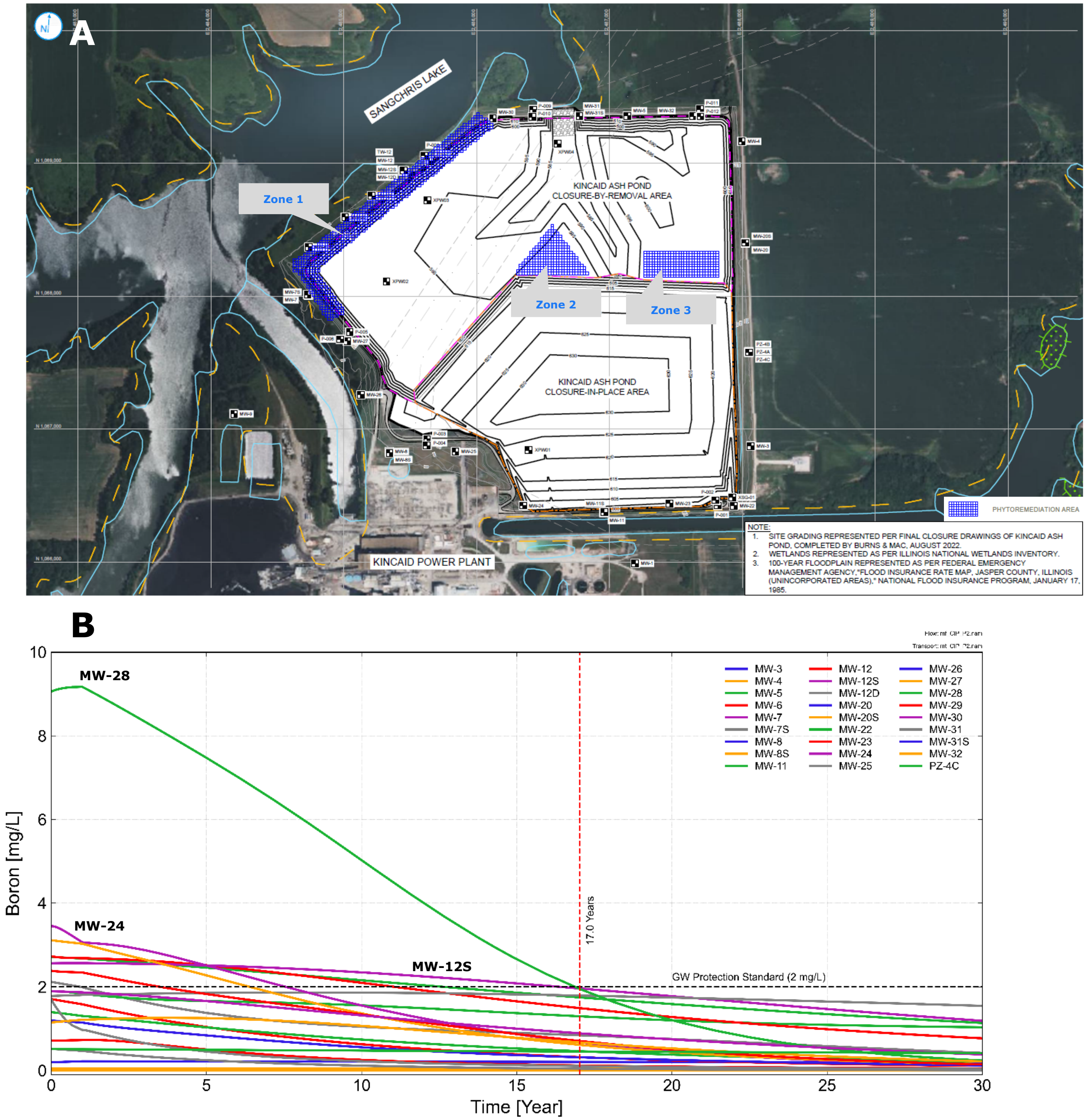
FIGURE 2



(A) LOCATION OF MONITORING WELLS AND EXTRACTION TRENCHES; (B) BORON CONCENTRATION IN MONITORING WELLS FOLLOWING SOURCE CONTROL WITH GROUNDWATER EXTRACTION

GROUNDWATER MODELING TECHNICAL MEMORANDUM
ASH POND, KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 3



(A) LOCATION OF MONITORING WELLS AND PHYTOREMEDIATION AREAS; (B) BORON CONCENTRATION IN MONITORING WELLS FOLLOWING SOURCE CONTROL WITH PHYTOREMEDIATION

GROUNDWATER MODELING TECHNICAL MEMORANDUM
ASH POND, KINCAID POWER PLANT
KINCAID, ILLINOIS

APPENDIX A
MODFLOW AND MT3DMS MODELING FILES

(ELECTRONIC ONLY)

APPENDIX A2
GROUNDWATER MODELING REPORT (2022)

Intended for
Kincaid Generation, LLC

Date
July 28, 2022

Project No.
1940101010-006

GROUNDWATER MODELING REPORT

ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

GROUNDWATER MODELING REPORT
KINCAID POWER PLANT ASH POND

Project Name	**Kincaid Power Plant Ash Pond**
Project No.	**1940101010-006**
Recipient	**Kincaid Generation, LLC**
Document Type	**Groundwater Modeling Report**
Revision	**FINAL**
Date	**July 28, 2022**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Pejman Rasouli, PhD
Senior Consultant

Brian G. Hennings, PG
Senior Managing Hydrogeologist

CONTENTS

TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
BCU	bedrock confining unit
Cabeno	Cabeno Field Services
CBR	closure by removal
CIP	closure in place
CCR	coal combustion residuals
cm/s	centimeters per second
CSM	conceptual site model
ft/d	feet/foot per day
Geosyntec	Geosyntec Consultants, Inc.
GMP	Groundwater Monitoring Plan
GMR	Groundwater Modeling Report
Golder	Golder Associates USA Inc.
GWPS	Groundwater Protection Standard
HCR	Hydrogeologic Site Characterization Report
HELP	Hydrologic Evaluation of Landfill Performance
ID	identification
IEPA	Illinois Environmental Protection Agency
Kd	soil adsorption coefficient
K_d	linear partition coefficients
K_{dF}	Frendlich partition coefficients
Kh/Kv	vertical anisotropy
KPP	Kincaid Power Plant
L/kg	liters per kilogram
LCU	lower confining unit
mg/L	milligrams per liter
mL/g	milliliters per gram
MNA	monitored natural attenuation
NAVD88	North American Vertical Datum of 1988

No.	number
Part 845	35 I.A.C. § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments
PMP	potential migration pathway
R2	correlation coefficient
Ramboll	Ramboll Americas Engineering Solutions, Inc.
TDS	total dissolved solids
TVD	total-variation-diminishing
UA	uppermost aquifer
USCU	upper semi-confining unit
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

EXECUTIVE SUMMARY

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Modeling Report (GMR) on behalf of the Kincaid Power Plant (KPP), operated by Kincaid Generation, LLC, in accordance with requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845) (Illinois Environmental Protection Agency [IEPA], 2021). This document presents the results of predictive groundwater modeling simulations for proposed closure scenarios for the Ash Pond (AP; Vistra identification [ID] number [No.] 141, IEPA ID No. W0218140002-01).

The AP coal combustion residuals (CCR) unit is located between two lobes of Sangchris Lake, which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River. Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and the northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of the AP and is connected to the eastern lobe of Sangchris Lake. The KPP property is surrounded by the lobes of Sangchris Lake and Sangchris Lake State Park to the north and east, and a combination of undeveloped land and surface support facilities associated with the former Peabody Coal Company #10 mine to the south and west.

A detailed summary of site conditions was provided in the Hydrogeologic Site Characterization Report (HCR; Ramboll, 2021a). Five distinct water-bearing units have been identified in the vicinity of the AP based on stratigraphic relationships and common hydrogeologic characteristics. The units are described as follows:

- **CCR**: Saturated CCR, consisting primarily of bottom ash, and boiler slag.
- **Upper Semi-Confining Unit (USCU)**: Low-permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU have a higher probability of contaminant transport and these materials are referred to as the potential migration pathways (PMP).
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which include the clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations, also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet (referenced to North American Vertical Datum of 1988 [NAVD88]. The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit). Includes the lithologic layers identified as the Vandalia Till.

- **Bedrock Confining Unit (BCU):** The water-bearing layer referred to as the BCU is composed of interbedded shale and limestone of the Pennsylvanian Age Bond Formation that underlie the Vandalia Till, and underlies the entire AP.

Groundwater flow in the UA is to the northwest toward Sangchris Lake. Groundwater elevations are primarily controlled by the surface water levels in the lobes of Sangchris Lake and the water level within the AP. An apparent groundwater divide trending southwest to northeast has been observed beneath the AP.

A review and summary of data collected from 2015 through 2021 for parameters with groundwater protection standards (GWPS) listed in 35 I.A.C. § 845.600 is provided in the HCR (Ramboll, 2021a). Groundwater concentrations presented in HCR Table 4-1 and summarized in the History of Potential Exceedances (Ramboll, 2021b) are considered potential exceedances because the methodology used to determine them is proposed in the Groundwater Monitoring Plan (GMP; Ramboll, 2021c) and has not been reviewed or approved by IEPA at the time of this submittal. The following constituents with potential exceedances of the GWPS listed in 35 I.A.C. § 845.600 were identified: boron, sulfate, and total dissolved solids (TDS) (Ramboll, 2021b).

Statistically significant correlations between boron concentrations and concentrations of other parameters identified as potential exceedances of the GWPS indicate boron is an acceptable surrogate for sulfate and TDS in the groundwater model. It was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil adsorption coefficient [Kd] was set to 0 milliliters per gram [mL/g]) which is a conservative estimate for predicting contaminant transport times. Boron, sulfate, and TDS transport is likely to be affected by both chemical and physical attenuation mechanisms (*i.e.,* adsorption and/or precipitation reactions as well as dilution and dispersion).

Data collected from previous field investigations, as well as the 2021 field investigations, were used to develop a groundwater model for the AP. The MODFLOW and MT3DMS models were then used to evaluate two closure scenarios, including CCR consolidation and closure in place (CIP), and closure by removal (CBR) scenarios, using information provided in the CCR Surface Impoundment Final Closure Plan (Burns & McDonnell, 2022):

- Scenario 1: CIP (CCR removal from the north and west areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR); and,
- Scenario 2: CBR (CCR removal from the AP)

Scenario 1 (CIP) was predicted to reduce both total flux in and out of the Fill Unit (CCR) by greater than 99% when simulated post-construction heads in the groundwater monitoring wells are predicted to stabilize.

Prior to the simulation of these scenarios, a dewatering simulation was included for the removal of free liquids from the AP prior to the implementation of the two scenarios. Predictive simulations of closure conservatively indicate groundwater in the UA will achieve the GWPS in site monitoring wells for Scenarios 1 and 2 in 17 and 16.5 years after implementation of the closure scenarios, respectively. From a modeling perspective, the difference between the predicted time to reach the GWPS for boron (2 mg/L) in Scenario 1 (17 years) versus Scenario 2 (16.5 years) is negligible. In other words, both scenarios are predicted to reach the GWPS after approximately 17 years, the simulated difference between these two scenarios is not significant.

Results of groundwater fate and transport modeling estimate that groundwater will attain the GWPS for all constituents identified as potential exceedances of the GWPS within 17 years of closure implementation for both Scenarios. In both scenarios residual boron exceedances from the calibrated model remain in close proximity to the ash pond and/or calibrated extent of exceedances as the plumes recede.

1. INTRODUCTION

1.1 Overview

In accordance with requirements of Part 845 (IEPA, 2021), Ramboll has prepared this GMR on behalf of KPP, operated by Kincaid Generation, LLC. This report will apply specifically to the CCR Unit referred to as the AP (**Figure 1-1**). The KPP operates as a coal-fired power plant and has a single CCR management unit, the AP (**Figure 1-2**), a 172-acre, unlined surface impoundment used to manage CCR and non-CCR waste streams at the KPP with a total storage capacity of approximately 3,560 acre-feet. This GMR presents and evaluates the results of predictive groundwater modeling simulations for two scenarios:

- Scenario 1: CIP (CCR removal from the north and west areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR)
- Scenario 2: CBR (CCR removal from the AP)

1.2 Site Location and Background

The KPP is located in the southwest quarter of Section 1, and the northeast quarter of Section 12, Township 13 North, Range 4 West, along West Route 104, Christian County, Illinois and approximately four miles west of the Village of Kincaid. The AP is located between two lobes of Sangchris Lake (**Figure 1-1**), which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River. Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of the AP and is connected to the eastern lobe of Sangchris Lake. The KPP property is surrounded by the lobes of Sangchris Lake and Sangchris Lake State Park to the north and east, and a combination of undeveloped land and surface support facilities associated with the former Peabody Coal Company #10 mine to the south and west.

1.3 Site History and Unit Description

Construction of the AP began in 1964 and it was commissioned for use in 1967. The AP primarily contains bottom ash and boiler slag, and other minor materials, including water and wastewater treatment solids, excavation spoils, and dredge spoils. The discharge for the AP is located at the southeast corner of the unit. The approximate dates of construction of each successive stage of the AP are summarized in **Table A** on the following page (AECOM, 2016).

Table A. History of Construction

Date	Event
1964-1965	Construction of AP
1967	AP was put into service
1978-1980	Installation of AP recycle water intake structures and associated piping
Mid-1980's	Erosion repair along north embankment adjacent to Sangchris Lake
2006	Replacement of emergency outlet piping
2009-2010	Tree removal, grading, and vegetation re-established along the north and east embankment
2010	Riprap placement along the northwest AP embankment adjacent to Sangchris Lake

2. SITE GEOLOGY AND HYDROGEOLOGY

AP hydrogeologic and groundwater quality data was presented in the HCR (Ramboll, 2021a) and used to establish a conceptual site model (CSM) for this GMR, and is summarized below. There are three principal types of unlithified materials present overlying bedrock at the KPP, consisting of the following in descending order:

- Fill, the constructed AP consists of fill (predominantly coal ash within the AP, but also including constructed berms and railroad embankments around the AP).
- Clays and silts of the Cahokia Formation, interbedded with thin sand lenses, most of which are laterally discontinuous, but a thin bed of sand was observed at the bottom of the Cahokia Formation in the majority of soil borings advanced near the AP. This sand unit comprises the UA. The Cahokia materials extend to depths of less than 44 feet.
- Clay and silt with varying amounts of sand and gravel of the Vandalia Till, which extend to depths of up to 52 feet.

Bedrock beneath the AP consists of the Pennsylvanian-age Bond Formation, comprised mainly of limestone with lesser amounts of shale and sandstone.

Prior to 2021, there were 12 monitoring wells (MW-1 through MW-12) around the AP for monitoring groundwater. Nineteen additional monitoring wells (MW-7S, MW-8S, MW-11S, MW-12S, MW-12D, MW-20S, MW-20, MW-22, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, MW-31, MW-32, and MW-31S) were installed in 2021 around the perimeter of the AP to meet the requirements of Part 845. Construction details for monitoring wells and piezometers are provided in **Table 2-1** and depicted in **Figure 2-1**. Boring logs, monitoring well and piezometer construction forms are provided in Appendix B of the HCR.

Five distinct water-bearing units have been identified in the vicinity of the AP based on stratigraphic relationships and common hydrogeologic characteristics. The units are described as follows:

- **CCR**: Saturated CCR, consisting primarily of bottom ash, and boiler slag.
- **USCU**: Low-permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU have a higher probability of contaminant transport and these materials are referred to as the PMP.
- **UA**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which include the clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations, also includes the interface with the Vandalia Till.
- **LCU:** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet NAVD88. The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit). Includes the lithologic layers identified as the Vandalia Till.

- **BCU:** The water-bearing layer referred to as the BCU is composed of interbedded shale and limestone of the Pennsylvanian Age Bond Formation that underlie the Vandalia Till, and underlies the entire AP.

Groundwater flow direction (**Figure 2-2 and Figure 2-3**) and gradients have not changed significantly since the first hydrogeologic study of the AP was completed, and recent data supports the existing CSM which has been refined to incorporate additional data as follows:

- Due to the downgradient location and proximity of Sangchris Lake to the AP, Sangchris Lake is likely to be hydraulically connected to the UA beneath the AP. Flow of groundwater from the KPP to Sangchris Lake through the UA is the primary pathway for contaminant migration.
- The elevations of water within the AP are greater than groundwater elevations in the surrounding areas, and, depending on the hydraulic connection between the AP and the surrounding aquifer, water may flow radially from the AP toward the lobes of Sangchris Lake.
- Horizontal groundwater flow in the USCU in the area of the AP is toward the north and northwest toward the western lobe of Sangchris Lake. There also appears to be a component of groundwater flow to the south and east toward the discharge flume that flows to the eastern lobe of Sangchris Lake, as evidenced by groundwater elevations on the southern side of the AP. These two components of groundwater flow suggest a groundwater divide beneath the AP.
- The groundwater divide beneath the AP is further supported by horizontal groundwater flow in the UA, which is to the northwest and southeast toward the western and eastern lobes of Sangchris Lake, respectively.
- Groundwater elevations are primarily controlled by the surface water level in Sangchris Lake, and the water level within the AP. Typically, groundwater from the AP flows from east to west and discharges to Sangchris Lake.
- Vertical gradients calculated between the bedrock and UA are generally upward, consistent with previous vertical gradient calculations (HCR, Ramboll, 2021a).

3. GROUNDWATER QUALITY

Groundwater at the AP does not meet the definition of Class I - Potable Resource Groundwater (35 I.A.C. § 620.210), based on the following criteria provided in the HCR:

- Site investigations have determined that water bearing lenses contain more than 12 percent fines and are less than five feet in thickness (Cabeno Field Services [Cabeno], 2013),
- Sustained groundwater yield from a 12-inch borehole of less than 150-gallons per day from a thickness of 15-feet or less.
- Field (horizontal) hydraulic conductivity tests and laboratory (vertical) hydraulic conductivity tests from wells screened within the UA resulted in an overall (geometric mean) of 5.07 x 10^{-5} centimeters per second (cm/s) and 1.07 x 10^{-7} cm/s, respectively (see Table 2-1 and Table 3-4 in the HCR; Ramboll, 2021a).

As set forth in 35 I.A.C. § 620.220, any geologic material with a hydraulic conductivity of less than 1 x 10^{-4} cm/s, and which does not meet the provisions of 35 I.A.C. § 620.210 (Class I), 35 I.A.C. § 620.230 (Class III), or 35 I.A.C. § 620.240 (Class IV), meets the definition of Class II: General Resource Groundwater. Based on the detailed geologic information provided for the unlithified materials and bedrock encountered at the AP and the hydrogeologic data, the groundwater in the UA can be classified as Class II: General Resource Groundwater. This is supported by results of the hydrogeologic study completed in 2013 (Cabeno, 2013), which concluded that the AP does not meet most criteria of Class I groundwater and the data collected supported a Class II groundwater classification.

Groundwater quality investigations were completed at the AP starting in 2010. In 2021, additional wells were installed to comply with Part 845 requirements, specifically to reduce the lateral spacing between monitoring points and to further characterize the PMPs. Wells were sampled for the parameters listed in 35 I.A.C. § 845.600. A review and summary of data collected from 2015 through 2021 for parameters with GWPSs listed in 35 I.A.C. § 845.600 is provided in the HCR (Ramboll, 2021a).

Concentration results presented in the HCR were compared directly to 35 I.A.C. § 845.600 GWPSs to determine potential exceedances. The results are considered potential exceedances because the results were compared directly to the standard and did not include an evaluation of background groundwater quality or utilize the statistical methodologies proposed in the GMP (Ramboll, 2021c) attached to the operating permit application.

Groundwater concentrations from 2015 to 2021 are summarized in the History of Potential Exceedances (Ramboll, 2021b) (attached to the operating permit application) and are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to the GMP, Ramboll 2021c), which has not been reviewed or approved by IEPA at the time of submittal of the Part 845 operating permit application.

The History of Potential Exceedances attached to the operating permit application summarizes all potential groundwater exceedances following the proposed Statistical Analysis Plan. The following potential exceedances were identified:

- Boron – determined at monitoring wells MW-7S, MW-12, and MW-28
- Sulfate – determined at monitoring wells MW-28 and MW-32
- TDS – determined at monitoring well MW-28

4. GROUNDWATER MODEL

4.1 Overview

Data collected at the site from the 2021 field investigation were used to develop a groundwater model for the AP. The MODFLOW and MT3DMS models were then used to evaluate two closure scenarios, including CCR consolidation and CIP using information provided in the CCR Surface Impoundment Final Closure Plan (Burns & McDonnell, 2022), and CBR scenarios. The results of the CIP and CBR closure scenarios are summarized and evaluated in this GMR. Associated model files are included as **Appendix A**.

4.2 Conceptual Site Model

The HCR (Ramboll, 2021a) is the foundation of the site setting and CSM that describes groundwater flow at the site. The AP overlies the recharge area for the underlying transmissive geologic media, which are composed of moderate permeability sand, silty sand, and clayey sand and gravel units, which include the clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations, also includes the interface with the Vandalia Till deposits (*i.e.*, the UA). Groundwater enters the model domain vertically via recharge. The groundwater from the UA flows into the forks of Sangchris Lake.

Boron was selected for transport modeling. Boron is commonly used as an indicator parameter for contaminant transport modeling for CCR because: (i) it is commonly present in coal ash leachate; (ii) it is mobile and typically not very reactive but conservative (*i.e.*, low rates of sorption or degradation) in groundwater; and (iii) it is less likely than other constituents to be present in background groundwater from natural or other anthropogenic sources. The only significant source of boron is the AP. Mass (boron) is added to groundwater via vertical recharge through CCR, and horizontal groundwater flow through CCR where it is in contact with the water table. Mass flows with groundwater toward Sangchris Lake. The primary transport pathway is the UA as indicated by groundwater observations. The USCU is also a PMP, although the sands in this unit are discontinuous which limit migration potential.

4.3 Model Approach

4.3.1 Potential Groundwater Exceedances

Comparisons of observed sulfate and TDS concentrations to boron (**Figure A** on the following page) indicate statistically significant correlations between these parameters within wells screened in the UA. Observed concentrations were transformed into Log10 concentrations for evaluation. The correlation coefficient (R2) and p values (indicator of statistical significance) are also provided on **Figure A**. Higher R2 values (*i.e.*, closer to 1) indicate stronger correlation between parameters. A correlation is considered statistically significant when the p value is lower than 0.05. Both correlations have p values less than the target of 0.05, indicating correlations are statistically significant. The correlation is slightly stronger between TDS and boron. The statistically significant correlations associated with boron concentrations indicate boron is an acceptable surrogate for sulfate, and TDS in the groundwater model, and concentrations of these parameters are expected to change along with model predicted boron concentrations.

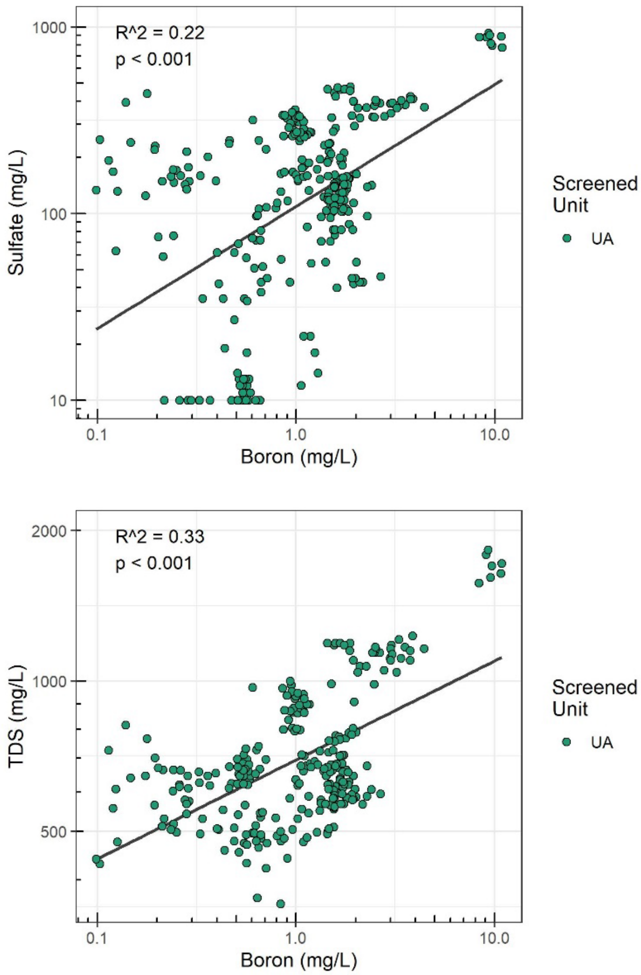


Figure A. Boron Correlation with Sulfate and TDS in UA Wells

4.3.2 Summary of Modeling Activities

A three-dimensional groundwater flow and transport model was calibrated to represent the conceptual flow system described above. Initial modeling was performed for a sufficient period (27.5 years) to allow modeled boron concentrations in the primary transport layer (*i.e.,* UA) to achieve steady concentrations. The model was calibrated to match the mean groundwater elevation and median concentration observed at individual monitoring wells. Prediction simulations were then performed to evaluate the effects of CBR and CIP closure scenarios on groundwater quality for a period of 30 years following corrective action measures, which include dewatering of the AP for 1 year, consolidation of CCR and cover system construction or removal of CCR. The calibration and prediction model timelines are illustrated in **Figure 4-1**.

Three model codes were used to simulate groundwater flow and contaminant transport:

- Groundwater flow was modeled in three dimensions using MODFLOW 2005
- Contaminant transport was modeled in three dimensions using MT3DMS
- Percolation (recharge) after removal at the AP was modeled using the results of the Hydrologic Evaluation of Landfill Performance (HELP) model.

Modeling steps are a summarized below:

- A steady state model was created in MODFLOW 2005 and used to simulate the general groundwater flow conditions at the site. The model was calibrated to match mean groundwater elevations observed between 2015 to 2021.
- A transient flow model based off of the calibrated steady state model was used to simulate groundwater flow and transport for 27.5 years using MODFLOW 2005 and MT3DMS to simulate boron entering the system through time and allow concentrations to match currently observed concentrations of boron in groundwater (**Table 4-1**).
- Prediction simulations began with a 1-year dewatering period simulated in MODFLOW 2005 and MT3DMS where heads were reduced within the CCR unit and concentrations were removed from CCR removal areas.
- Prediction simulations resumed for CIP and CBR following the 1-year dewatering period using the results of HELP modeling as input values for recharge rates in the construction areas.
- The prediction simulations were run using MODFLOW 2005 and MT3DMS to estimate the time for boron concentrations to meet the GWPS in the compliance wells; and, to evaluate the differences between the two closure scenarios.

5. MODEL SETUP AND CALIBRATION

5.1 Model Descriptions

For the construction and calibration of the numerical groundwater flow model for the site, Ramboll selected the model code MODFLOW, a publicly-available groundwater flow simulation program developed by the United States Geological Survey (USGS) (McDonald and Harbaugh, 1988). MODFLOW is thoroughly documented, widely used by consultants, government agencies and researchers, and is consistently accepted in regulatory and litigation proceedings. MODFLOW uses a finite difference approximation to solve a three-dimensional head distribution in a transient, multi-layer, heterogeneous, anisotropic, variable-gradient, variable-thickness, confined or unconfined flow system—given user-supplied inputs of hydraulic conductivity, aquifer/layer thickness, recharge, wells, and boundary conditions. The program also calculates water balance at wells, rivers, and drains.

MODFLOW was developed by USGS (McDonald and Harbaugh, 1988) and has been updated several times. Major assumptions of the code are: (i) groundwater flow is governed by Darcy's law; (ii) the formation behaves as a continuous porous medium; (iii) flow is not affected by chemical, temperature, or density gradients; and (iv) hydraulic properties are constant within a grid cell. Other assumptions concerning the finite difference equation can be found in McDonald and Harbaugh (1988). MODFLOW 2005 was used for these simulations with Groundwater Vistas 7 software for model pre- and post- processing tasks (Environmental Simulations, Inc., 2017).

MT3DMS (Zheng and Wang, 1998) is an update of MT3D. It calculates concentration distribution for a single dissolved solute as a function of time and space. Concentration is distributed over a three-dimensional, non-uniform, transient flow field. Solute mass may be input at discrete points (wells, drains, river nodes, constant head cells), or distributed evenly or unevenly over the land surface (recharge).

MT3DMS accounts for advection, dispersion, diffusion, first-order decay, and sorption. Sorption can be calculated using linear, Freundlich, or Langmuir isotherms. First-order decay terms may be differentiated for the adsorbed and dissolved phases.

The program uses the standard finite difference method, the particle-tracking-based Eulerian-Lagrangian methods and the higher-order finite-volume total-variation-diminishing (TVD) method for the solution schemes. The finite difference solution has numerical dispersion for low-dispersivity transport scenarios but conserves good mass balance. The particle-tracking method avoids numerical dispersion but was not accurate in conserving mass. The TVD solution is not subject to significant numerical distribution and adequately conserves mass, but is numerically intensive, particularly for long-term models such as developed for the AP. The finite difference solution was used for this simulation.

Major assumptions of MT3DMS are: (i) changes in the concentration field do not affect the flow field; (ii) changes in the concentration of one solute do not affect the concentration of another solute; (iii) chemical and hydraulic properties are constant within a grid cell; and (iv) sorption is instantaneous and fully reversible, while decay is not reversible.

The HELP model was developed by the United States Environmental Protection Agency (USEPA). HELP is a one-dimensional hydrologic model of water movement across, into, through, and out of a landfill or soil column based on precipitation, evapotranspiration, runoff, and the geometry and hydrogeologic properties of a layered soil and waste profile. For this modeling, results of the HELP model, HELP Version 4.0 (Tolaymat and Krause, 2020), were used to estimate the hydraulic conditions from closure conditions.

5.2 Flow and Transport Model Setup

The modeled area was approximately 6,520 feet by 7,780 feet. The north, west, and south edges of the model are bounded by the forks of Sangchris Lake. The eastern edge of the model is selected to maintain sufficient distance from the AP to reduce boundary interference with model calculations, while not extending too far past the extent of available calibration data. The middle of the AP is an approximate topographic high and surface water divide in the model. The model grid and boundary conditions are displayed in **Figure 5-1 through Figure 5-4**.

Evaluation of monitoring well data has not identified statistically significant seasonal trends in groundwater quality which could affect model applicability for prediction of boron transport. The MODFLOW model was calibrated to mean groundwater elevation collected from June 2015 to September 2021 presented in **Table 5-1**. MT3DMS was run on the calibrated flow model and model-simulated concentrations were calibrated to the median observed boron concentration values at the monitoring wells calculated from boron concentrations results from March to July 2021 presented in **Table 5-2**. Multiple iterations of MODFLOW and MT3DMS calibration were performed to achieve an acceptable match to observed flow and transport data. The calibrated flow and transport models were used in predictive modeling to evaluate the CBR closure scenario by removing saturated ash cells and CIP closure scenario by removing ash cells from the northern part and capping ash cells in the southern part as demonstrated in the closure plan. The HELP model is used to estimate recharge values to simulate changes proposed in the closure scenarios.

5.2.1 Grid and Boundary Conditions

A five-layer, 326 x 389 node grid was established with 20 foot grid spacing (**Figure 5-1**). Boundary conditions are illustrated in **Figure 5-2 through Figure 5-4**. The north, south and west edges of the model are bounded by Sangchris Lake. To simulate the lake, a constant head (Dirichlet) boundary was imposed on layer 3. For water in the AP, a constant head boundary was also used. Constant concentration boundary conditions were imposed in layer 1 and a small wedge in northwest of layer 2 upgradient of MW-28. The observed boron concentrations at well MW-28 are two times greater than observed concentrations in other monitoring wells and the porewater samples collected from within the AP (**Table 5-2**). These elevated concentrations in MW-28 suggests that materials with higher concentrations than bottom ash may have been deposited in that area in the past. The historical survey map of 1966 (Appendix A in Ramboll, 2021) shows lower surface elevation extending into the AP footprint from the lake. This low area would have been filled during construction of the AP berm and have been interpreted to contain CCR material with higher boron concentrations than the rest of the AP to match observed elevated concentrations at MW-28.

5.2.2 Flow Model Input Values and Sensitivity

Flow model input values and sensitivity analyses results are presented in **Table 5-3** and described below.

The flow model calibration targets (*i.e.*, mean groundwater elevations from June 2015 to September 2021 and target well locations) are summarized in **Table 5-1**. Groundwater elevations measured at wells MW1, MW-2, MW-9, and MW-10 were not included as flow model calibration targets because they were on the other side of the lake channels and were outside the immediate vicinity of the AP.

Sensitivity analysis was conducted by changing input values and observing changes in the sum of squared residuals. Horizontal and vertical conductivities were varied between one-tenth- and ten-times calibrated values. Recharge terms were varied between one-half and two times calibrated values. When the calibrated model was tested, the sum of squared residuals was 81.1. Sensitivity test results were categorized into negligible, low, moderate, moderately high, and high sensitivity based on the change in the sum of squared residuals as summarized in the notes in **Table 5-3**.

5.2.2.1 Model Layers

Model layer elevations were generated through spatial interpolation of boring log data in Surfer software, with the use of pilot points as needed to maintain consistency with the conceptual site model for each of the five distinct water-bearing units described in **Section 2**. The bottom elevation of the LCU in layer 5 was generated by kriging with pilot points. Its thickness in the model is 50 feet. The contacts between the overlying layers were approximated from hydrostratigraphic unit thicknesses presented in the HCR (Ramboll, 2021a), including the bottom of the fill (ash) layer. The approximate base of ash surface was developed from information presented in the HCR (Ramboll, 2021a). The resulting surfaces were imported as layers into the model to represent the distribution and change in thickness of each water-bearing unit across the model domain.

5.2.2.2 Hydraulic Conductivity

Hydraulic conductivity values and sensitivity results are summarized in **Table 5-3**. When available, these values were derived from field or laboratory measured values reported in the HCR (Ramboll, 2021a). No horizontal anisotropy was assumed. Vertical anisotropy (presented as Kh/Kv in **Table 5-3**) was applied to conductivity zones to simulate preferential flow in the horizontal direction in these materials. Permeability tests discussed in the HCR (Ramboll, 2021a) indicate vertical conductivity values that are generally lower than horizontal.

The spatial distribution of the hydraulic conductivity zones (**Figure 5-5 through Figure 5-9**) in each layer simulates the distribution of hydrostratigraphic units as reported in the HCR (Ramboll, 2021a). The limits of the fill unit hydraulic conductivity zone (zone 1) in the model reflect the limits of the ash fill as presented in the HCR (Ramboll, 2021a). The distribution of other hydraulic conductivity zones was determined through analysis of each of the five distinct water-bearing unit layer surfaces. The USCU and UA are both exhibiting presence of each other's lenses which makes them relatively heterogenous, especially along the western and northern AP boundaries where historical survey map of 1966 (Appendix A in Ramboll, 2021) shows a lower topographic surface elevation extending into the AP footprint from the lake. Based on boring logs and measured hydraulic conductivities, zones of different hydraulic conductivity were defined to improve the flow calibration (**Figure 5-5 and Figure 5-8**).

The model displayed moderately high sensitivity to changes in horizontal conductivity in zones 1 (CCR), 2 (USCU) and 3 (UA), where the model was moderately sensitive to horizontal conductivity in the remaining zones. The model was highly sensitive to changes in vertical conductivity in zones 1 (CCR), 2 (USCU) and 3 (UA), while the model exhibited a low sensitivity in the remaining zones.

5.2.2.3 Recharge

Recharge rates were determined through calibration and spatial distribution of recharge zones were based on the location and type of material present at land surface (**Figure 5-10**). Four different zones were created to simulate recharge in the model area. The recharge occurring through the AP area was split into four different values. The recharge zone of 1.314 (inches per year [in/yr]) corresponds to approximate limits of ash based on the 1995 topographic map, which also matches with the current area of open water. The recharge zone 8.76 (in/yr) corresponds to the approximate extent of CCR present on a 1971 aerial image. The northern zone of 4.38 (in/yr) recharge zone approximates the extent of ash present on a 1983 aerial image and the same recharge rate was used in areas that have been disturbed along the western portion of the pond and south of the pond where the plant is present. The recharge zone of 0.22 (in/yr) represents ambient recharge through the USCU at the land surface and portions of the berms around the AP. In the model, zones with the same recharge rates that are divided by the implementation boundary of CBR and CIP were given different zone numbers for the purpose of calibration runs and closure scenarios setup (i.e. zone 3, 5 and zone 4, 7 and 8)

The model had a high sensitivity to changes in recharge in zones with high recharge rates (zones 4, 7 and 8). The model varied from moderately high to negligible sensitivity to changes in recharge in the remaining zones.

5.2.2.4 Storage and Specific Yield

The current calibration model did not use these terms because it was run at steady state. For the transport model, which was run in transient, no field data defining these terms were available so published values were used consistent with Fetter (1988). Specific yield was set to equal effective porosity values described in **Section 5.2.3.3**. The spatial distribution of the storage and specific yield zones were consistent with those of the hydraulic conductivity zones. The sensitivity of these parameters was tested by evaluating their effect on the transport model as described in **Section 5.2.3.4**.

5.2.2.5 Constant Head Boundary

Constant head boundary conditions were used for the lake and water impoundment in the AP area (**Figure 5-4**). Based on digital elevation model (DEM), constant head for the lake is set to 584.35 feet and 603.48 feet for the impoundment inside the AP domain. The flow calibration model had moderately high sensitivity to changes in constant head values.

5.2.3 Transport Model Input Values and Sensitivity

MT3DMS input values are listed in **Table 5-4** and described below. Sensitivity of the transport model is summarized in **Table 5-5**.

The model was calibrated to groundwater boron concentration ranges at each well as measured from June 2015 to September 2021. The transport model calibration targets are summarized in **Table 5-2**.

Sensitivity analysis was conducted by changing input values and observing percent change in boron concentration at each well from the calibrated model boron concentration. Effective porosity was varied by decreasing and increasing calibrated model values by 0.05. Storage values were multiplied and divided by a factor of 10, and specific yield by a factor of 2.

5.2.3.1 Initial Concentrations

No initial concentrations were placed in the calibration model. The flow model was run as transient and concentration was added to the model through constant concentration cells starting at the same time as flow simulation. Modeling was performed for a sufficient period (27.5 years, **Figure 4-1**) to allow modeled concentrations to match currently observed concentrations of boron in groundwater.

5.2.3.2 Source Concentrations

Two concentration sources in the form of constant concentration boundary cells were simulated in fill unit layer 1 and one small wedge of fill in layer 2 upgradient of MW-28 for calibration as discussed in **Section 5.2.1**. The locations of the boundary cells are illustrated in **Figures 5-2 and 5-3** and input values are summarized in **Table 5-4**. Water that comes into contact with CCR in the northern and eastern portions of the AP (constant concentration zones 31, 401 and 402) were given a concentration of 3.1 mg/L. Water that comes into contact with CCR in the western and southern portion of the AP (constant concentration zones 351 and 352) was given a concentration of 3.5. The observed boron concentrations at well MW-28 are two times greater than observed concentrations in other monitoring wells and the porewater samples collected from within the AP (**Table 5-2**). These elevated concentrations in MW-28 suggest that materials with higher concentrations than bottom ash may have been deposited in that area in the past. The historical survey map of 1966 (Appendix A in Ramboll, 2021) shows a lower topographic surface elevation extending into the AP footprint from the lake. This low area would have been filled during construction of the AP berm and has been interpreted to contain fill/CCR material with higher boron concentrations than the rest of the AP to match observed elevated concentrations at MW-28. All sources were simulated by assigning constant concentration cells placed in layer 1 and layer 2 to simulate saturated ash conditions. From the model perspective, this means that when the simulated water level is above the base of these cells, water that passes through the cell will take on the assigned concentration. All source concentrations were calibrated to the boron concentration data collected in from 2015 to 2021.

Because these are the sources of concentration in the model, the model will be highly sensitive to changes in the input values. For that reason, sensitivity testing was not completed for the source values.

5.2.3.3 Effective Porosity

Effective porosity for each modeled hydrostratigraphic unit were calibrated in the model and derived from literature values, 0.21 for silt and clay, 0.25 for sand, silt and gravel and 0.1 for clay from Morris and Johnson (1967) and Heath (1983) and presented in **Table 5-4**.

The model had a negligible to high sensitivity to changes in porosity values, not including monitoring location where the calibration concentration was 0.0 mg/L (i.e., MW-8S) (**Table 5-5**). The greatest sensitivity for porosity was high for the low porosity sensitivity test at monitoring locations MW-8, MW-20 and MW-20S. Computed concentrations is these locations are very small (1.2E-3 to 2.3E-3 mg/L) and are prone to numerical errors and therefore their high sensitivity can be considered over-predicted.

5.2.3.4 Storage and Specific Yield Sensitivity

The model had negligible sensitivity to changes in storage and specific yield values (**Table 5-5**).

5.2.3.5 Dispersivity

Physical attenuation (dilution and dispersion) of contaminants is simulated in MT3DMS. Dispersion in porous media refers to the spreading of contaminants over a greater region than would be predicted solely from the average groundwater velocity vectors (Anderson, 1979; Anderson, 1984). Dispersion is caused by both mechanical dispersion, a result of deviations of actual velocity at a microscale from the average groundwater velocity, and molecular diffusion driven by concentration gradients. Molecular diffusion is generally secondary and negligible compared to the effects of mechanical dispersion and only becomes important when groundwater velocity is very low. The sum of mechanical dispersion and molecular diffusion is termed hydrodynamic dispersion, or simply dispersion (Zheng and Wang, 1998).

Dispersivity values were applied to the entire model domain and determined during calibration. Longitudinal dispersivity was set at 5 feet. The transverse and vertical dispersivity were set at 1/10 and 1/100 of longitudinal dispersivity. These input values were determined during model calibration. With an approximate travel distance of 50 feet for groundwater from the source to the receiving body of water, the model is not expected to be sensitive to dispersivity inputs and the sensitivity of the model to dispersivity was not tested.

5.2.3.6 Retardation

It was assumed that boron would not significantly sorb or chemically react with aquifer solids (distribution coefficient [Kd] was set to 0 mL/g) which is a conservative estimate for estimating contaminant transport times. Boron, sulfate, and TDS transport is likely to be affected by both chemical and physical attenuation mechanisms (i.e., adsorption and/or precipitation reactions as well as dilution and dispersion). Batch adsorption testing was conducted to generate site specific partition coefficient results for boron and sulfate (Golder, 2022, **Appendix B**) for locations MW-12S and MW-28. Results of the testing are summarized below:

- Boron: Calculated linear partition coefficient (K_D) values for MW-12S and MW-28 were 0.05 and 1.81 liters per kilogram (L/kg), respectively. Langmuir partition coefficient (K_L) values were 1.4 x 10^6 and -1.5 x 10^4 L/kg, respectively. Freundlich partition coefficients (K_F) values were 112 and 27.5 L/kg, respectively. For comparison, in Strenge and Peterson (1989) the partition coefficients for boron range from 0.19 to 1.3 L/kg, depending on pH conditions and the amount of sorbent (*i.e.*, clay, organic matter, and iron and aluminum oxyhydroxide) present.

- Sulfate: Calculated K_D values for MW-12S and MW-28 were 0.23 and 15.5 L/kg, respectively. K_L values were 454 and -750 L/kg, respectively. K_F values were 1.87 and 0.13 L/kg, respectively. In Strenge and Peterson (1989), partition coefficients for sulfate are 0.0 L/kg, regardless of pH conditions and the amount of sorbent present.

The results from site samples have a high degree of variation and little correlation with the literature values provided for comparison. The potential exceedances identified in groundwater (boron, sulfate, and TDS) are affected by natural attenuation processes in multiple ways and to varying degrees. Further assessment of these processes and how they may be applied as a potential groundwater remedy will be completed as part of future remedy selection evaluations, as necessary. For the purposes of this GMR, and as mentioned at the beginning of this section, no retardation was applied to boron transport in the model (i.e., Kd was set to 0).

5.3 Flow and Transport Model Assumptions and Limitations

Simplifying assumptions were made while developing this model:

- Leading up to 2022, the groundwater flow system can be simulated as steady state.
- Natural recharge is constant over the long term.
- No fluctuations are assumed for the lake stage.
- Hydraulic conductivity is consistent within hydrostratigraphic zones
- The approximate base of ash surface was developed from information presented in the HCR (Ramboll, 2021a).
- Observed concentrations in groundwater exhibit no long-term trend.
- Source concentrations are assumed to remain constant over time.
- Boron is not adsorbed and does not decay, and mixing and dispersion are the only attenuation mechanisms.

The model is limited by the data used for calibration, which adequately define the local groundwater flow system and the source and extent of the plume. Since data used for calibration are near the monitoring wells, model predictions of transport distant spatially and temporally from the calibrated conditions at the CCR units will not be as reliable as predictions closer to the CCR units and concentrations observed in 2021.

5.4 Calibration Flow and Transport Model Results

Results of the MODFLOW/MT3DMS modeling are presented below. Electronic copies of the model files are attached to this report in **Appendix A**.

Flow model calibration results are presented in **Figure 5-11 through Figure 5-18**. The mass balance error for the flow model was -0.02 percent and the ratio of the residual standard deviation to the range was 8.0 percent; these values are within the targets for these criteria of 1 percent and 10 percent, respectively. Another flow model calibration goal is that residuals are evenly distributed such that there is no bias affecting modeled flow. The observed heads are plotted versus the simulated heads in **Figure 5-16**. The near-linear relationship between observed and simulated values indicates that the model adequately represents the calibration dataset. The residual mean was -0.08 feet and absolute residual mean was 1.31 feet; in general the simulated residuals were evenly distributed above and below the observed values as presented in **Figure 5-17**.

The range of observed boron concentrations in 2021 for transport calibration locations are summarized in **Table 5-2**. The goals of the transport model calibration were to have predicted concentrations fall within the range of observed concentrations, and/or have predicted concentrations above and below the GWPS for boron (2 mg/L) match observed concentrations above or below the standard at each well. One or both of these goals were achieved at all but 8 of the transport calibration location wells, including MW-5, MW-7, MW-12S, MW-23, MW-24, MW-27, MW-29, and MW-31S (**Figure 5-18**). Deviations from the observed ranges are discussed below.

- Simulated concentration at UA well MW-23 (0.72 mg/L) was slightly less than the observed minimum of 0.93. The median observed boron concentration at MW-23 is equal to the GWPS of 2.0 mg/L, so the simulated concentration below 2.0 mg/L was not far off the calibration goals. This is the only calibration location to not meet both goals where simulated concentration was lower than observed.
- Co-located wells are challenging to simulate accurately unless very detailed vertical discretization is being implemented in the model, which will cost performance and run time issues. Well MW-12S in the USCU did not meet the calibration goals because the simulated concentration (2.65 mg/L) is slightly above the observed maximum concentration of 2.63 mg/L and is also above the median observed concentration of 1.51 mg/L. The elevated concentrations in this well are acceptable because accurate calibration to UA well MW-12 (one of the UA wells with the highest observed boron concentrations) was a greater priority for calibration than wells MW-12S and MW-12D, which are nested in lower permeability materials at the same location. The model simulates MW-12 very accurately, which results in over simulation of concentrations at MW-12S and MW-12D. Over simulation of concentrations in these wells is also more conservative given the objectives of the modeling to estimate time to reach the GWPS (*i.e.,* there is more boron mass to be removed in the modeled system leading to longer predicted timelines to reach the GWPS).
- Similarly, the model simulates higher concentrations of boron (2.12 mg/L) at UA well MW-7 because the model was calibrated to simulate elevated boron concentrations observed in USCU well MW-7S at the same location. To be conservative, the model was calibrated to meet the goals at the nested well with higher observed concentrations.
- Wells MW-5 and MW-31S have simulated concentrations that are greater than observed and greater than the GWPS of 2.0 mg/L along the northern berm of the AP. These wells are in close proximity to the modeled source areas. Other wells along this berm met the calibration goals; over simulation in these wells makes the model more conservative.
- Similarly, wells MW-24, MW-27, and MW-29 have simulated concentrations that are greater than observed and greater than the GWPS of 2.0 mg/L along the eastern and southern berm. These wells are in close proximity to the source areas and other wells located on either side of these locations met the calibration goals. Over simulation of boron concentration in these wells makes the model more conservative.

The remaining calibration locations had predicted concentrations that fall within the range of observed concentrations and/or have predicted concentrations above and below the GWPS for boron (2.0 mg/L) that match observed concentrations above or below the standard at each well. MW-28, located downgradient of the CCR unit, where the highest concentrations downgradient of the CCR unit were observed, was also calibrated near the median concentration of the observed values from June 2015 to September 2021. Similarly, MW-12 was calibrated near the median concentration of observed values. The calibration result for wells MW-28 and MW-12 indicate the transport calibration model was able to simulate the highest observed concentrations downgradient of the AP in the UA.

The simulated extents of boron concentrations greater than the GWPS (2.0 mg/L) are presented by layer in **Figures 5-19 to 5-22**. Boron exceedances are in close proximity to the limits of the

Ash Pond with the exception of areas to the west, where the plume is simulated as present beneath Sangchris Lake.

6. SIMULATION OF CLOSURE SCENARIOS

6.1 Overview and Prediction Model Development

Prediction simulations were performed to evaluate the effects of source control measures (CIP and CBR) for the AP on groundwater quality, which include removal of free liquids from the AP prior to construction (**Figure 4-1**). As discussed in **Sections 5.2.3.5**, physical attenuation (dilution and dispersion) of contaminants in groundwater is simulated in MT3DMS, which captures the physical process of natural attenuation as part of corrective actions for both of the closure scenarios simulated. No retardation was applied to boron transport in the model (*i.e.,* Kd was set to 0) as discussed in **Section 5.2.3.6**. The following methods were used to develop the prediction models and simulate the CIP and CBR closure scenarios:

- Define ash fill material removal and consolidation areas based on designs provided in the CCR Surface Impoundment Final Closure Plan (Burns & McDonnell, 2022).
- A 1-year dewatering period to remove free liquids was simulated in MODFLOW 2005 and MT3DMS where heads were reduced within the CCR unit using constant heads and concentrations were removed from CCR removal areas.
- In the two closure scenarios, HELP-calculated average annual percolation rates were developed from a 30-year HELP model run. This 30-year HELP-calculated percolation rate remained constant over duration of the closure scenario prediction model runs following CBR.
- Changes in recharge resulting from dewatering (assumed decrease calibration model recharge rates by 90 percent) and ash fill removal/ ash consolidation areas (recharge rates are based on HELP-calculated average annual percolation rates) have an instantaneous effect on recharge and percolation through surface materials.
- Boron source concentrations were assumed to remain constant as a function of time following the end of the calibration simulation in the ash consolidation area. Boron concentration in the ash fill removal areas was assumed to be 0 mg/L following construction to simulate removal of ash.
- The start of each closure prediction simulation was initiated at the end of the calibration model period of 27.5 years plus 1 year to complete dewatering and closure. The prediction modeling timeline for each scenario is illustrated in **Figure 4-1**.
- Ash fill removal areas were assumed to be graded following placement of soil backfill based on the design drawings provided in the CCR Surface Impoundment Final Closure Plan (Burns & McDonnell, 2022).
- Apply drain cells (drain input parameters approximated designs provided in CCR Surface Impoundment Final Closure Plan) to simulate storm water management within CCR removal areas following closure.
- All saturated ash (constant concentration cells) in the transport calibration model were removed instantaneously in all prediction models following ash fill removal/final soil backfill grading. Local fill materials assumed to be sourced from surrounding USCU materials (clay) replaced ash fill in areas of removal.
- Local fill materials applied to the prediction models have similar hydraulic properties as the USCU materials used in the transport calibration models.

6.2 HELP Model Setup and Results

HELP (Version 4.0; Tolaymat and Krause, 2020) was used to estimate percolation through the AP areas for two ash fill removal scenarios. HELP input and output files are included electronically and attached to this report.

HELP input data and results are provided in **Table 5-6**. All scenarios were modeled for a period of 30 years. Climatic inputs were synthetically generated using default equations developed for Springfield, Illinois (the closest weather station included in the HELP database). Precipitation, temperature, and solar radiation was simulated based on the latitude of the Ash Pond. Thickness of soil backfill and soil runoff input parameters were developed for the ash fill removal scenarios using data provided the CCR Surface Impoundment Final Closure Plan (Burns & McDonnell, 2022).

HELP model results (**Table 5-6**) indicated 5.83 inches of percolation per year for the Ash Pond closure by removal and backfill area, 5.82 inches of percolation per year for the Ash Pond closure in place removal and backfill area, and 0.0041 inches of percolation per year for the Ash Pond closure in place consolidation and cover system area. The differences in HELP model runs for each area included the following parameters: area, soil backfill thickness, and soil runoff slope length; all other HELP model input parameters were the same for each simulated area.

Two additional HELP model simulations were completed to support the *Proposed Alternative Final Protective Layer Equivalency Demonstration*, (Geosyntec, 2022) which is an appendix to the Construction Permit Application to which this report is also attached. Results of these two HELP simulations were not incorporated in the MODFLOW simulations for closure. Simulation inputs and output results are presented in **Appendix C**.

6.3 Simulation of Closure Scenarios

The calibrated model was used to evaluate the effectiveness of the two closure scenarios by decreasing recharge to simulate dewatering of the ash fill prior to removal, applying drains to simulate stormwater management, and changing recharge rates to simulate ash fill removal areas at the AP. Removal of leachate inputs from the ash removal areas (source control) was simulated by deactivation constant concentration cell.

Each prediction scenario was started after the 1-year dewatering simulation to remove free liquids from the AP (27.5 years calibration plus 1 year of dewatering). The prediction model input values are summarized in **Table 6-2** and changes to the recharge zones for ash removal and consolidation areas and placement of drain for stormwater management for each closure scenario are illustrated in **Figures 6-1 and 6-2**. The two closure scenarios are discussed in this report based on predicted changes in boron concentrations as described below.

6.3.1 Closure Scenario 1 (CIP) Predicted Boron Concentrations

The design for Scenario 1: CIP includes CCR removal from the north and west areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR.

Predicted concentrations start to decline within approximately 2 years (**Figure 6-3**). These declines occur as recharge is reduced from dewatering. As a result of dewatering, downward percolation of solute mass from the AP is reduced, which decreases the boron concentration entering the model domain. The southern part of the AP was capped with a cover system which further reduces recharge and decreases the amount of boron mass entering the model domain. At all downgradient wells in the UA and USCU, concentrations in Scenario 1: CIP were predicted to decrease rapidly following initial dewatering and completion of closure construction (**Figure 6-3**).

At well MW-23, the model indicates concentrations will continue to increase for a brief period of time following closure construction before concentrations decrease. MW-28 shows the highest concentration and it falls below the GWPS for boron approximately 17 years after closure construction, at which time concentrations in all wells are predicted to be below the GWPS. Boron is predicted to decrease below the GWPS in all wells approximately 17 years after implementation of CIP.

Residual boron concentrations at approximately 17 years are presented in **Figures 6-4 through 6-7**. Note that boron is not present in layer 5 of the calibrated or prediction models so there are no figures of boron concentrations in model layer 5. By year 17, the residual boron plume has significantly receded when compared to the calibrated model plume (**Figures 5-19 to 5-22**).

Evaluations of post-construction water flux through the consolidated and covered Fill Unit (CCR) were completed using data obtained from the Scenario 1 (CIP) prediction model when simulated post-construction heads in the groundwater monitoring wells are predicted to stabilize (once heads stabilized in the model, the post-construction movement of water in and out of the Fill Unit [CCR] were compared to pre-construction conditions). The pre-construction (calibration model) and post-construction Scenario 1 (CIP) prediction model simulated water flux values are summarized in **Appendix D** and discussed below. Data export files used for flux evaluations are found along with model files in **Appendix A**.

Scenario 1 (CIP) was predicted to reduce both total flux in and out of the Fill Unit (CCR) by greater than 99% when simulated post-construction heads in the groundwater monitoring wells are predicted to stabilize (approximate hydraulic steady state) as illustrated in **Figure 6-8**. **Figure 6-9** is a plot showing the changes in flux reduction (shown as negative percentage) over time, starting from implementation of Scenario 1 (CIP) through approximate hydraulic steady state conditions. Following implementation of Scenario 1 (CIP), influx to the CCR unit decreases rapidly as illustrated in **Figure 6-9**. Concurrently, outflux from the CCR unit decreases rapidly and after approximately 21.5 years decreases by over 99%. The reduction of outflux of at least 99% is maintained as heads approach hydraulic stabilization (**Figure 6-9**).

Further, the base of consolidated CCR was compared to the simulated steady-state groundwater elevations and results indicate up to 10 feet of separation will be present between the base of CCR and groundwater (**Figure 6-10**).

6.3.2 Closure Scenario 2 (CBR) Predicted Boron Concentrations

The design for Scenario 2: CBR includes removal of all CCR. Predicted concentrations start to decline rapidly following closure (**Figure 6-11**). These declines occur as recharge is reduced from dewatering and constant concentration cells are removed to simulate removal of CCR. The decrease of concentration in the CBR scenario is slightly faster than the CIP scenario because in the CBR scenario all the fill material is being removed from the site. However, the decline in concentration in wells located north of the AP is almost identical with the CIP scenario, where ash is removed for consolidation. Following CBR, boron concentrations are no longer entering the model domain from recharge or from saturated ash cells (constant concentration cells). A very similar pattern of concentration decrease is observed in MW-23, where concentration starts to increase initially but then declines. The simulated increase of concentration at MW-23 is slightly less in the CBR scenario due to the absence of the consolidation and cover system which has lower recharge rates in the CIP scenario. MW-28 with the highest concentration falls below the GWPS for boron approximately 16.5 years after closure. Boron is also predicted to decrease below the GWPS in all wells approximately 16.5 years after implementation of CBR.

Residual boron concentrations after approximately 16.5 years are presented in **Figures 6-12 through 6-15**. Note that boron is not present in layer 5 of the calibrated or prediction models, so there are no figures of boron concentrations in model layer 5. By year 16.5 the residual boron plume has significantly receded when compared to the calibrated model plume (**Figures 5-19 to 5-22**). When compared to CIP (**Figures 6-4 to 6-7**) the residual boron plumes show similar distribution of boron greater than 2 mg/L. Differences are present in layers 2, 3, and 4 of the CIP scenario, where boron is present within the footprint of the AP near the area of CCR consolidation due to the lower infiltration rates beneath the cover system. In both scenarios residual boron exceedances remain in close proximity to the ash pond and/or calibrated extent of exceedances as the plumes recede.

From a modeling perspective, the difference between the predicted time to reach the GWPS for boron (2 mg/L) in Scenario 1 (17 years) versus Scenario 2 (16.5 years) is negligible. In other words, both scenarios are predicted to reach the GWPS after approximately 17 years.

7. CONCLUSIONS

This GMR has been prepared to evaluate how proposed closure scenarios will achieve compliance with the applicable groundwater standards at the KPP. Data collected from the 2021 field investigation were used to develop a groundwater model for the AP. Statistically significant correlations between boron concentrations and concentrations of other parameters identified as potential exceedances of the GWPS indicate boron is an acceptable surrogate for sulfate and TDS in the groundwater model. It was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil adsorption coefficient [Kd] was set to 0 milliliters per gram [mL/g]) which is a conservative estimate for predicting contaminant transport times. Boron, sulfate, and TDS transport is likely to be affected by both chemical and physical attenuation mechanisms (i.e., adsorption and/or precipitation reactions as well as dilution and dispersion). MODFLOW and MT3DMS models were then used to evaluate two closure scenarios:

- Scenario 1: CIP (CCR removal from the north and west areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR); and,
- Scenario 2: CBR (CCR removal from the AP)

Scenario 1 (CIP) was predicted to reduce both total flux in and out of the Fill Unit (CCR) by greater than 99% when simulated post-construction heads in the groundwater monitoring wells are predicted to stabilize.

Prior to the simulation of these scenarios, a dewatering simulation was included for the removal of free liquids from the AP prior to the implementation of the two scenarios. Predictive simulations of closure conservatively indicate groundwater in the UA will achieve the GWPS in site monitoring wells for Scenarios 1 and 2 in 17 and 16.5 years after implementation of the closure scenarios, respectively. From a modeling perspective, the difference between the predicted time to reach the GWPS for boron (2 mg/L) in Scenario 1 (17 years) versus Scenario 2 (16.5 years) is negligible. In other words, both scenarios are predicted to reach the GWPS after approximately 17 years, the simulated difference between these two scenarios is not significant.

Results of groundwater fate and transport modeling estimate that groundwater will attain the GWPS for all constituents identified as potential exceedances of the GWPS within 17 years of closure implementation for both Scenarios. In both scenarios residual boron exceedances from the calibrated model remain in close proximity to the ash pond and/or calibrated extent of exceedances as the plumes recede.

8. REFERENCES

AECOM, 2016. *History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Kincaid Power Station, Kincaid, Illinois*. October.

Anderson, M.P. 1979. *Using models to simulate the movement of contaminants through groundwater flow systems*. CRC Critical Rev. Environ. Control., 9(2), p. 97-156.

Anderson, M.P. 1984. *Movement of contaminants in groundwater: groundwater transport -- advection and dispersion*. Groundwater Contamination. National Academy Press, Washington, D.C. p. 37-45.

Burns & McDonnell, 2022. *CCR Surface Impoundment Final Closure Plan, Kincaid Power Plant Ash Pond*, Kincaid, Illinois. July 2022.

Cabeno Field Services (Cabeno), 2013. *Groundwater Reclassification and Manganese Discussion Report, Ash Impoundment, Kincaid Power Station.* January 10, 2013.

Environmental Simulations, Inc., 2017. *Groundwater Vistas 7 Software*.

Fetter, C.W., 1988. *Applied Hydrogeology*. Merrill Publishing Company, Columbus, Ohio.

Geosyntec Consultants, Inc. (Geosyntec), 2022. *Technical Memorandum: Proposed Alternative Final Protective Layer Equivalency Demonstration, Kincaid Ash Pond, Kincaid Power Plant, Kincaid, Illinois*.

Golder Associates USA Inc., (Golder), 2022. *Technical Memorandum: Evaluation of Partition Coefficient Results, Kincaid Power Plant Ash Pond (CCR Unit 141), Kincaid Power Plant, Christian County, Illinois*. March 30, 2022.

Heath, R.C., 1983. *Basic ground-water hydrology*, U.S. Geological Survey Water-Supply Paper 2220, 86p.

Illinois Environmental Protection Agency (IEPA), 2021. *In the Matter of: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 Illinois Administration Code 845, Addendum*. April 15, 2021.

Morris, D.A and A.I. Johnson, 1967. *Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey*. U.S. Geological Survey Water-Supply Paper 1839-D, 42p.

McDonald, M.G., and A.W. Harbaugh, 1988. *A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model: Techniques of Water-Resources Investigations, Techniques of Water-Resources of the United States Geological Survey*. Book 6, Chapter A1.

Morris, D.A and A.I. Johnson, 1967. *Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey*. U.S. Geological Survey Water-Supply Paper 1839-D, 42p.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021a. *Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois*. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. *History of Potential Exceedances, Ash Pond, Kincaid Power Plant, Kincaid, Illinois*. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021c. *Groundwater Monitoring Plan, Ash Pond, Kincaid Power Plant, Kincaid, Illinois*. October 25, 2021.

Tolaymat, T. and Krause, M, 2020. *Hydrologic Evaluation of Landfill Performance: HELP 4.0 User Manual*. United States Environmental Protection Agency, Washington, DC, EPA/600/B 20/219.

United States Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS), 2022. National Geospatial Center of Excellence, Digital Elevation Model.

Zheng, Z., and P.P. Wang, 1998. *MT3DMS, a Modular Three-Dimensional Multispecies Transport Model,* Model documentation and user's guide prepared by the University of Alabama Hydrogeology Group for the US Army Corps of Engineers.

TABLES

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Well Number	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
MW-1	UA	04/20/2010	604.71	604.71	Top of PVC	602.60	15.00	25.00	587.60	577.60	25.00	568.10	10	2	39.592051	-89.490283
MW-2	UA	04/21/2010	601.10	601.10	Top of PVC	598.88	10.00	20.00	588.90	578.90	20.00	541.40	10	2	39.590698	-89.488916
MW-3	UA	04/15/2010	601.46	601.46	Top of PVC	599.24	14.00	24.00	585.20	575.20	24.00	552.70	10	2	39.594458	-89.487173
MW-4	UA	04/14/2010	600.88	600.88	Top of PVC	598.46	12.00	22.00	586.50	576.50	22.00	560.50	10	2	39.600751	-89.487354
MW-5	UA	04/22/2010	619.44	619.44	Top of PVC	617.77	30.00	40.00	587.80	577.80	40.00	541.80	10	2	39.601296	-89.490402
MW-6	UA	04/16/2010	600.46	600.46	Top of PVC	598.44	10.00	20.00	588.40	578.40	20.00	572.90	10	2	39.598638	-89.498944
MW-7	UA	04/16/2010	597.75	597.75	Top of PVC	596.00	10.00	20.00	586.00	576.00	20.00	569.50	10	2	39.597637	-89.498959
MW-7S	USCU	02/02/2021	597.64	597.64	Top of PVC	595.59	6.00	11.00	589.59	584.59	11.00	580.59	5	2	39.59766	-89.498978
MW-8	UA	04/13/2010	603.14	603.14	Top of PVC	601.14	12.00	22.00	589.10	579.10	22.00	563.10	10	2	39.594399	-89.496829
MW-8S	USCU	02/02/2021	603.30	603.30	Top of PVC	600.57	4.00	7.00	596.57	593.57	7.00	580.57	3	2	39.594381	-89.496822
MW-9	UA	04/19/2010	599.39	599.39	Top of PVC	597.63	10.00	20.00	587.60	577.60	20.00	573.10	10	2	39.595204	-89.500968
MW-10	UA	04/19/2010	600.11	600.11	Top of PVC	598.22	10.00	20.00	588.20	578.20	20.00	575.20	10	2	39.590652	-89.503745
MW-11	UA	06/17/2015	601.81	601.81	Top of PVC	599.27	11.00	21.00	588.30	578.30	21.00	578.30	10	2	39.593104	-89.491115
MW-11S	USCU	01/26/2021	601.76	601.76	Top of PVC	599.43	4.00	8.00	595.43	591.43	8.00	591.43	4	2	39.593122	-89.491102
MW-12	UA	07/23/2015	591.40	591.40	Top of PVC	589.04	15.00	25.00	573.90	563.90	25.00	563.90	10	2	39.600208	-89.496381
MW-12S	USCU	01/27/2021	591.10	591.10	Top of PVC	588.62	5.00	9.00	583.62	579.62	9.00	579.12	4	2	39.600208	-89.496412
MW-12D	BCU	01/26/2021	590.96	590.96	Top of PVC	589.08	50.00	55.00	539.08	534.08	55.00	489.08	5	2	39.600194	-89.496418
MW-20	UA	01/26/2021	600.77	600.77	Top of PVC	598.52	14.00	24.00	584.52	574.52	24.00	547.52	10	2	39.598653	-89.48728
MW-20S	USCU	01/26/2021	600.64	600.64	Top of PVC	598.43	4.00	10.00	594.43	588.43	10.00	588.43	6	2	39.598665	-89.487279
MW-22	UA	02/03/2021	601.77	601.77	Top of PVC	599.51	15.00	19.00	584.51	580.51	19.00	579.51	4	2	39.593235	-89.487638
MW-23	UA	02/02/2021	610.32	610.32	Top of PVC	608.05	23.00	28.00	585.05	580.05	28.00	558.05	5	2	39.593293	-89.489352
MW-24	UA	02/02/2021	615.48	615.48	Top of PVC	613.01	27.00	32.00	586.01	581.01	32.00	581.01	5	2	39.593271	-89.493267
MW-25	USCU	02/02/2021	607.20	607.20	Top of PVC	604.60	9.00	14.00	595.60	590.60	14.00	579.60	5	2	39.594397	-89.495062

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Well Number	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
MW-26	UA	02/02/2021	596.16	596.16	Top of PVC	593.33	7.00	12.00	586.33	581.33	12.00	573.33	5	2	39.595584	-89.497582
MW-27	USCU	02/02/2021	600.05	600.05	Top of PVC	597.35	10.00	15.00	587.35	582.35	15.00	577.35	5	2	39.596694	-89.497927
MW-28	UA	02/02/2021	601.40	601.40	Top of PVC	598.33	12.00	22.00	586.33	576.33	22.00	573.33	10	2	39.599258	-89.497962
MW-29	UA	02/01/2021	599.94	599.94	Top of PVC	596.86	14.00	19.00	582.86	577.86	19.00	576.86	5	2	39.599691	-89.497249
MW-30	UA	02/03/2021	618.47	618.47	Top of PVC	616.00	35.00	40.00	581.00	576.00	40.00	571.00	5	2	39.601262	-89.493996
MW-31	UA	02/03/2021	617.34	617.34	Top of PVC	615.02	35.00	40.00	580.02	575.02	40.00	565.02	5	2	39.601301	-89.491702
MW-31S	USCU	02/03/2021	617.54	617.54	Top of PVC	615.13	25.00	30.00	590.13	585.13	30.00	585.13	5	2	39.601303	-89.491681
MW-32	UA	02/03/2021	619.49	619.49	Top of PVC	617.20	32.00	37.00	585.20	580.20	37.00	577.20	5	2	39.601279	-89.488643
PZ-4C	UA	03/30/2016	600.57	600.57	Top of PVC	597.89	15.50	20.50	582.39	577.39	20.50	577.39	5	2	39.596398	-89.487207
XPW01	CCR	02/01/2021	627.84	627.84	Top of PVC	625.48	22.00	32.00	603.48	593.48	32.00	593.48	10	2	39.594417	-89.493104
XPW02	CCR	01/26/2021	620.19	620.19	Top of PVC	617.91	13.00	23.00	604.91	594.91	23.00	595.91	10	2	39.597918	-89.49687
XPW03	CCR	01/26/2021	616.08	616.08	Top of PVC	616.08	10.00	20.00	606.08	596.08	20.00	596.08	10	2	39.599588	-89.495765
XPW04	CCR	01/26/2021	606.53	606.53	Top of PVC	604.57	13.00	23.00	591.57	581.57	23.00	580.57	10	2	39.600737	-89.492276
XSG-01	CCR	--	--	608.43	Staff gauge	--	--	--	--	--	--	--	--	--	39.593401	-89.48768
SG-02	SW	--	--	564.80	Staff gauge	--	--	--	--	--	--	--	--	--	39.593106	-89.498155

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
-- = data not available
BCU = bedrock confining unit
BGS = below ground surface
CCR = Coal Combustion Residual
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
SW = surface water
UA = uppermost aquifer
USCU = upper semi-confining unit

generated 10/05/2021, 4:22:06 PM CDT

RAMBOLL

TABLE 5-1. FLOW MODEL CALIBRATION TARGETS

GROUNDWATER MODELING REPORT

KINCAID POWER PLANT

ASH POND

KINCAID, ILLINOIS

				Flow Targets							
Well Name	Easting	Northing	HSU	Number of Samples	median GWL[1] (feet)	mean GWL[1] (feet)	std dev GWL[1] (feet)	min GWL[1] (feet)	max GWL[1] (feet)	Earliest Sample Date	Latest Sample Date
MW-1	2487193	1065989	UA	33	589.6	589.0	2.7	587.6	604.7	06/16/2015	09/01/2021
MW-2	2487582	1065499	UA	33	594.6	594.9	1.5	592.4	601.1	06/16/2015	09/01/2021
MW-4	2487995	1069164	UA	30	593.4	593.4	1.1	590.8	597.1	12/14/2015	09/01/2021
MW-5	2487135	1069356	UA	32	593.8	594.1	4.6	590.6	619.4	06/16/2015	09/01/2021
MW-6	2484735	1068370	UA	33	592.2	592.0	2.3	588.2	600.5	06/16/2015	09/01/2021
MW-7	2484734	1068005	UA	35	589.2	589.5	3.1	586.6	597.8	06/17/2015	09/01/2021
MW-7S	2484728.09	1068011.16	USCU	11	587.3	587.2	0.2	587.1	587.9	02/23/2021	08/11/2021
MW-8	2485342	1066831	UA	34	594.7	595.5	2.0	593.2	603.1	06/17/2015	09/01/2021
MW-8S	2485344.57	1066821.52	USCU	8	594.9	595.0	1.0	593.9	597.5	02/23/2021	06/10/2021
MW-9	2484174	1067115	UA	27	590.2	590.7	3.7	583.2	596.8	12/14/2015	09/01/2021
MW-10	2483403	1065451	UA	27	588.2	588.7	2.0	585.0	592.3	12/14/2015	09/01/2021
MW-11	2486956	1066371	UA	30	590.2	590.2	0.3	589.9	591.7	12/14/2015	09/01/2021
MW-12	2485452.88	1068944.67	UA	30	585.1	584.1	0.6	583.2	586.6	12/14/2015	09/01/2021
MW-12S	2485444.27	1068944.79	USCU	11	585.4	584.8	0.6	584.8	587.2	02/23/2021	08/11/2021
MW-12D	2485442.58	1068939.69	LCU	11	586.2	584.6	0.9	584.6	587.2	02/23/2021	08/11/2021
MW-20	2488021.74	1068397.57	UA	11	595.1	594.8	1.2	594.2	598.9	02/23/2021	08/10/2021
MW-20S	2488021.76	1068402.07	USCU	11	595.0	594.8	1.2	594.2	599.1	02/23/2021	08/10/2021
MW-22	2487935.62	1066423.38	UA	11	595.7	596.1	0.7	594.9	597.5	02/23/2021	08/10/2021
MW-23	2487452.37	1066440.78	UA	11	594.0	594.2	0.6	593.5	595.9	02/23/2021	08/10/2021
MW-24	2486349.15	1066424.59	UA	10	593.4	592.2	1.1	590.5	594.4	02/23/2021	07/22/2021
MW-25	2485840.34	1066830.95	USCU	11	601.2	601.4	5.0	584.0	602.1	02/23/2021	08/11/2021
MW-26	2485127.12	1067258.09	UA	11	589.0	588.9	2.2	585.0	592.5	02/23/2021	08/10/2021
MW-27	2485026.71	1067661.72	USCU	11	586.1	586.1	3.2	583.4	594.4	02/23/2021	08/11/2021
MW-28	2485010.02	1068595.29	UA	11	595.4	595.4	1.0	593.5	597.6	02/23/2021	08/11/2021

RAMBOLL

TABLE 5-1. FLOW MODEL CALIBRATION TARGETS
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Well Name	Easting	Northing	HSU	Flow Targets							
				Number of Samples	median GWL[1] (feet)	mean GWL[1] (feet)	std dev GWL[1] (feet)	min GWL[1] (feet)	max GWL[1] (feet)	Earliest Sample Date	Latest Sample Date
MW-29	2485209.8	1068754.64	UA	11	595.7	595.7	0.6	594.9	597.1	02/23/2021	08/11/2021
MW-30	2486122	1069336	UA	11	594.0	594.0	0.6	593.4	595.7	02/23/2021	08/10/2021
MW-31	2486768.38	1069352.71	UA	11	587.9	587.7	2.0	586.7	594.2	02/23/2021	08/10/2021
MW-31S	2486774.19	1069353.41	USCU	11	590.9	591.2	1.5	588.3	592.8	02/23/2021	08/10/2021
MW-32	2487630	1069354	UA	11	596.9	596.9	0.7	596.1	598.7	02/23/2021	08/10/2021
XPW01	2486392.09	1066842.23	CCR	11	603.4	603.5	0.1	603.1	603.5	02/23/2021	08/11/2021
XPW02	2485321.31	1068109.66	CCR	11	603.8	603.8	0.1	603.5	603.9	02/23/2021	08/11/2021
XPW03	2485628.19	1068720.21	CCR	11	601.0	601.0	0.2	600.8	601.6	02/23/2021	08/11/2021
XPW04	2486608.19	1069145.99	CCR	11	603.2	603.4	0.2	602.8	603.4	02/23/2021	08/10/2021

[O: PR 05/05/22; C: EGP 5/6/22]

Notes:
[1] Groundwater Elevation
std dev = standard deviation from the mean
min = minimum
max = maximum

HSU: Hydrostratigraphic Unit
CCR = coal combustion residual
USCU = upper semi-confining unit
UA = uppermost aquifer
LCU = lower confining unit

TABLE 5-2. TRANSPORT MODEL CALIBRATION TARGETS

GROUNDWATER MODELING REPORT

KINCAID POWER PLANT

ASH POND

KINCAID, ILLINOIS

				Transport Targets							
Well Name	Easting	Northing	HSU	Number of Samples	median Boron (mg/L)	mean Boron (mg/L)	std dev Boron (mg/L)	min Boron (mg/L)	max Boron (mg/L)	Earliest Sample Date	Latest Sample Date
MW-3	2488063	1066873	UA	20	1.62	1.68	0.28	1.02	2.40	06/03/2015	08/10/2021
MW-4	2487995	1069164	UA	17	0.57	0.57	0.12	0.34	0.84	06/03/2015	06/09/2021
MW-5	2487135	1069356	UA	24	0.55	0.55	0.04	0.47	0.66	06/04/2015	09/01/2021
MW-6	2484735	1068370	UA	24	1.06	1.11	0.33	0.63	1.91	06/04/2015	09/01/2021
MW-7	2484734	1068005	UA	24	0.26	0.28	0.14	0.10	0.65	06/04/2015	09/01/2021
MW-7S	2484728.09	1068011.16	USCU	8	4.03	4.33	0.75	3.56	5.51	02/24/2021	08/11/2021
MW-8	2485342	1066831	UA	24	1.01	1.03	0.13	0.86	1.51	06/04/2015	09/01/2021
MW-8S	2485344.57	1066821.52	USCU	4	1.04	0.98	0.14	0.74	1.10	02/24/2021	05/21/2021
MW-9	2484174	1067115	UA	13	0.10	0.10	0.03	0.06	0.18	06/04/2015	06/10/2021
MW-11	2486956	1066371	UA	23	1.65	1.65	0.21	1.34	2.28	12/15/2015	09/01/2021
MW-12	2485452.88	1068944.67	UA	23	2.78	2.87	0.65	1.95	4.42	12/15/2015	09/01/2021
MW-12S	2485444.27	1068944.79	USCU	8	1.51	1.60	0.52	0.86	2.63	02/25/2021	08/11/2021
MW-12D	2485442.58	1068939.69	LCU	8	0.84	0.86	0.10	0.71	1.08	02/25/2021	08/11/2021
MW-20	2488021.74	1068397.57	UA	8	0.45	0.46	0.06	0.34	0.56	02/26/2021	08/10/2021
MW-20S	2488021.76	1068402.07	USCU	8	1.29	1.24	0.50	0.06	1.89	02/26/2021	08/10/2021
MW-22	2487935.62	1066423.38	UA	4	1.46	1.48	0.04	1.44	1.55	02/26/2021	05/18/2021
MW-23	2487452.37	1066440.78	UA	8	2.00	1.96	0.45	0.93	2.67	02/26/2021	08/10/2021
MW-24	2486349.15	1066424.59	UA	--	--	--	--	--	--	--	--
MW-25	2485840.34	1066830.95	USCU	5	1.08	1.09	0.04	1.04	1.14	02/25/2021	08/11/2021
MW-26	2485127.12	1067258.09	UA	4	1.10	1.15	0.10	1.07	1.32	02/25/2021	05/21/2021
MW-27	2485026.71	1067661.72	USCU	8	1.23	1.19	0.24	0.77	1.50	02/24/2021	08/11/2021
MW-28	2485010.02	1068595.29	UA	8	9.49	9.64	0.80	8.35	10.90	02/24/2021	08/11/2021
MW-29	2485209.8	1068754.64	UA	8	1.66	1.72	0.14	1.57	2.01	02/25/2021	08/11/2021
MW-30	2486122	1069336	UA	8	1.19	1.22	0.16	1.06	1.60	02/25/2021	08/10/2021
MW-31	2486768.38	1069352.71	UA	8	0.29	0.29	0.04	0.22	0.37	02/24/2021	08/10/2021

TABLE 5-2. TRANSPORT MODEL CALIBRATION TARGETS

GROUNDWATER MODELING REPORT

KINCAID POWER PLANT

ASH POND

KINCAID, ILLINOIS

				Transport Targets							
Well Name	**Easting**	**Northing**	**HSU**	**Number of Samples**	**median Boron (mg/L)**	**mean Boron (mg/L)**	**std dev Boron (mg/L)**	**min Boron (mg/L)**	**max Boron (mg/L)**	**Earliest Sample Date**	**Latest Sample Date**
MW-31S	2486774.19	1069353.41	USCU	8	0.05	0.05	0.00	0.04	0.06	02/24/2021	08/11/2021
MW-32	2487630	1069354	UA	8	1.65	1.67	0.14	1.44	1.88	02/25/2021	08/10/2021
PZ-4C	1067576.48	2488048.39	UA	8	1.56	1.57	0.17	1.34	1.93	02/25/2021	08/11/2021
XPW01*	2486392.09	1066842.23	CCR	8	1.46	1.40	0.15	1.18	1.58	03/01/2021	08/11/2021
XPW02*	2485321.31	1068109.66	CCR	8	3.73	3.78	0.39	3.11	4.23	03/01/2021	08/11/2021
XPW03*	2485628.19	1068720.21	CCR	8	2.89	3.06	0.46	2.69	4.21	03/02/2021	08/11/2021
XPW04*	2486608.19	1069145.99	CCR	8	1.54	1.68	0.30	1.26	2.28	03/02/2021	08/10/2021

[O: PR 05/05/22; C: EGP 5/6/22]

Notes:

mg/L = milligrams per liter
std dev = standard deviation from the mean
min = minimum
max = maximum
* Porewater samples used for boundary condition estimate and not as target

HSU = Hydrostratigraphic Unit
CCR = coal combustion residuals
USCU = upper semi-confining unit
UA = uppermost aquifer
LCU = lower confining unit

RAMBOLL

TABLE 5-3. FLOW MODEL INPUT AND SENSITIVITY ANALYSIS RESULTS
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Zone	Hydrostratigraphic Unit	Materials	ft/d	cm/s	Kh/Kv	Value Source	Sensitivity[1]
Horizontal Hydraulic Conductivity			**Calibration Model**				
1	CCR	Bottom Ash and boiler slag	243	8.57E-02	NA	Calibrated - Within Range of Field Test Results (Ramboll, 2021a)	High
2	USCU	Clay with silt and sand lenses	0.45	1.59E-04	NA	Calibrated - Conductivity Value to Allow Groundwater Flow from UD to Riverand Drain Boundary Conditions	High
3	UA	Sand, silty sand, and clayey sand and gravel	0.5	1.76E-04	NA	Calibrated - Within Range of Field Test Results (Ramboll, 2021a)	High
4	LCU	Clay till	4.79	1.69E-03	NA	Calibrated - Within Range of Field Test Results (Ramboll, 2021a)	High
5	CL	Clay lens	0.05	1.76E-05	NA	Calibrated - Within Range of Field Test Results (Ramboll, 2021a)	High
6	SGL	Sand and gravel lens	25	8.82E-03	NA	Calibrated - Within Range of Field Test Results (Ramboll, 2021a)	Moderately High
Vertical Hydraulic Conductivity[2]			**Calibration Model**				
1	CCR	Bottom Ash and boiler slag	1.20E+01	4.23E-03	20	Calibrated - Within Range Laboratory Test Results and near Geomean of Laboratory Test Results (Ramboll, 2021a)	High
2	USCU	Clay with silt and sand lenses	4.50E-02	1.59E-05	10	Calibrated - Conductivity Value to Allow Groundwater Flow from UD to Riverand Drain Boundary Conditions	High
3	UA	Sand, silty sand, and clayey sand and gravel	5.00E-02	1.76E-05	10	Calibrated - Within Range Laboratory Test Results and near Geomean of Laboratory Test Results (Ramboll, 2021a)	High
4	LCU	Clay till	4.79E-01	1.69E-04	10	Calibrated - Within Range Laboratory Test Results and near Geomean of Laboratory Test Results (Ramboll, 2021a)	High
5	CL	Clay lens	5.00E-03	1.76E-06	10	Calibrated - Within Range Laboratory Test Results and near Geomean of Laboratory Test Results (Ramboll, 2021a)	High
6	SGL	Sand and gravel lens	2.50E+00	8.82E-04	10	Calibrated - Within Range Laboratory Test Results and near Geomean of Laboratory Test Results (Ramboll, 2021a)	Moderately High
Zone	**Hydrostratigraphic Unit**	**Materials**	**ft/d**	**in/yr**	**Kh/Kv**	**Value Source**	**Sensitivity[1]**
Recharge			**Calibration Model**				
1	USCU	Clay with silt and sand lenses	5.00E-05	0.22	NA	Calibrated	Low
2	CCR	Bottom Ash and boiler slag	1.00E-03	4.38	NA	Calibrated	Negligible
3, 5	CCR - 1971/1983 area	Bottom Ash and boiler slag	2.00E-03	8.76	NA	Calibrated	Moderate
6	USCU - developed area	Clay with silt and sand lenses	1.00E-03	4.38	NA	Calibrated	Moderately High
4, 7, 8	CCR - 1995 area	Bottom Ash and boiler slag	3.00E-04	1.31	NA	Calibrated	High
Storage							
1	CCR	Bottom Ash and boiler slag	*Not used in steady-state calibration model*				
2	USCU	Clay with silt and sand lenses					
3	UA	Sand, silty sand, and clayey sand and gravel					
4	LCU	Clay till					

RAMBOLL

TABLE 5-3. FLOW MODEL INPUT AND SENSITIVITY ANALYSIS RESULTS
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Zone	Hydrostratigraphic Unit	Materials		Value Source	Sensitivity[1]
Constant Head					
	Relative Location	**Head (feet)**			
5 (Lake)	Northwest and southern model boundary	*584.35*	---	---	High
4, 6, 7 (Pond)	Inside the Ash Pond domain	603.48			High

[O: PR 5/08/22; C: EGP 5/6/22]

Notes:
[1] Sensitivity Explanation:
Negligible - SSR changed by less than 1%
Low - SSR change between 1% and 10%
Moderate - SSR change between 10% and 50%
Moderately High - SSR change between 50% and 100%
High - SSR change greater than 100%
[2] For sensitivity analysis vertical conductivities maintained the same anisotropy.
RMSE = root of the mean squared error
--- = not tested
cm/s = centimeters per second
ft/d = feet per day
ft^2/day = feet squared per day
in/yr = inches per year
Kh/Kv = anisotropy ratio
NA = not applicable

Hydrostratigraphic Unit
CCR = coal combustion residuals
USCU = upper semi-confining unit
UA = uppermost aquifer

TABLE 5-4. TRANSPORT MODEL INPUT VALUES (CALIBRATION)
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Zone	Hydrostratigraphic Unit	Materials	Calibration Model				
			Boron Concentration (mg/L)			Value Source	Sensitivity
Initial Concentration							
Entire Domain	NA	NA	0			NA	- - -
Source Concentration (Constant Concentration Cells)							
			pre-1983	**post 1983**			
351, 352	CCR	Bottom Ash and boiler slog	3.5	--		Boron concentration data from XWP01, XWP02, XWP03 and XWP04 - calibrated	- - -
31, 401, 402	CCR	Bottom Ash and boiler slog	--	3.1		Boron concentration data from XWP01, XWP02, XWP03 and XWP04 - calibrated	- - -
11	USCU	Other high concentration ash materials	14	14		Calibrated to meet MW-28 observed concentration	
Storage, Specific Yield and Effective Porosity			**Calibration Model**				
Zone	**Hydrostratigraphic Unit**	**Materials**	**Storage**	**Specific Yield**	**Effective Porosity**	**Value Source**	**Sensitivity**
1	CCR	Bottom Ash and boiler slog	0.003	0.15	0.15	Calibrated	see Table 5-5
2	USCU	Clay with silt and sand lenses	0.003	0.21	0.21	Calibrated	see Table 5-5
3	UA	Sand, silty sand, and clayey sand and gravel	0.003	0.25	0.25	Calibrated	see Table 5-5
4	LCU	Clay till	0.003	0.1	0.1	Calibrated	see Table 5-5
Dispersivity							
Applicable Region	**Hydrostratigraphic Unit**	**Materials**	**Longitudinal (feet)**	**Transverse (feet)**	**Vertical (feet)**	**Value Source**	**Sensitivity**
Entire Domain	NA	NA	5	0.5	0.05	calibrated	- - -

[O: PR 5/4/22; C: EGP 5/6/22]

Notes:
[1] The concentrations from the end of the calibrated transport model were imported as initial concentrations for the prediction model runs.
- - - = not tested
mg/L = milligrams per liter
NA = not applicable

Hydrostratigraphic Unit
CCR = coal combustion residuals
USCU = upper semi-confining unit
UA = uppermost aquifer

TABLE 5-5. TRANSPORT MODEL INPUT SENSITIVITY (CALIBRATION)
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

			Storage and Specific Yield				Effective Porosity			
Well ID	HSU	Calibration on Boron Concentration (mg/L)	Boron Concentration (mg/L)	Sensitivity [1]	Boron Concentration (mg/L)	Sensitivity [1]	Boron Concentration (mg/L)	Sensitivity [1]	Boron Concentration (mg/L)	Sensitivity [1]
MW-3	UA	0.20	0.20	Negligible	0.20	Negligible	0.20	Low	0.19	Low
MW-4	UA	0.05	0.05	Negligible	0.05	Negligible	0.13	High	0.02	Moderately High
MW-5	UA	2.72	2.72	Negligible	2.72	Negligible	2.77	Low	2.63	Low
MW-6	UA	1.71	1.71	Negligible	1.71	Negligible	1.71	Negligible	1.70	Negligible
MW-7	UA	2.12	2.12	Negligible	2.12	Negligible	2.14	Negligible	2.09	Low
MW-7S	USCU	2.12	2.12	Negligible	2.12	Negligible	2.14	Negligible	2.09	Low
MW-8	UA	2.3E-03	2.3E-03	Negligible	2.3E-03	Negligible	5.2E-03	High	7.7E-04	Moderately High
MW-11	UA	1.90	1.90	Negligible	1.90	Negligible	1.90	Negligible	1.90	Negligible
MW-12	UA	2.72	2.72	Negligible	2.72	Negligible	2.89	Low	2.55	Low
MW-12S	USCU	2.65	2.65	Negligible	2.65	Negligible	2.75	Low	2.36	Low
MW-12D	LCU	1.78	1.78	Negligible	1.78	Negligible	2.48	Moderate	1.28	Moderate
MW-20	UA	1.2E-03	1.2E-03	Negligible	1.2E-03	Negligible	5.5E-03	High	3.0E-04	Moderately High
MW-20S	USCU	1.5E-03	1.5E-03	Negligible	1.5E-03	Negligible	6.9E-03	High	3.8E-04	Moderately High
MW-22	UA	1.39	1.39	Negligible	1.39	Negligible	1.39	Negligible	1.39	Negligible
MW-23	UA	0.72	0.72	Negligible	0.72	Negligible	0.72	Negligible	0.72	Negligible
MW-24	UA	3.45	3.45	Negligible	3.45	Negligible	3.45	Negligible	3.45	Negligible
MW-25	USCU	0.52	0.52	Negligible	0.52	Negligible	0.59	Moderate	0.43	Moderate
MW-26	UA	1.19	1.19	Negligible	1.19	Negligible	1.24	Low	1.11	Low
MW-27	USCU	3.11	3.11	Negligible	3.11	Negligible	3.12	Negligible	3.10	Negligible
MW-28	UA	9.06	9.06	Negligible	9.06	Negligible	9.06	Negligible	9.06	Negligible
MW-29	UA	2.38	2.38	Negligible	2.38	Negligible	2.39	Negligible	2.38	Negligible
MW-30	UA	1.89	1.89	Negligible	1.89	Negligible	1.90	Negligible	1.88	Negligible
MW-31	UA	1.71	1.71	Negligible	1.71	Negligible	1.71	Negligible	1.70	Negligible
MW-31S	USCU	2.42	2.42	Negligible	2.42	Negligible	2.42	Negligible	2.42	Negligible
MW-32	UA	1.15	1.15	Negligible	1.15	Negligible	1.15	Negligible	1.14	Negligible
PZ-4C	UA	0.52	0.52	Negligible	0.52	Negligible	0.59	Moderate	0.41	Moderate
			S*0.1 Sy*0.5[2]		S*10 Sy*2[2]		Porosity-0.05		Porosity+0.05	

Notes:

[O: PR 5/09/22; C: EGP 5/11/22]

[1] Sensitivity Explanation:
Negligible = concentration changed by less than 1%
Low = concentration change between 1% and 10%
Moderate = concentration change between 10% and 50%
Moderately High = concentration change between 50% and 100%
High = concentration change greater than 100%

[2] sensitivity test used steady state flow and transient transport

ID = identification
mg/L = milligrams per liter
S = storativity
Sy = specific yield
Disp = dispersivity

TABLE 6-1. HELP MODEL INPUT AND OUTPUT VALUES
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Closure Scenario - Area Description	CBR - Removal Area	CIP - Removal Area	CIP - Consolidation and Cover System Area	Notes
Input Parameter				
Climate-General				
City	Kincaid, IL	Kincaid, IL	Kincaid, IL	Nearby city to the Site within HELP database
Latitude	39.59	39.59	39.59	Site latitude
Evaporative Zone Depth	18	18	18	Estimated based on geographic location (Illinois) and uppermost soil type (Tolaymat, T. and Krause, M, 2020)
Maximum Leaf Area Index	4.5	4.5	4.5	Maximum for geographic location (Illinois) (Tolaymat, T. and Krause, M, 2020)
Growing Season Period, Average Wind Speed, and Quarterly Relative Humidity	Springfield, IL	Springfield, IL	Springfield, IL	Nearby city to the Kincaid Ash Pond within HELP database
Number of Years for Synthetic Data Generation	30	30	30	
Temperature, Evapotranspiration, and Precipitation	Precipitation, temperature, and solar radiation was simulated based on HELP V4 weather simulation for: Lat/Long: 39.59/-89.50	Precipitation, temperature, and solar radiation was simulated based on HELP V4 weather simulation for: Lat/Long: 39.59/-89.50	Precipitation, temperature, and solar radiation was simulated based on HELP V4 weather simulation for: Lat/Long: 39.59/-89.50	
Soils-General				
% where runoff possible	100	100	100	
Area (acres)	172	88	84	CBR - Removal Area based on HCR (Ramboll, 2021); CIP - Consolidation and Cover System Area based on construction drawing for Kincaid Ash Pond; CIP -Removal Area equals the difference
Specify Initial Moisture Content	No	No	No	
Surface Water/Snow	Model Calculated	Model Calculated	Model Calculated	
Soils-Layers				
1	Unsaturated Backfill Material (HELP Final Cover Soil [topmost layer])	Unsaturated Backfill Material (HELP Final Cover Soil [topmost layer])	Vegetative Soil Layer (HELP Final Cover Soil [topmost layer])	Layer details for CBR and CIP areas based on grading plans, construction drawings, and cover system design for Kincaid Ash Pond
2	Protective Soil Layer (HELP Vertical Percolation Layer)	Protective Soil Layer (HELP Vertical Percolation Layer)	Protective Soil Layer (HELP Vertical Percolation Layer)	
3	--	--	Geotextile Liner (HELP Drainage Net)	
4	--	--	Geomembrane Liner	
5	--	--	Unsaturated CCR Material (HELP Waste)	
6	--	--	Unsaturated Material (HELP Vertical Percolation Layer)	
Soil Parameters--Layer 1, Unsaturated Backfill Material (HELP Final Cover Soil [topmost layer]) or Vegetative Soil Layer (HELP Final Cover Soil [topmost layer])				
Type	1	1	1	Vertical Percolation Layer (Cover Soil)
Thickness (in)	30	30	6	For CBR and CIP removal areas, layer 1 thickness is the average thickness of unsaturated backfill material placed after removal
Texture	12	12	12	defaults used
Description	Silty Clay Loam	Silty Clay Loam	Silty Clay Loam	
Saturated Hydraulic Conductivity (cm/s)	4.20E-05	4.20E-05	4.20E-05	defaults used

TABLE 6-1. HELP MODEL INPUT AND OUTPUT VALUES
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Closure Scenario - Area Description	CBR - Removal Area	CIP - Removal Area	CIP - Consolidation and Cover System Area	Notes
Soil Parameters--Layer 2, Protective Soil Layer (HELP Vertical Percolation Layer)				
Type	1	1	1	Vertical Percolation Layer
Thickness (in)	72	72	18	design thickness
Texture	43	43	43	Custom layer, adjusted for site specific hydraulic conductivity
Description	Silty Clay	Silty Clay	Sandy Silty Clay	
Saturated Hydraulic Conductivity (cm/s)	1.20E-07	1.20E-07	1.00E-05	Design vertical hydraulic conductivity for backfill
Soil Parameters--Layer 3, Geotextile Liner (HELP Drainage Net)				
Type	--	--	2	Geotextile Protective Layer
Thickness (in)	--	--	0.11	design thickness
Texture	--	--	123	custom layer
Description	--	--	10 oz Nonwoven Geotextile	
Saturated Hydraulic Conductivity (cm/s)	--	--	3.00E-01	custom design hydraulic conductivity
Soil Parameters--Layer 4, Geomembrane Liner				
Type	--	--	4	Flexible Membrane Liner
Thickness (in)	--	--	0.04	design thickness
Texture	--	--	36	defaults used
Description	--	--	Geomembrane	
Saturated Hydraulic Conductivity (cm/s)			4.00E -13	defaults used
Soil Parameters--Layer 5, Unsaturated CCR Material (HELP Waste)				
Type	--	--	1	Vertical Percolation Layer (Waste)
Thickness (in)	--	--	372	Estimated unsaturated CCR thickness within CIP Consolidation and Cover System Area
Texture	--	--	83	Custom layer, adjusted for site specific hydraulic conductivity
Description	--	--	Electric Plant Coal Bottom Ash	
Saturated Hydraulic Conductivity (cm/s)	--	--	1.40E-03	calibrated flow model vertical hydraulic conductivity for CCR
Soil Parameters--Layer 6, Unsaturated Material (HELP Vertical Percolation Layer)				
Type	--	--	1	Vertical Percolation Layer
Thickness (in)	--	--	84	Estimated unsaturated Silty Clay thickness within CIP Consolidation and Cover System Area
Texture	--	--	44	Custom layer, adjusted for site specific hydraulic conductivity
Description	--	--	Silty Clay	
Saturated Hydraulic Conductivity (cm/s)	--	--	1.20E-07	calibrated flow model vertical hydraulic conductivity for Silty Clay
Soils--Runoff				
Runoff Curve Number	85.7	85.9	87.2	HELP-computed curve number
Slope	0.5%	0.5%	2.5%	Estimated average from construction design drawings for Kincaid Ash Pond
Length (ft)	3000	2300	800	estimated maximum flow path
Texture	10	10	10	uppermost layer texture
Vegetation	fair	fair	fair	fair indicating fair stand of grass on surface of soil backfill

TABLE 6-1. HELP MODEL INPUT AND OUTPUT VALUES
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Closure Scenario - Area Description	CBR - Removal Area	CIP - Removal Area	CIP - Consolidation and Cover System Area	Notes
Execution Parameters				
Years	30	30	30	
Report Daily	No	No	No	
Report Monthly	No	No	No	
Report Annual	Yes	Yes	Yes	
Output Parameter				
Percolation Rate (in/yr)	**5.83**	**5.82**	**0.0041**	

[O: EGP 4/25/22 C: JJW 5/11/22]

Notes:
% = percent
cm/s = centimeters per second
ft = feet
HELP = Hydrologic Evaluation of Landfill Performance
in = inches
in/yr = inches per year
Lat/Long = latitude/longitude
CBR = closure by removal
CIP = closure in place
HCR = Hydrogeologic Site Characterization Report

References:

Tolaymat, T. and Krause, M, 2020. *Hydrologic Evaluation of Landfill Performance: HELP 4.0 User Manual*. United States Environmental Protection Agency, Washington, DC, EPA/600/B 20/219.
Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. Hydrogeologic Site Characterization Report. Kincaid Ash Pond. Kincaid Power Plant. Kincaid, Illinois.

TABLE 6-2. PREDICTION MODEL INPUT VALUES
GROUNDWATER MODELING REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Hydrostratigraphic Unit/Recharge Area	Notes	Recharge Zone	Recharge (ft/day)	Recharge (inches/yr)	Stormwater Drain Stage	Constant Concentration Layer	Constant Concentration (mg/L)
Scenario 1: CIP							
Removal Area North	CCR	2, 4, 5, 7	1.3E-03	5.82	585	--	--
Removal Area South	CCR	3, 8	6.26E-08	4.10E-03	585	1	3.1, 3.5[1]
Scenario 2: CBR							
Removal Area North	CCR	2, 4, 5, 7	1.3E-03	5.82	585	--	--
Removal Area South	CCR	3, 8	1.3E-03	5.82	585	--	--

[O: PR 05/09/22; C: EGP 5/10/22]

Notes:

[1] See **Figure 5-2**

- - = not included

CCR = coal combustion residuals

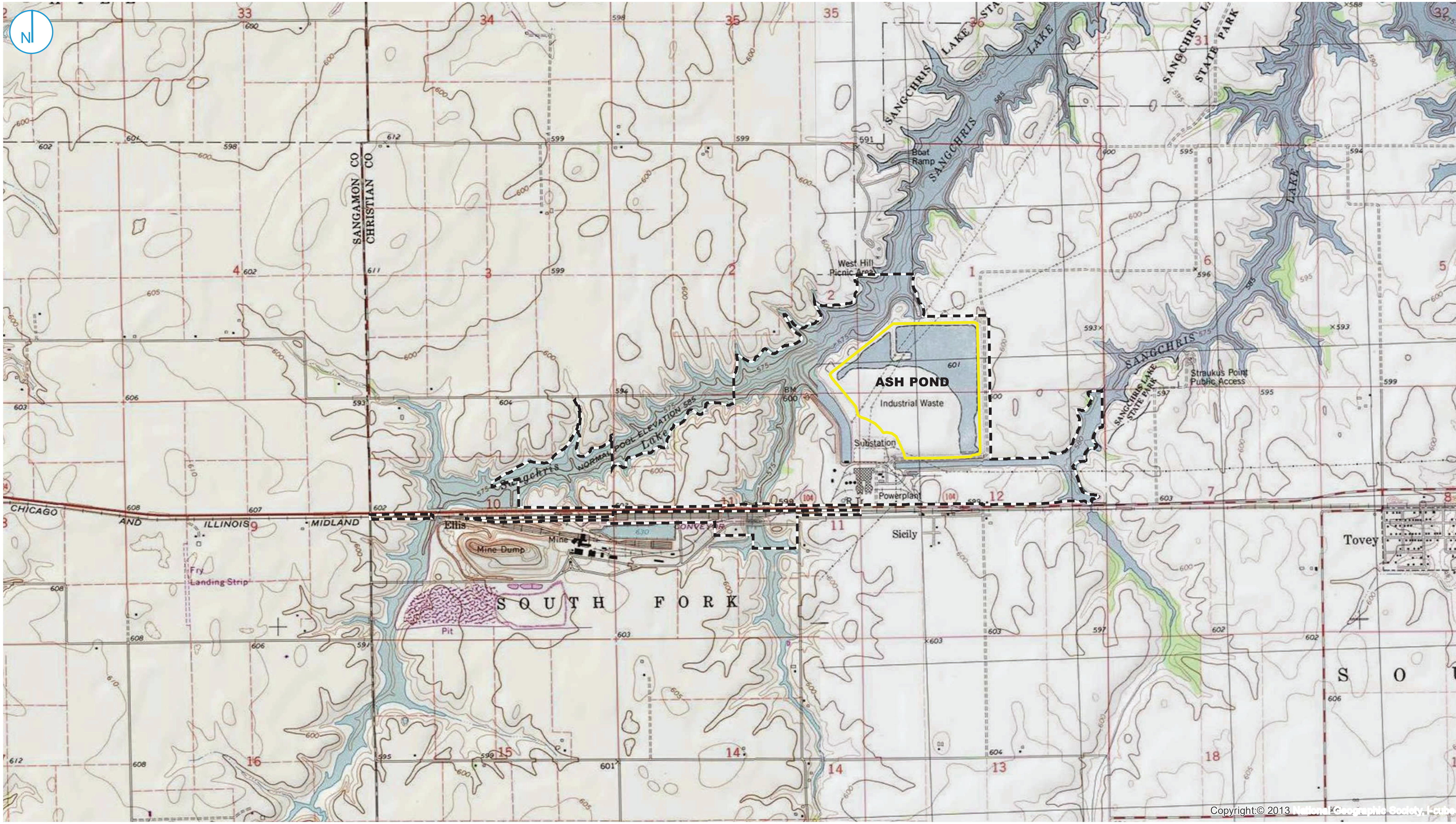
ft/day = feet per day

inches/yr = inches per year

mg/L = milligrams per liter

RAMBOLL

FIGURES



PART 845 REGULATED UNIT FACILITY BOUNDARY

PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-1

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 5/10/2022 | DESIGNER: galarmmc

Y:\Mapping\Projects\22\2285\MXD\Model_Figures\Kincaid\Figure 1-1_Site Location Map.mxd

PART 845 REGULATED UNIT (SUBJECT UNIT)
CLOSURE IN PLACE BOUNDARY
PROPERTY BOUNDARY

0 250 500 Feet

SITE MAP

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\Model_Figures\Kincaid\Figure 1-2_Site_Map.mxd

PROJECT: 169000XXXX | DATED: 5/10/2022 | DESIGNER: galarnmc

Y:\Mapping\Projects\22\2285\MXD\Model_Figures\Kincaid\Figure 2-1_Monitoring Well Location Map.mxd

PROJECT: 169000XXXX | DATED: 5/10/2022 | DESIGNER: galarnmc

BACKGROUND WELL
COMPLIANCE WELL
MONITORING WELL
PORE WATER WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
PART 845 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

MONITORING WELL LOCATION MAP

FIGURE 2-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\Model_Figures\Kincaid\Figure 2-2_Pot Surface 20210223.mxd

BACKGROUND WELL	STAFF GAGE, CCR UNIT	GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)	
COMPLIANCE WELL	STAFF GAGE, RIVER	INFERRED GROUNDWATER ELEVATION CONTOUR	
PORE WATER WELL	PART 845 REGULATED UNIT (SUBJECT UNIT)	GROUNDWATER FLOW DIRECTION	
MONITORING WELL	PROPERTY BOUNDARY		

0 250 500 Feet

NOTES
1. PARENTHESES INDICATES WELL NOT USED FOR CONTOURING

POTENTIOMETRIC SURFACE MAP
FEBRUARY 23, 2021

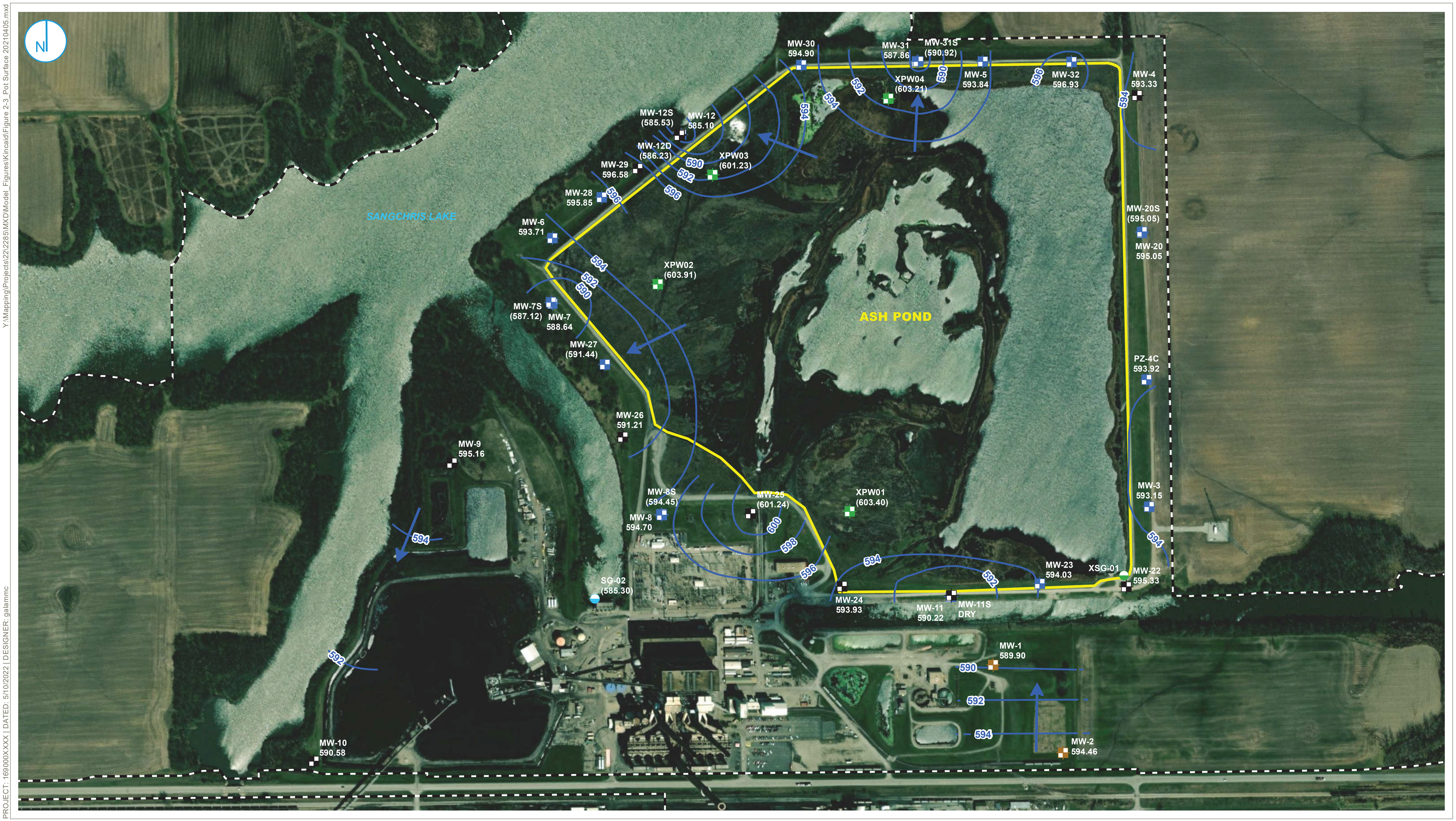
GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 5/10/2022 | DESIGNER: galanmc



BACKGROUND WELL
COMPLIANCE WELL
PORE WATER WELL
MONITORING WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, RIVER
PART 845 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

NOTES
1. PARENTHESES INDICATES WELL NOT USED FOR CONTOURING

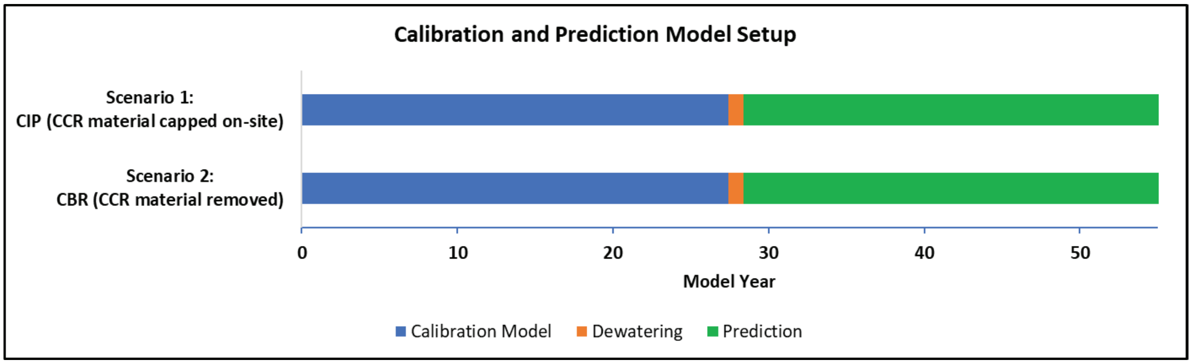
POTENTIOMETRIC SURFACE MAP
APRIL 5, 2021

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

FIGURE 4-1

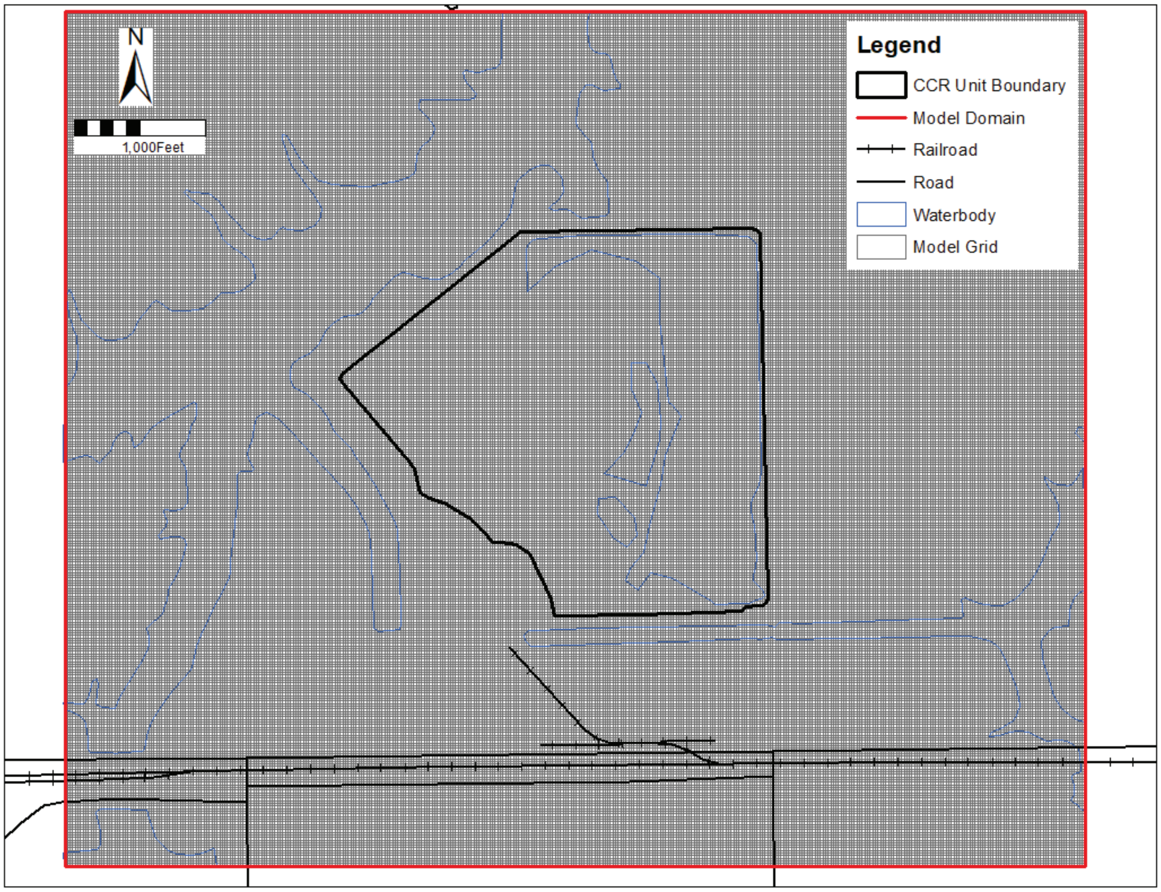


CALIBRATION AND PREDICTIVE TIMELINE

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

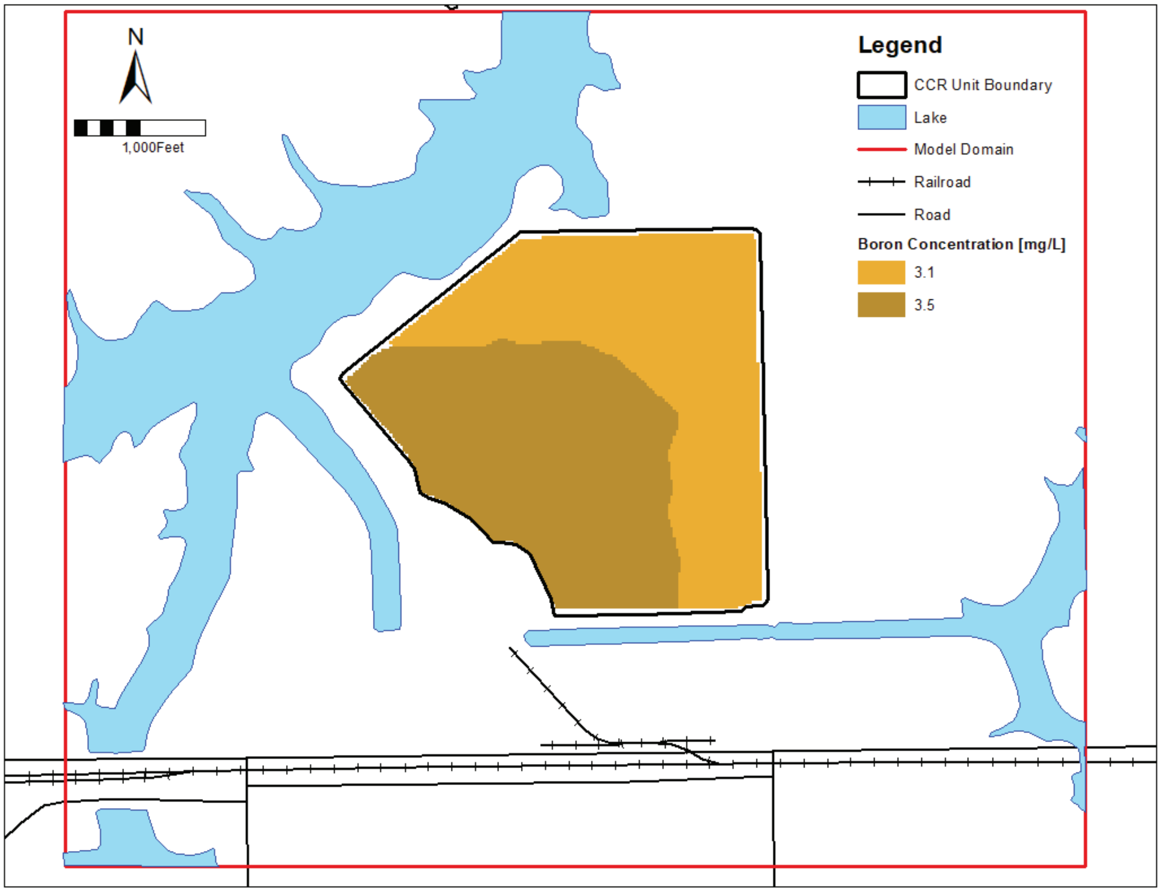
FIGURE 5-1



MODEL GRID FOR LAYERS 1 THROUGH 5

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

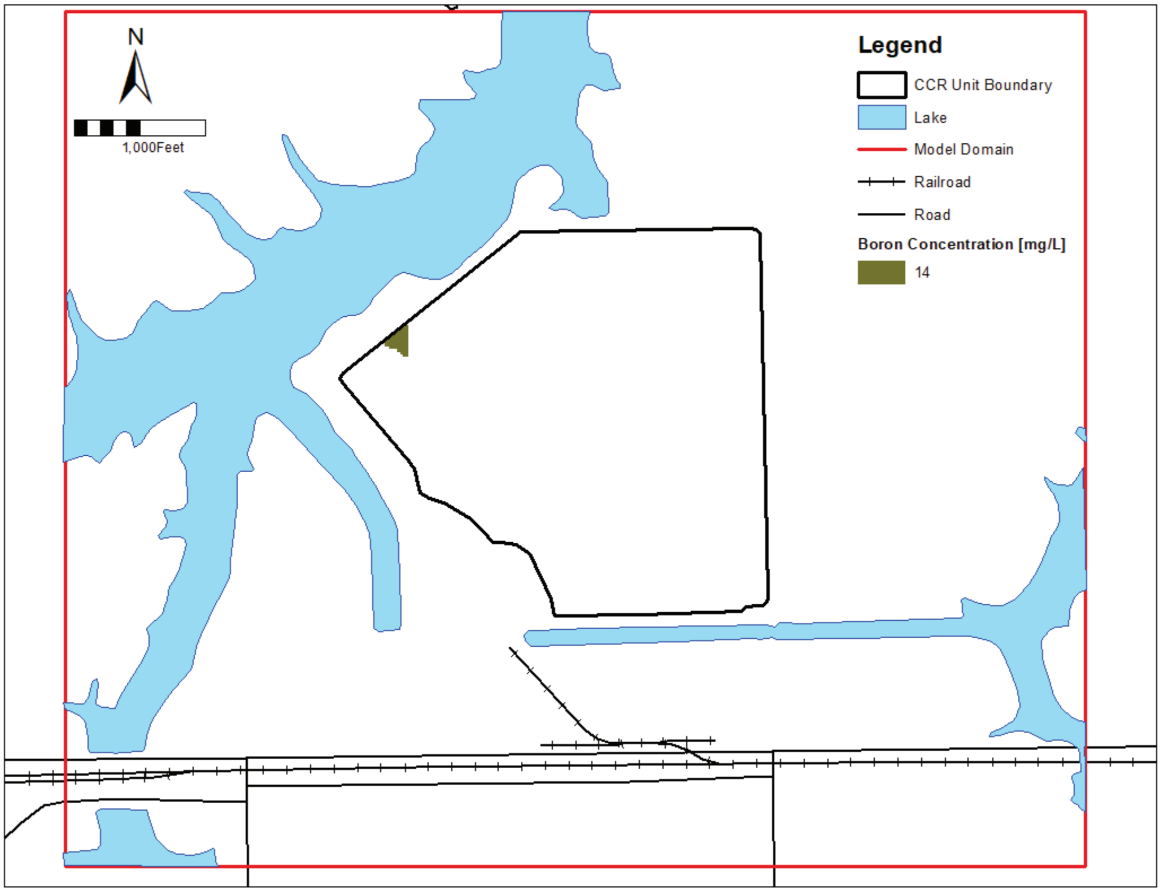
RAMBOLL



BOUNDARY CONDITIONS FOR LAYER 1

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

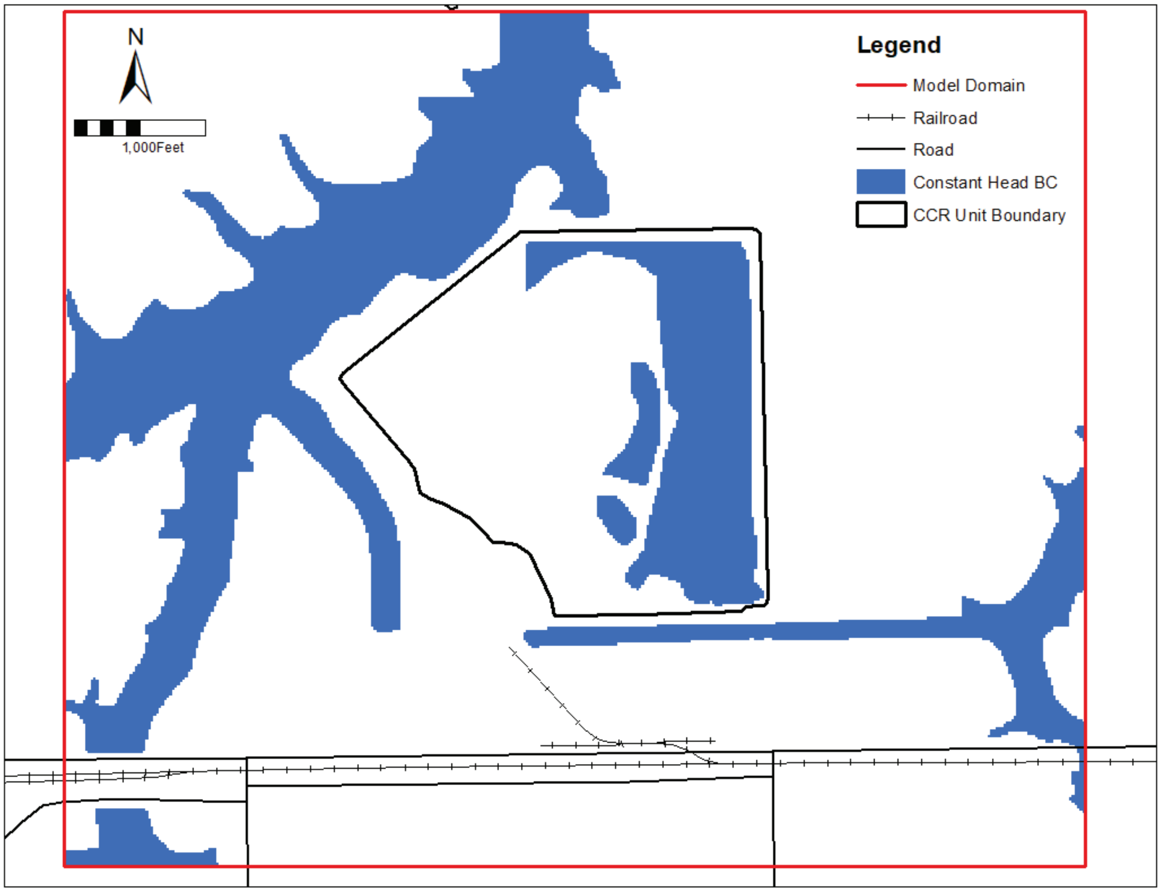
RAMBOLL



BOUNDARY CONDITIONS FOR LAYER 2

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

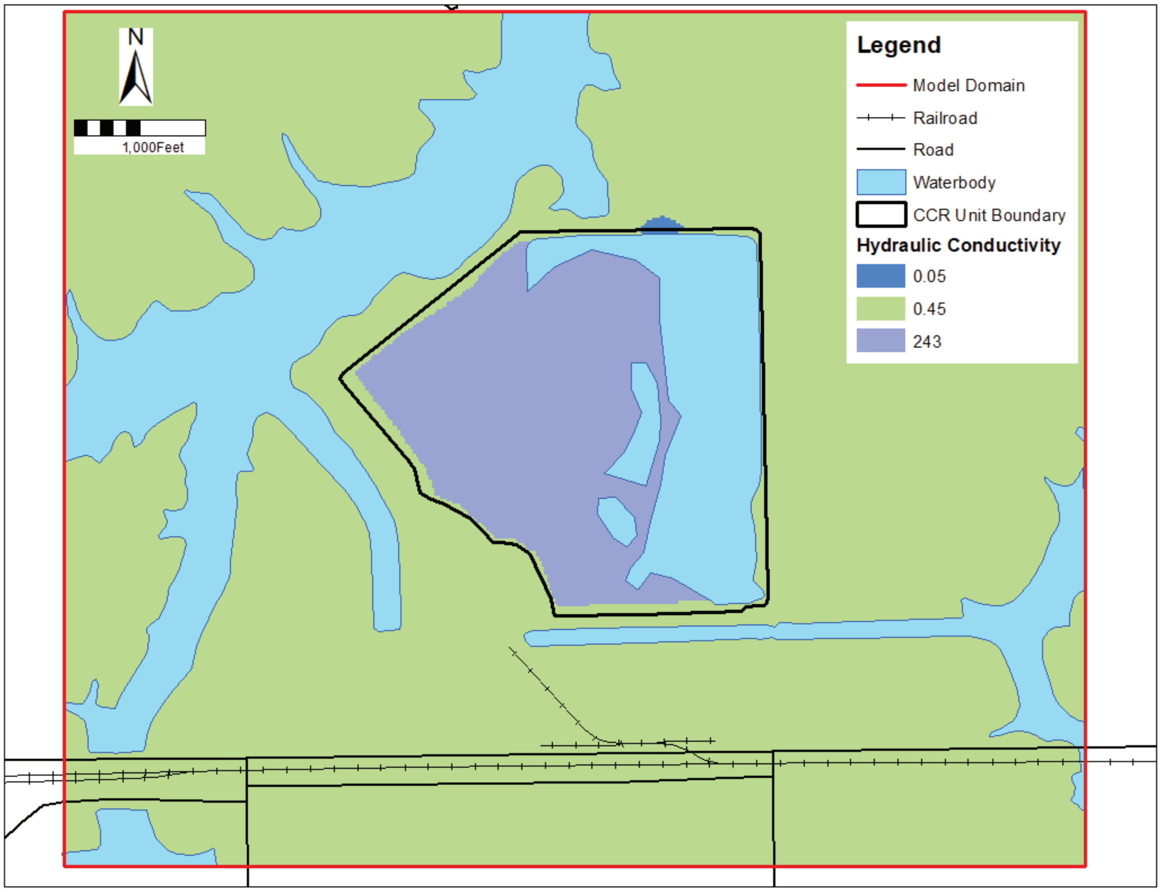
RAMBOLL



BOUNDARY CONDITIONS FOR LAYER 3

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

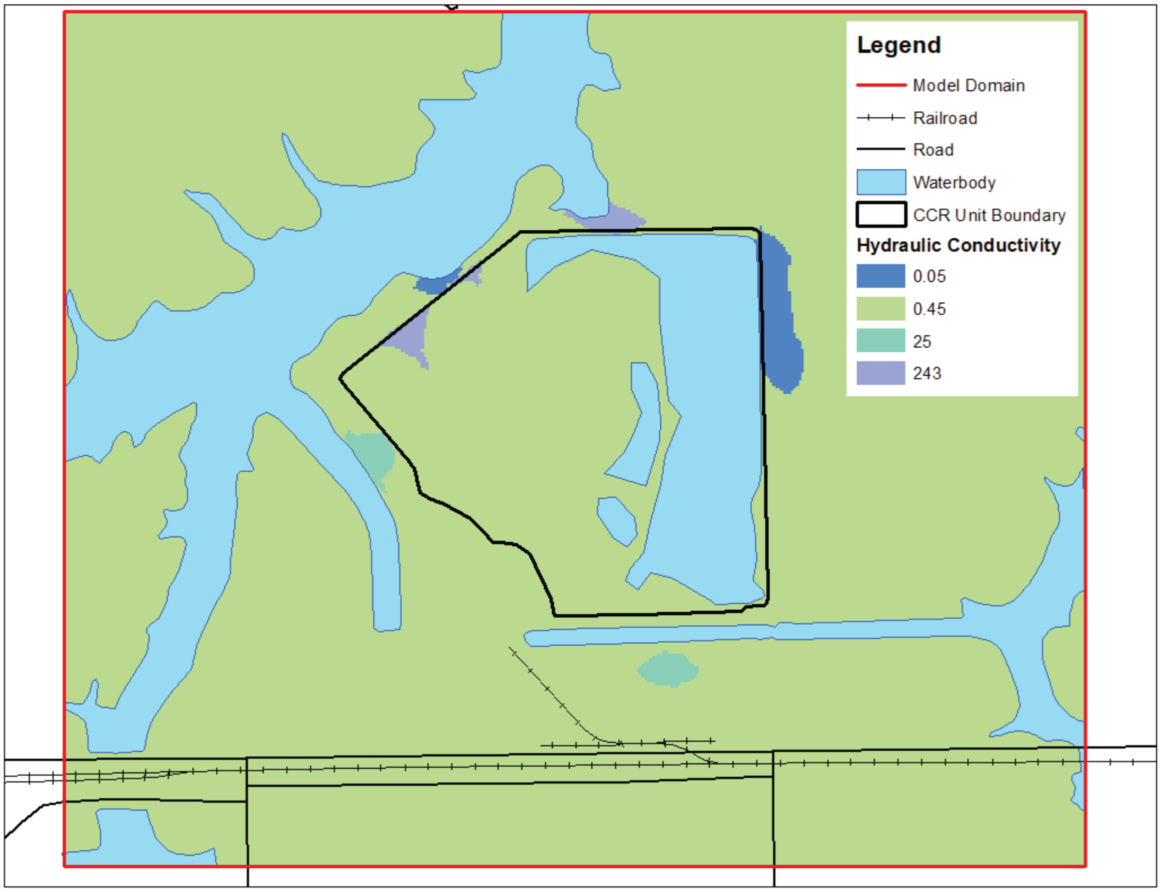
RAMBOLL



DISTRIBUTION OF HYDRAULIC CONDUCTIVITY ZONES (ft/d) FOR LAYER 1

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

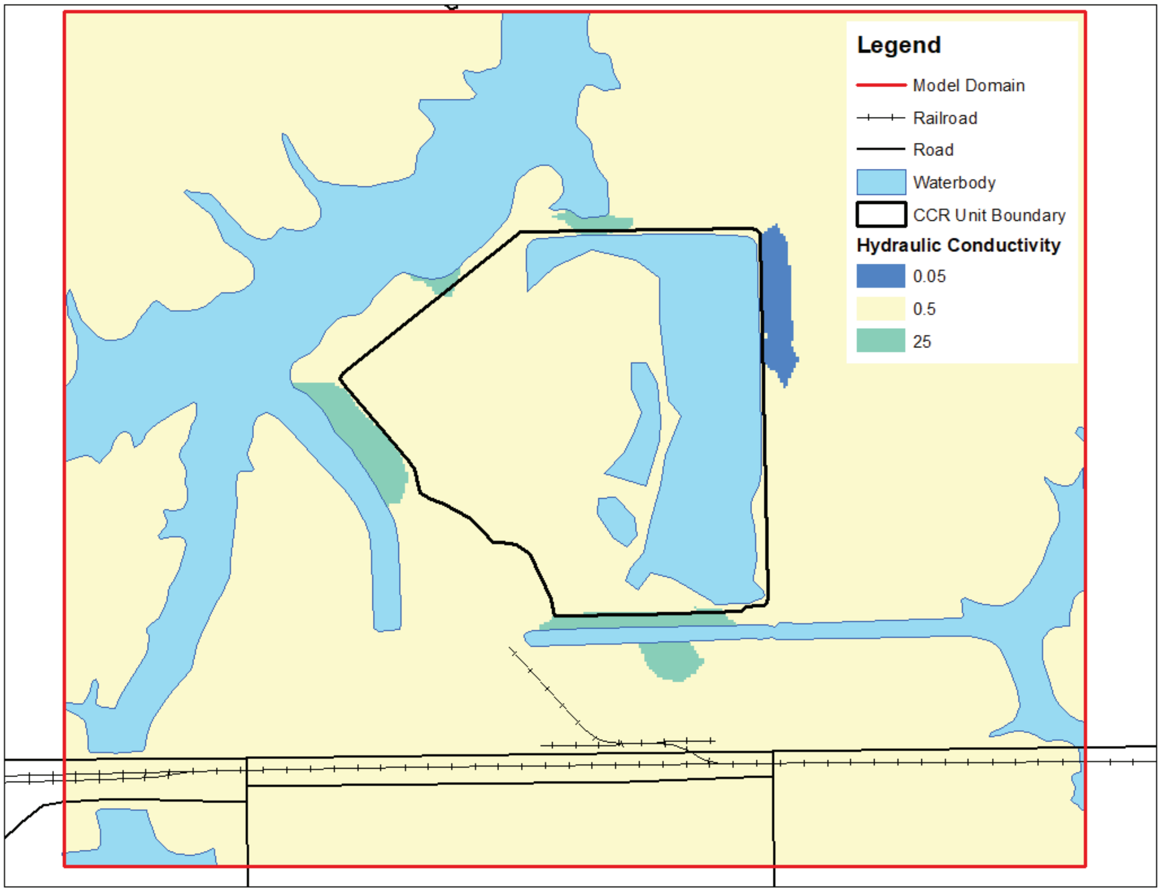
RAMBOLL



DISTRIBUTION OF HYDRAULIC CONDUCTIVITY ZONES (ft/d) FOR LAYER 2

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

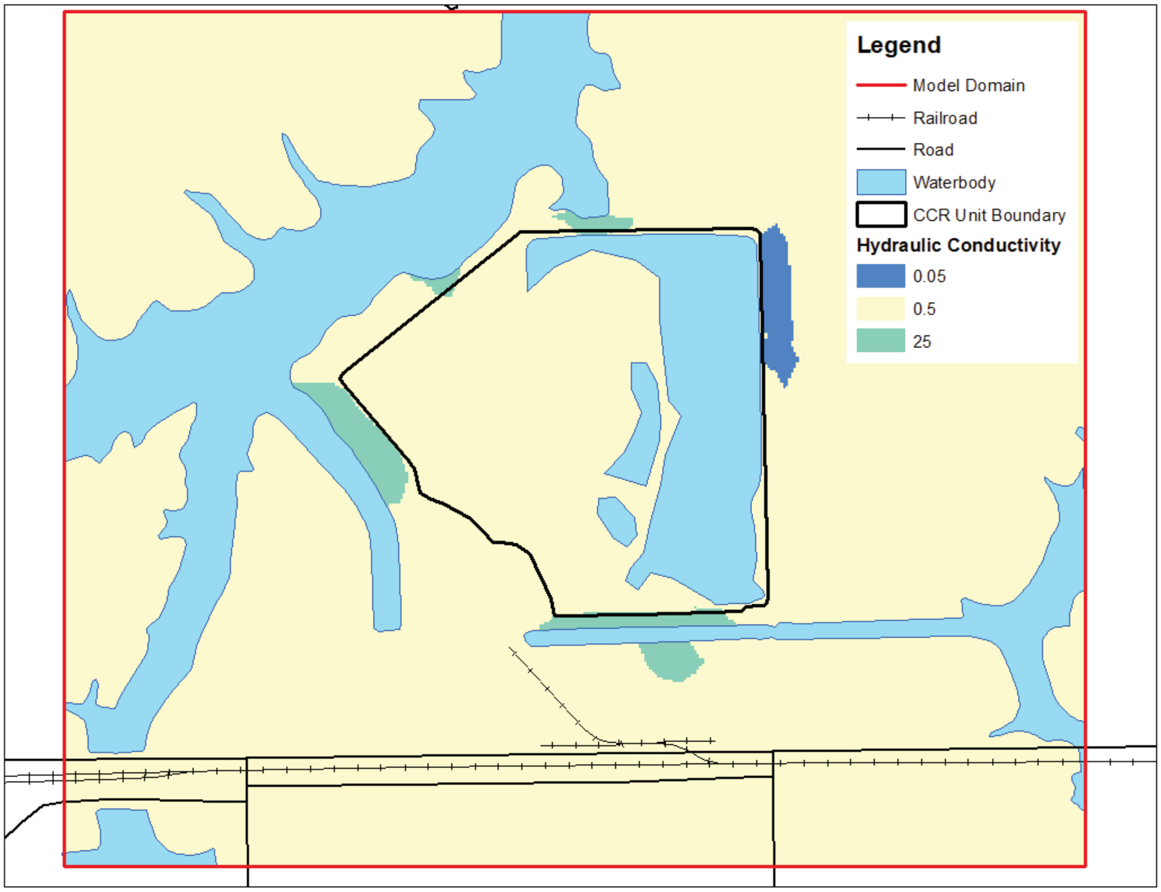
RAMBOLL



DISTRIBUTION OF HYDRAULIC CONDUCTIVITY ZONES (ft/d) FOR LAYER 3

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

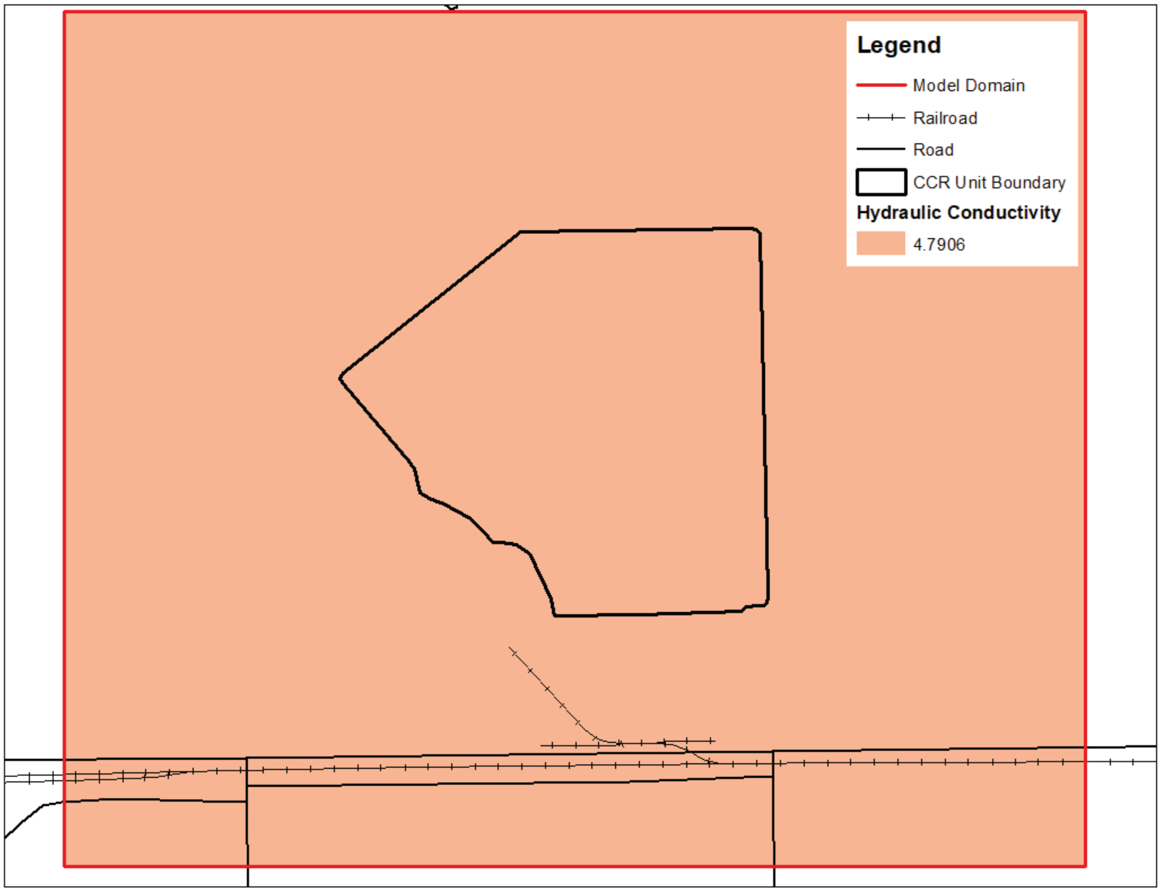
RAMBOLL



DISTRIBUTION OF HYDRAULIC CONDUCTIVITY ZONES (ft/d) FOR LAYER 4

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

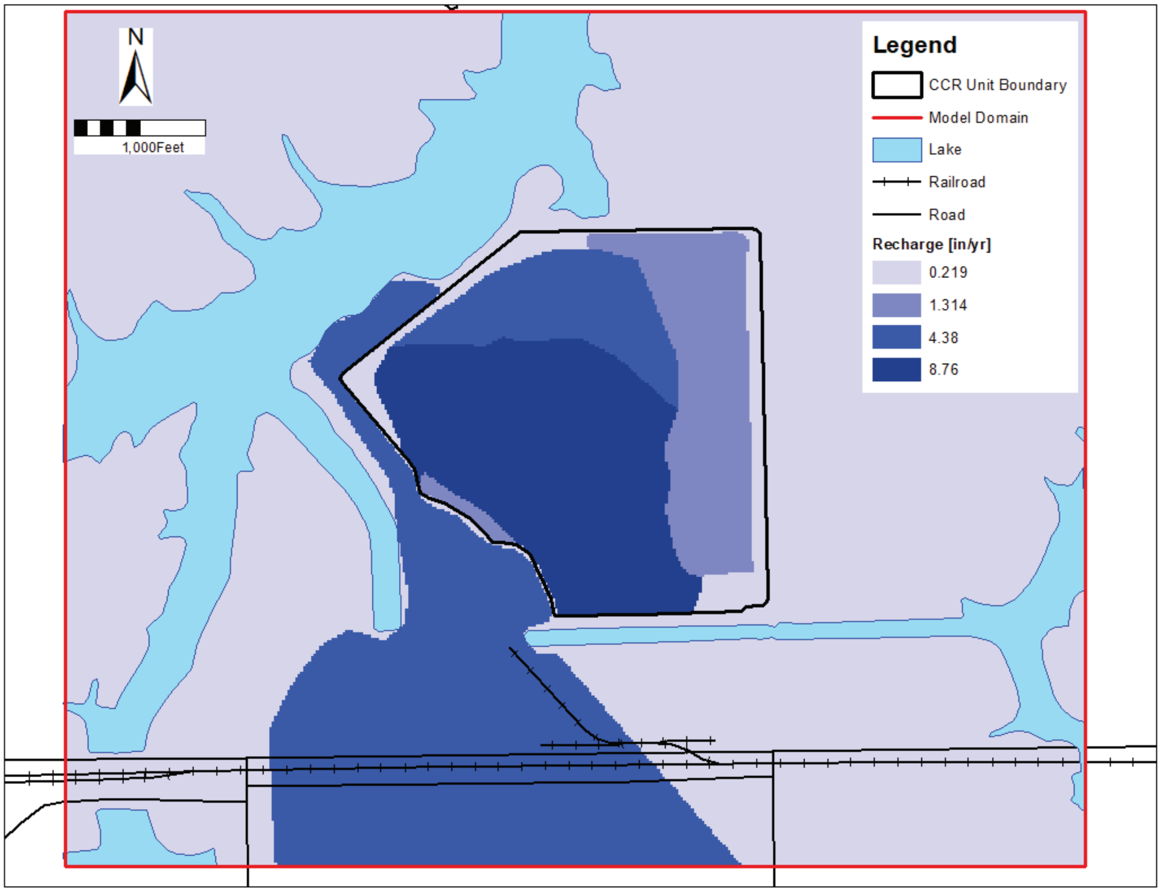
RAMBOLL



DISTRIBUTION OF HYDRAULIC CONDUCTIVITY ZONES (ft/d) FOR LAYER 5

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

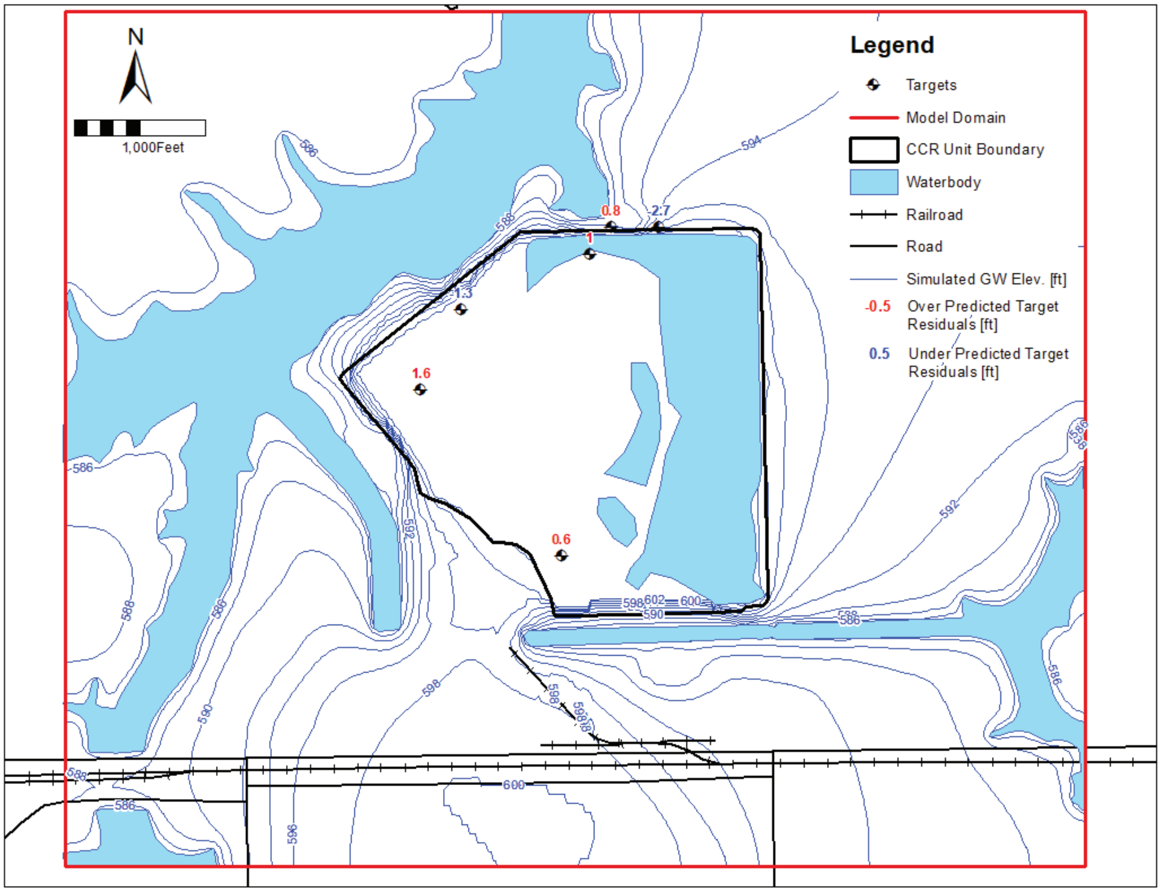
RAMBOLL



DISTRIBUTION OF RECHARGE ZONES (in/yr)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

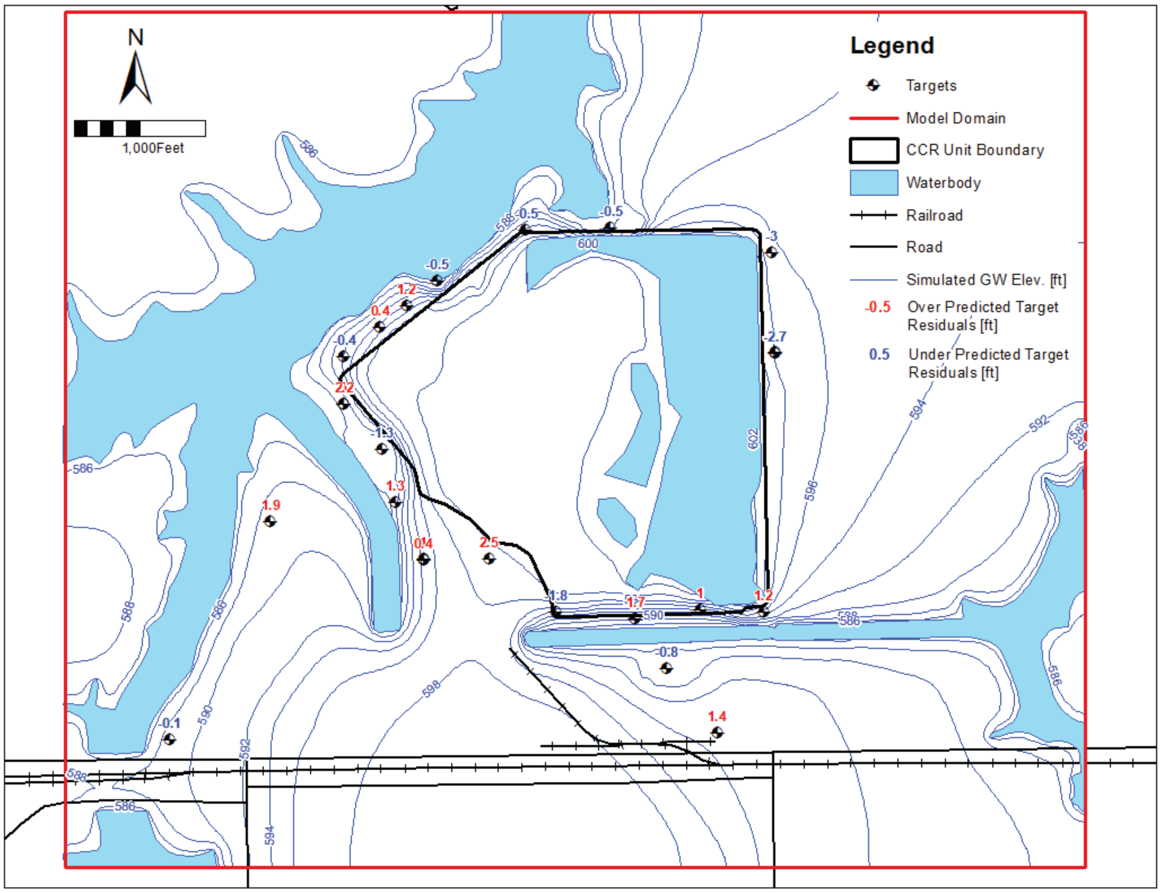
RAMBOLL



OBSERVED VERSUS SIMULATED GROUNDWATER ELEVATIONS LAYER 1

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

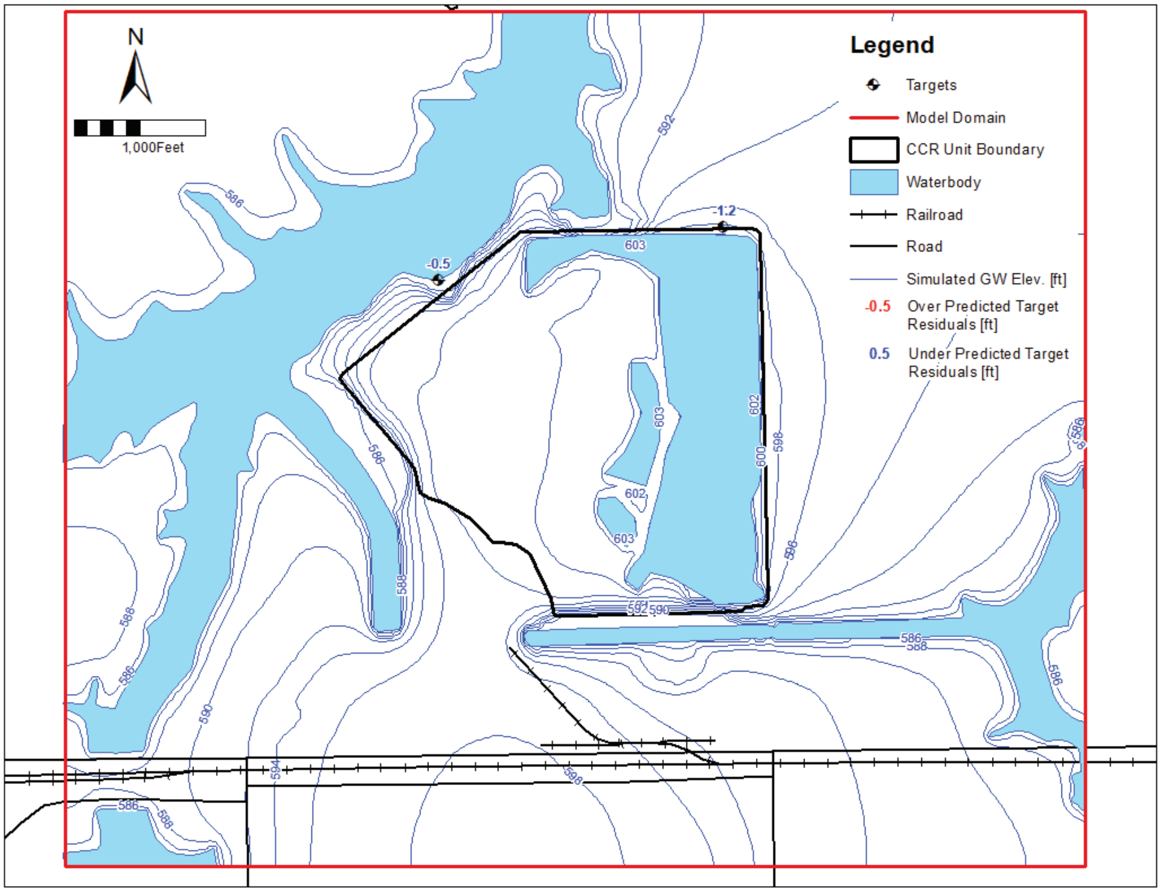
FIGURE 5-12



OBSERVED VERSUS SIMULATED GROUNDWATER ELEVATIONS LAYER 2

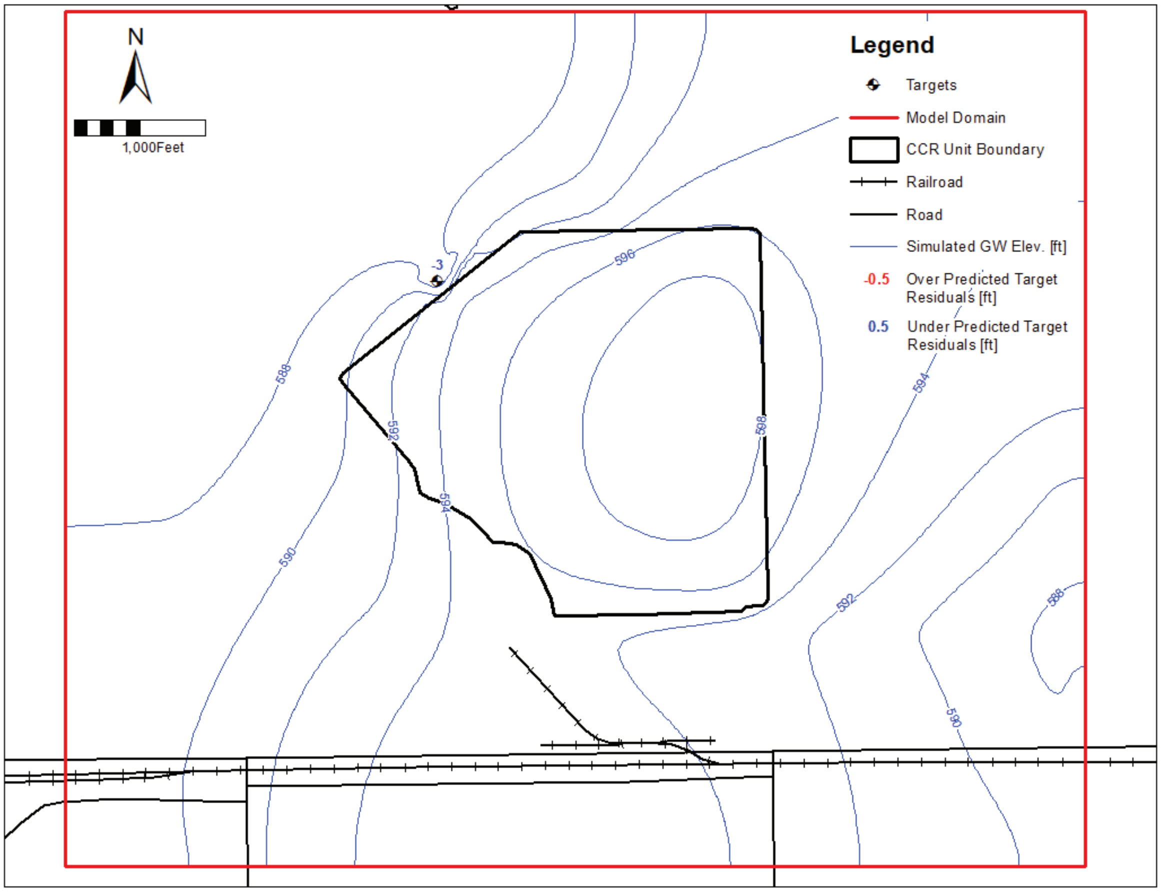
GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL



OBSERVED VERSUS SIMULATED GROUNDWATER ELEVATIONS LAYER 3

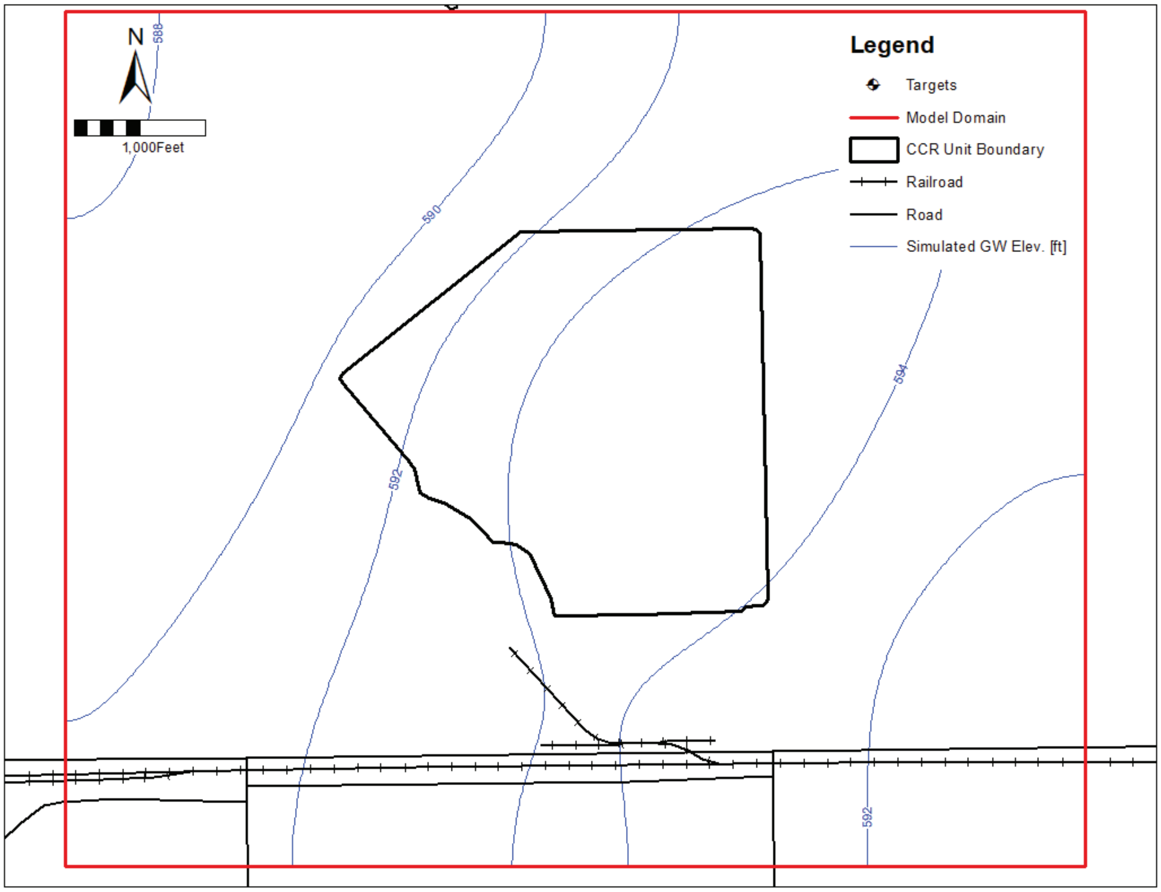
GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS



OBSERVED VERSUS SIMULATED GROUNDWATER ELEVATIONS LAYER 4

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

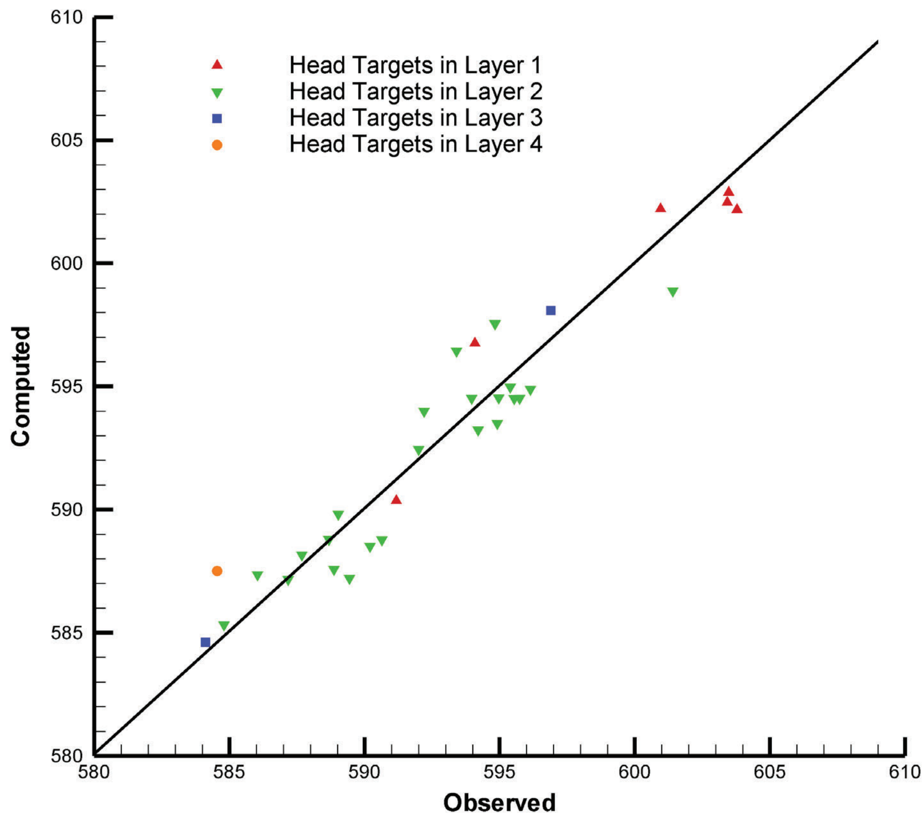
RAMBOLL



OBSERVED VERSUS SIMULATED GROUNDWATER ELEVATIONS LAYER 5

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

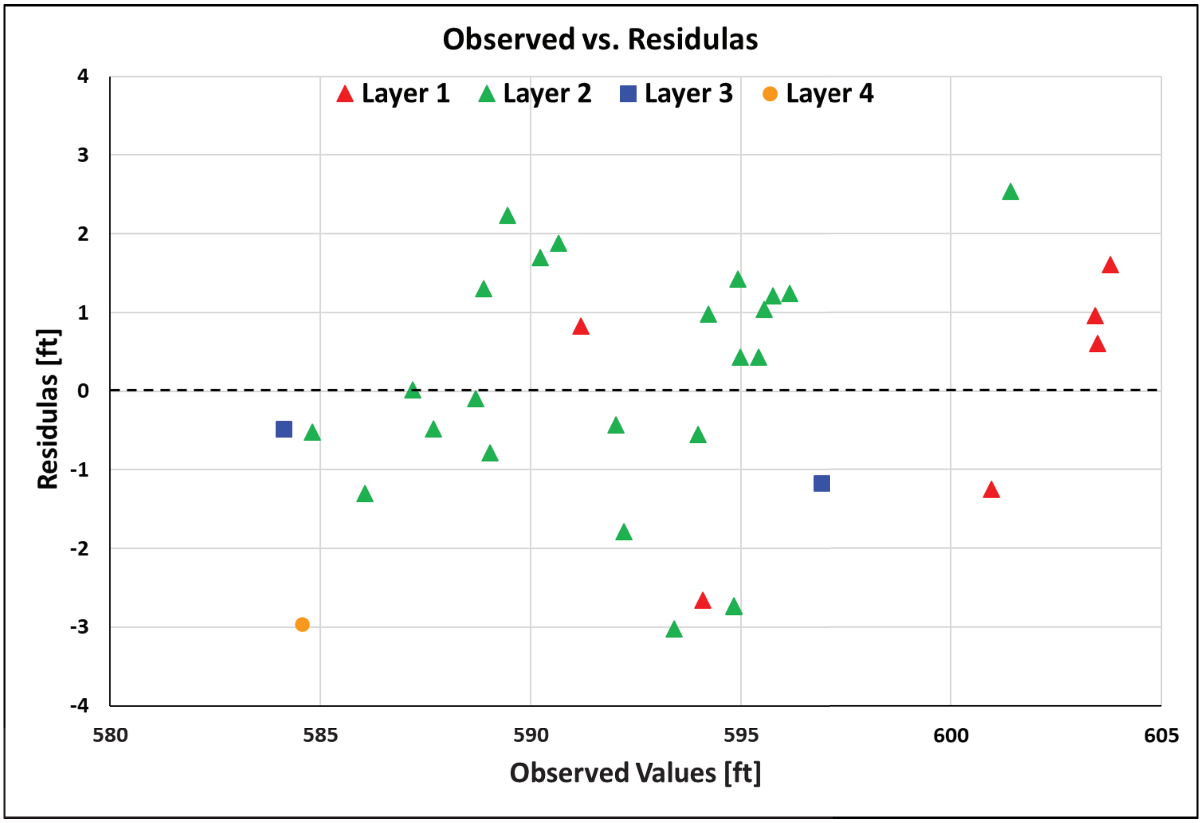
RAMBOLL



STEADY STATE MODFLOW CALIBRATION RESULTS – OBSERVED VERSUS SIMULATED (ft)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

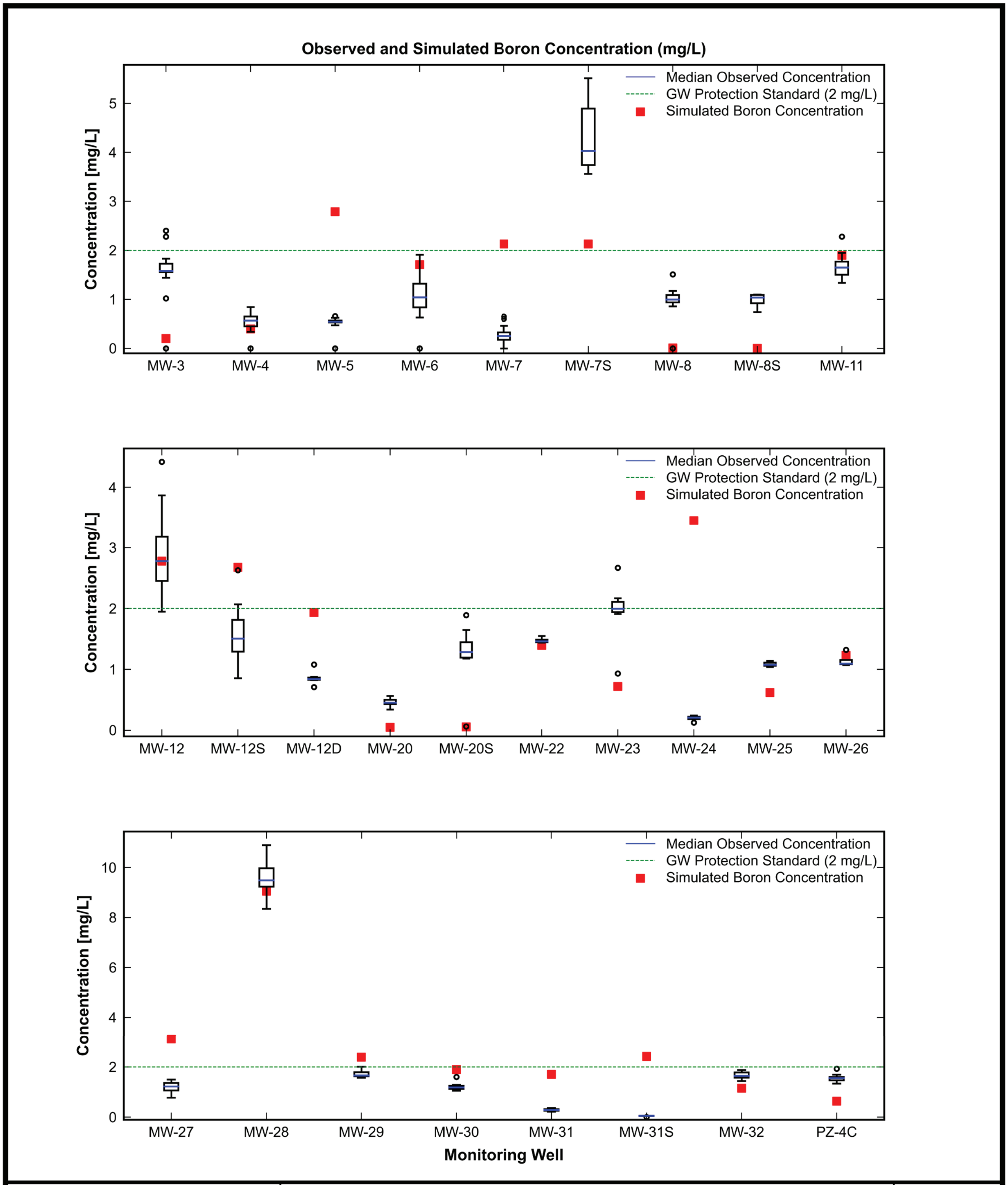
RAMBOLL



SIMULATED GROUNDWATER LEVEL RESIDUAL FROM THE CALIBRATED MODEL

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

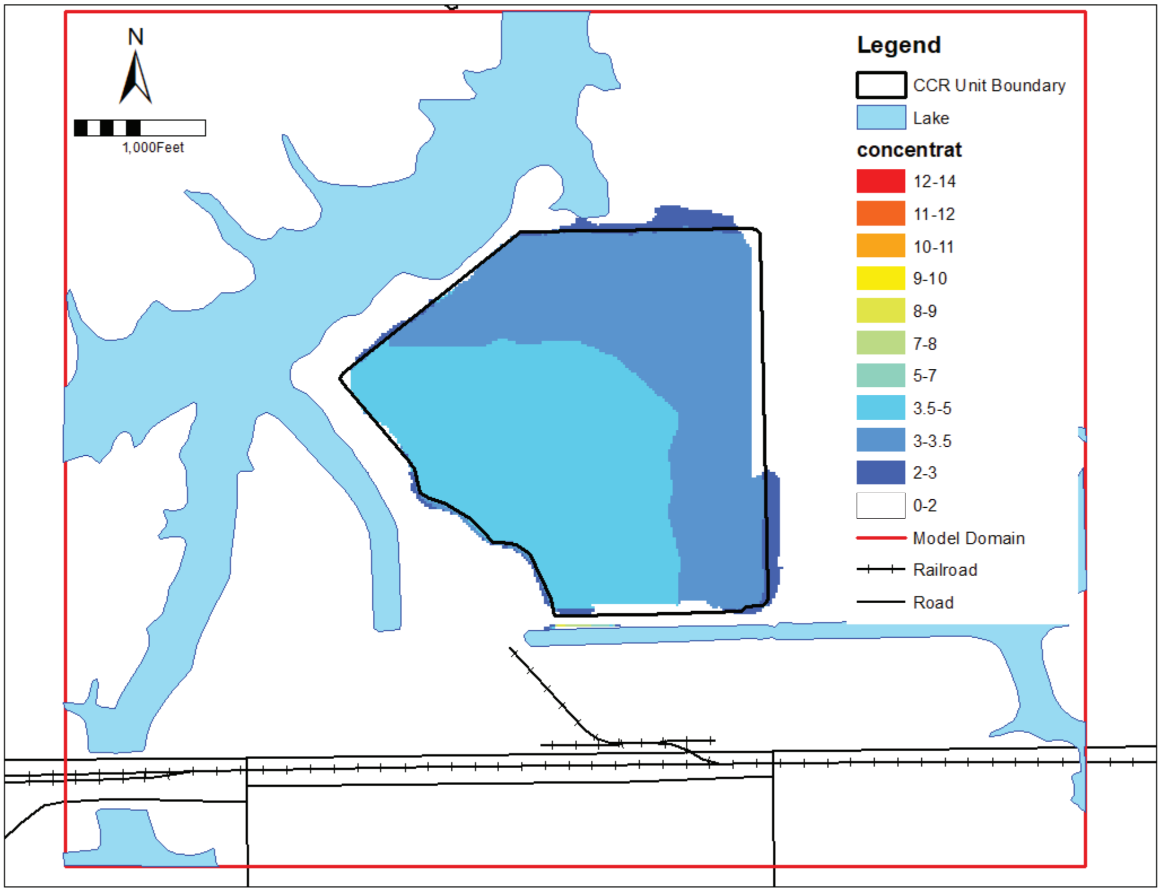
RAMBOLL



OBSERVED AND SIMULATED BORON CONCENTRATIONS (mg/L)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

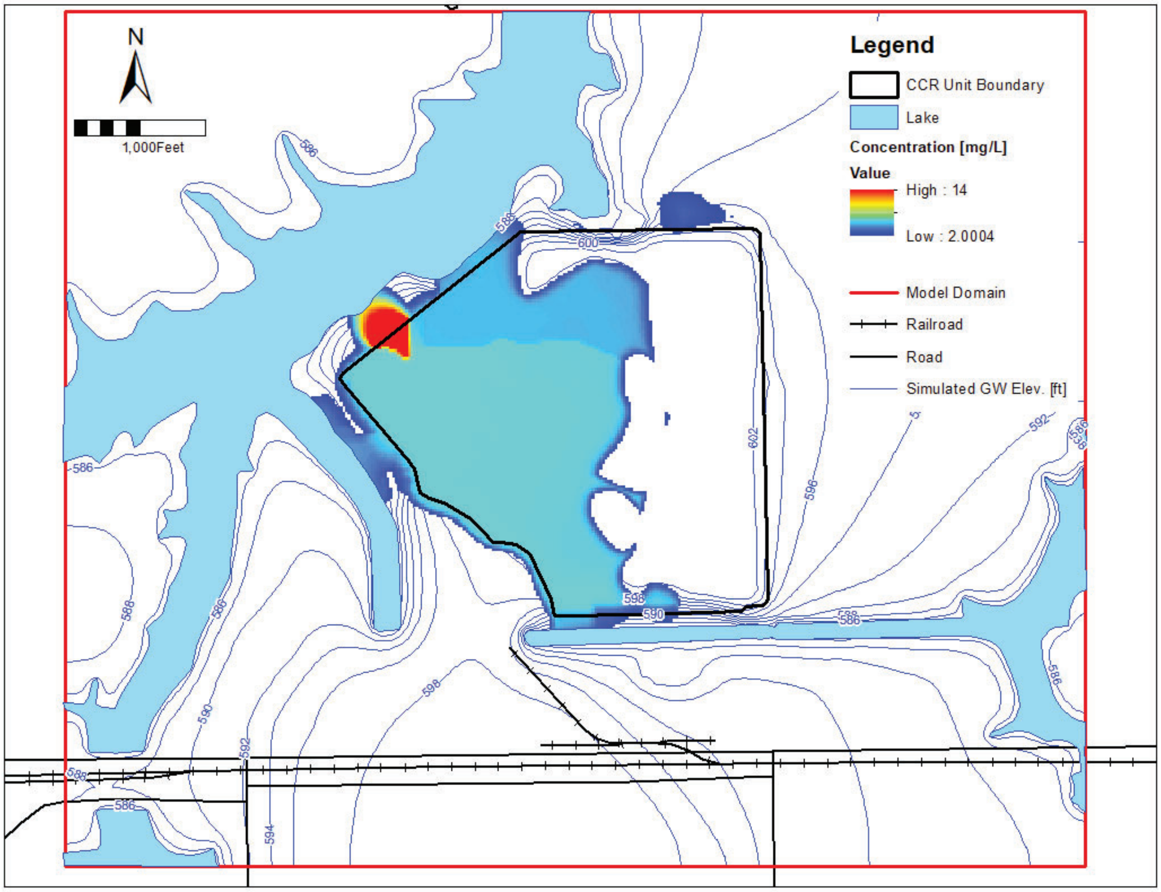
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN THE CALIBRATED MODEL LAYER 1

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

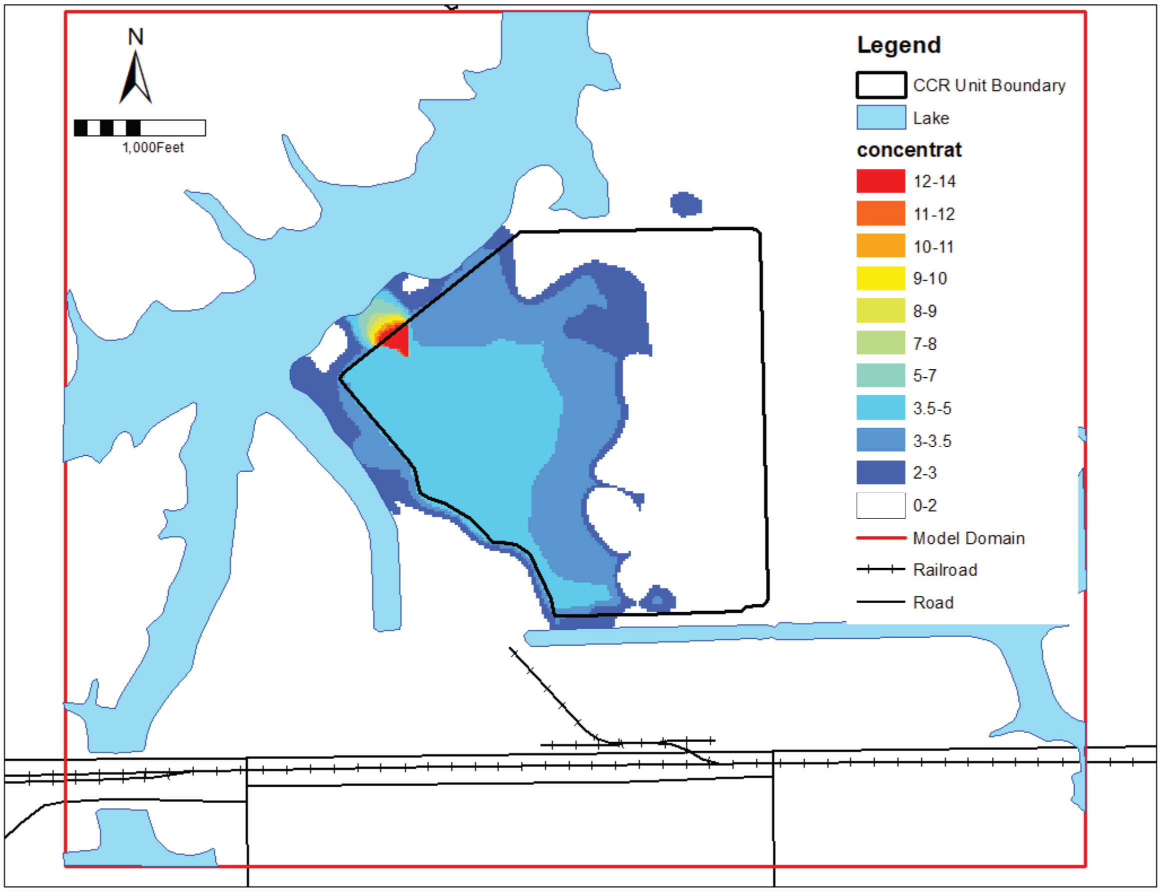
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN THE CALIBRATED MODEL LAYER 2

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

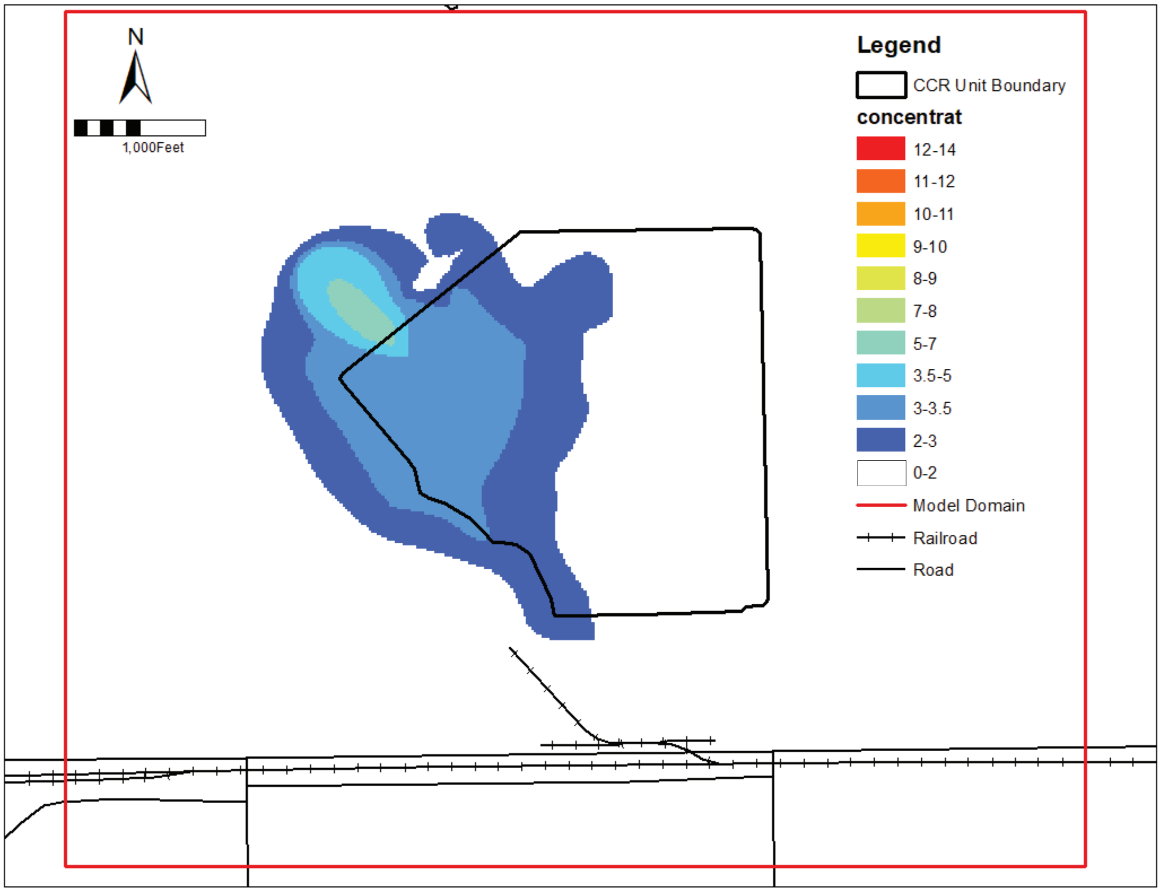
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN THE CALIBRATED MODEL LAYER 3

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

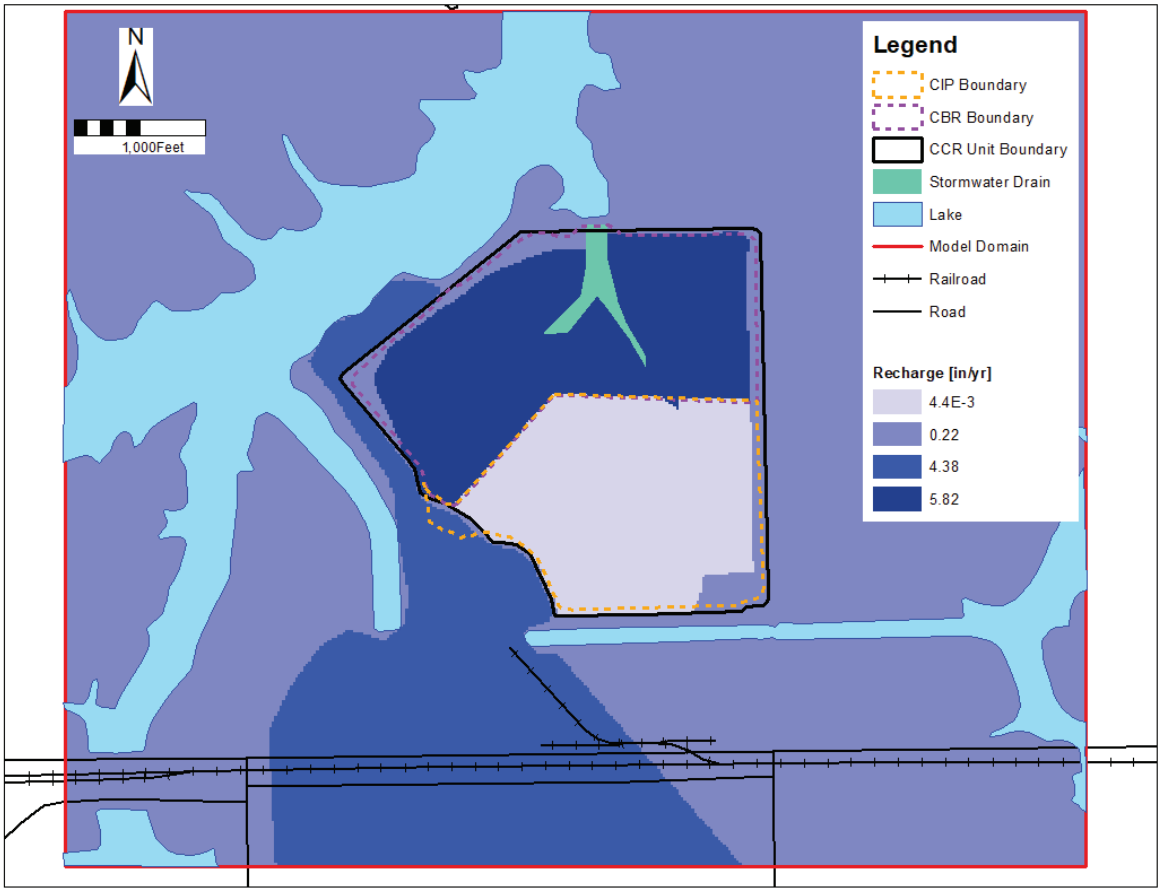
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN THE CALIBRATED MODEL LAYER 4

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

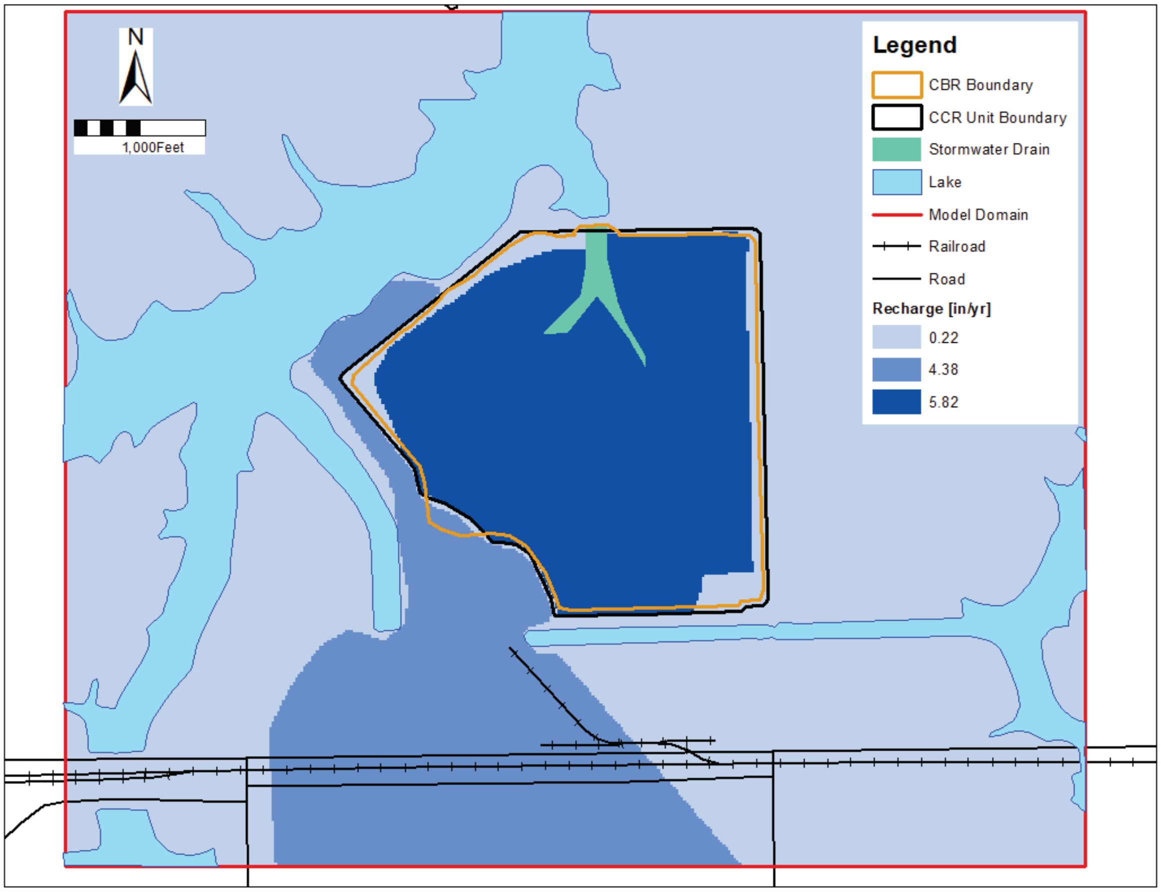
RAMBOLL



CIP RECHARGE DISTRIBUTION AND STORMWATER DRAIN

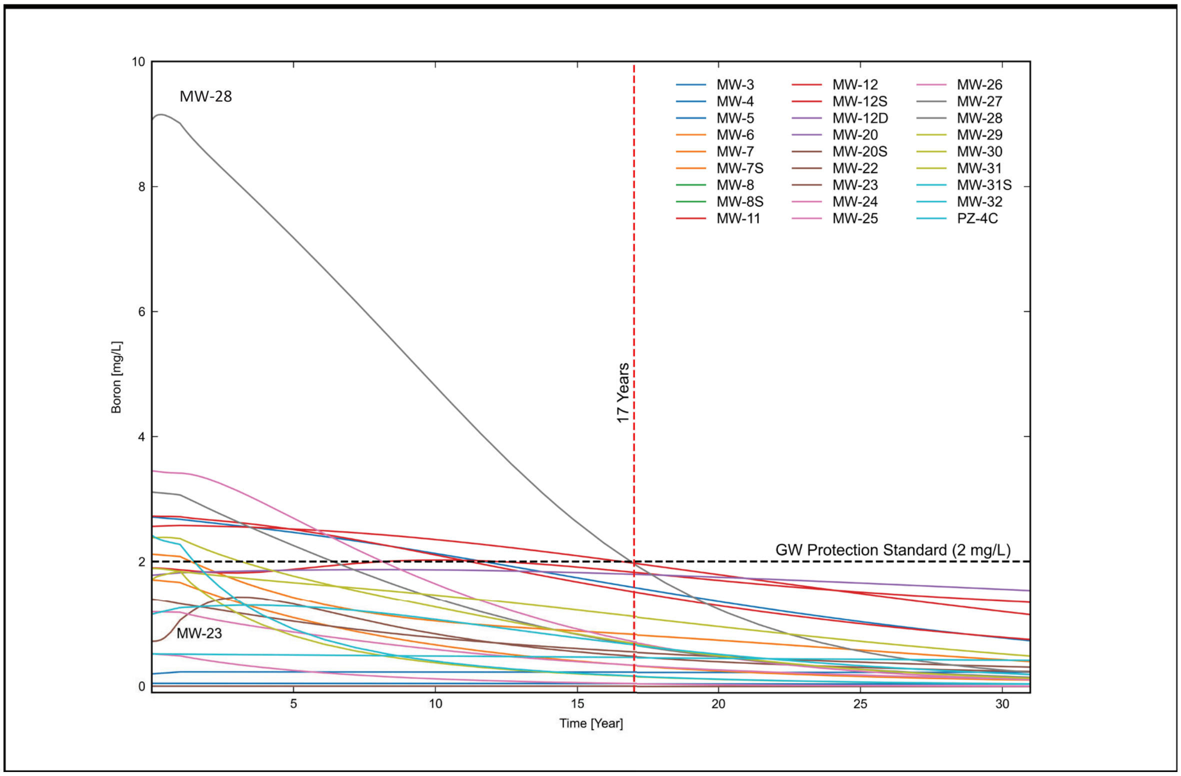
GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL



CBR RECHARGE DISTRIBUTION AND STORMWATER DRAIN

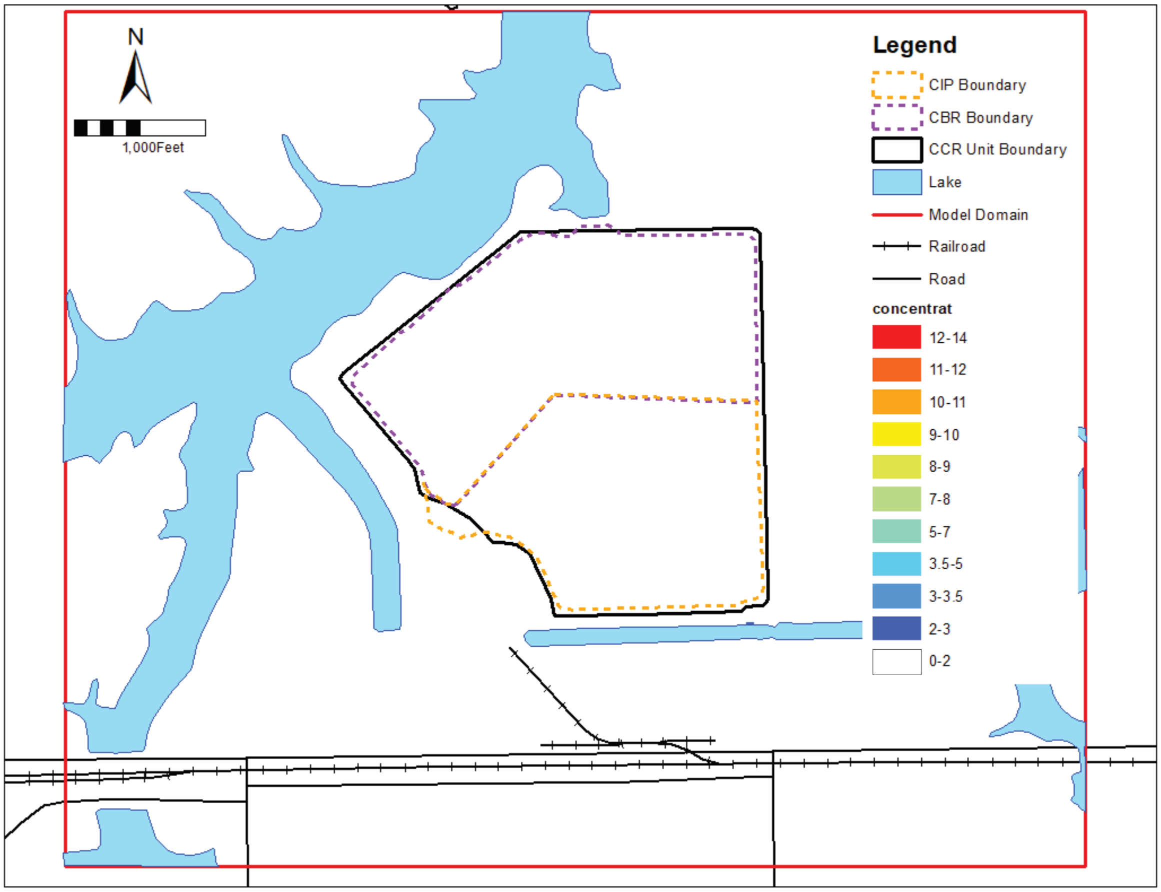
GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS



CIP (SCENARIO 1) - MODEL PREDICTED BORON CONCENTRATION

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

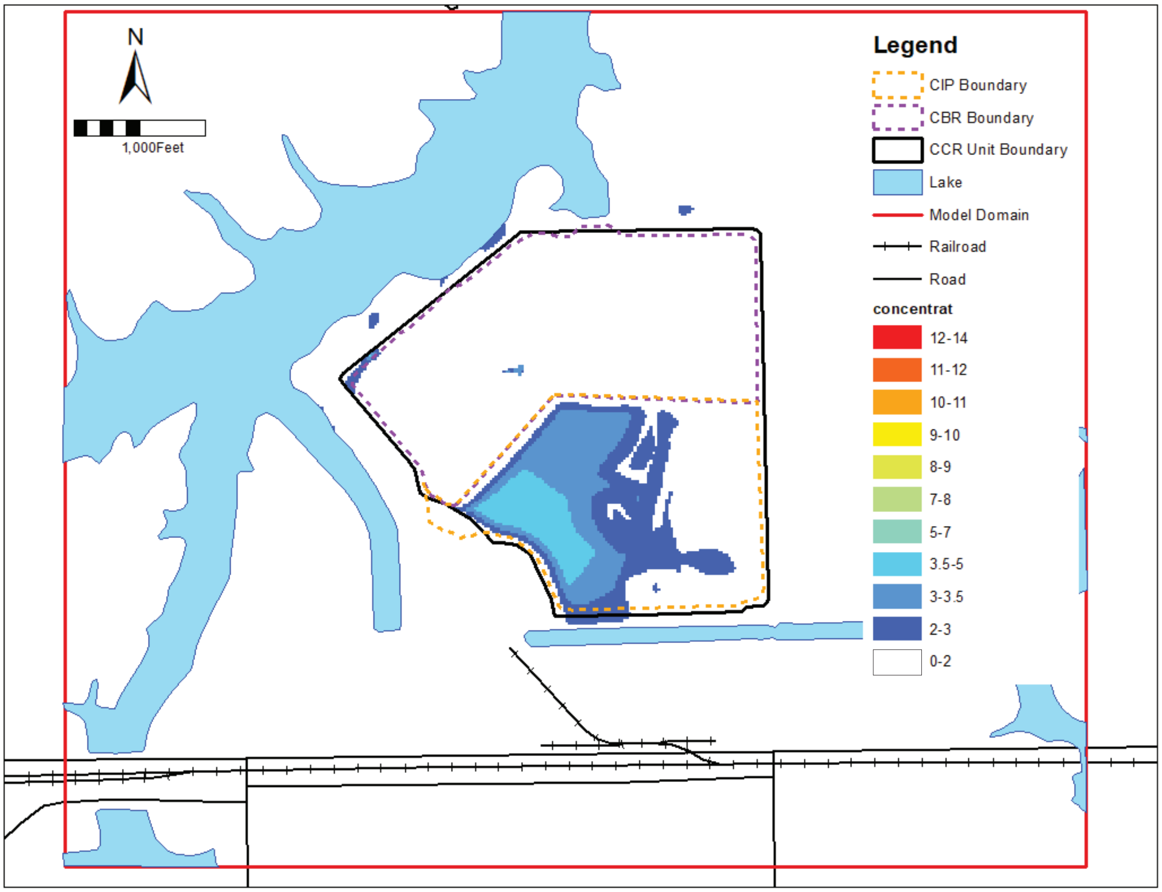
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CIP SCENARIO LAYER 1 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

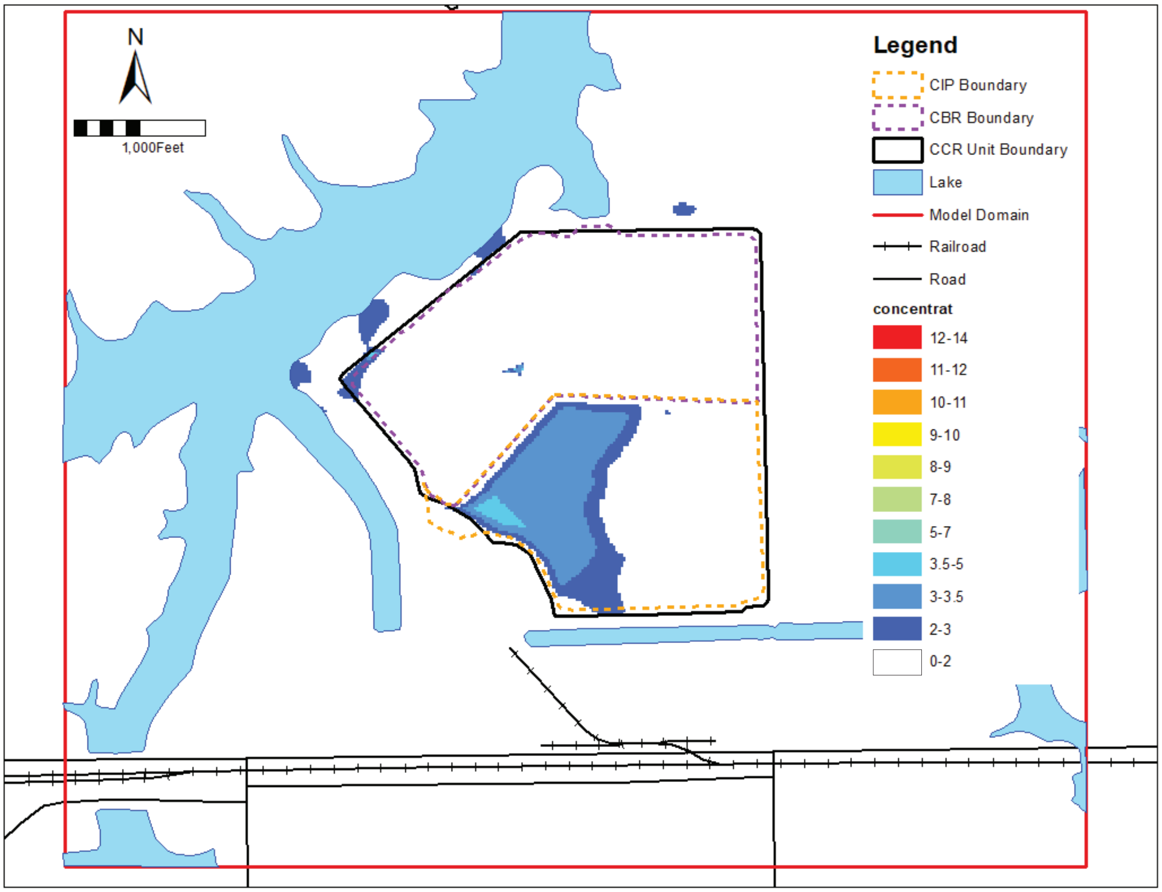


DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CIP SCENARIO LAYER 2 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

FIGURE 6-6

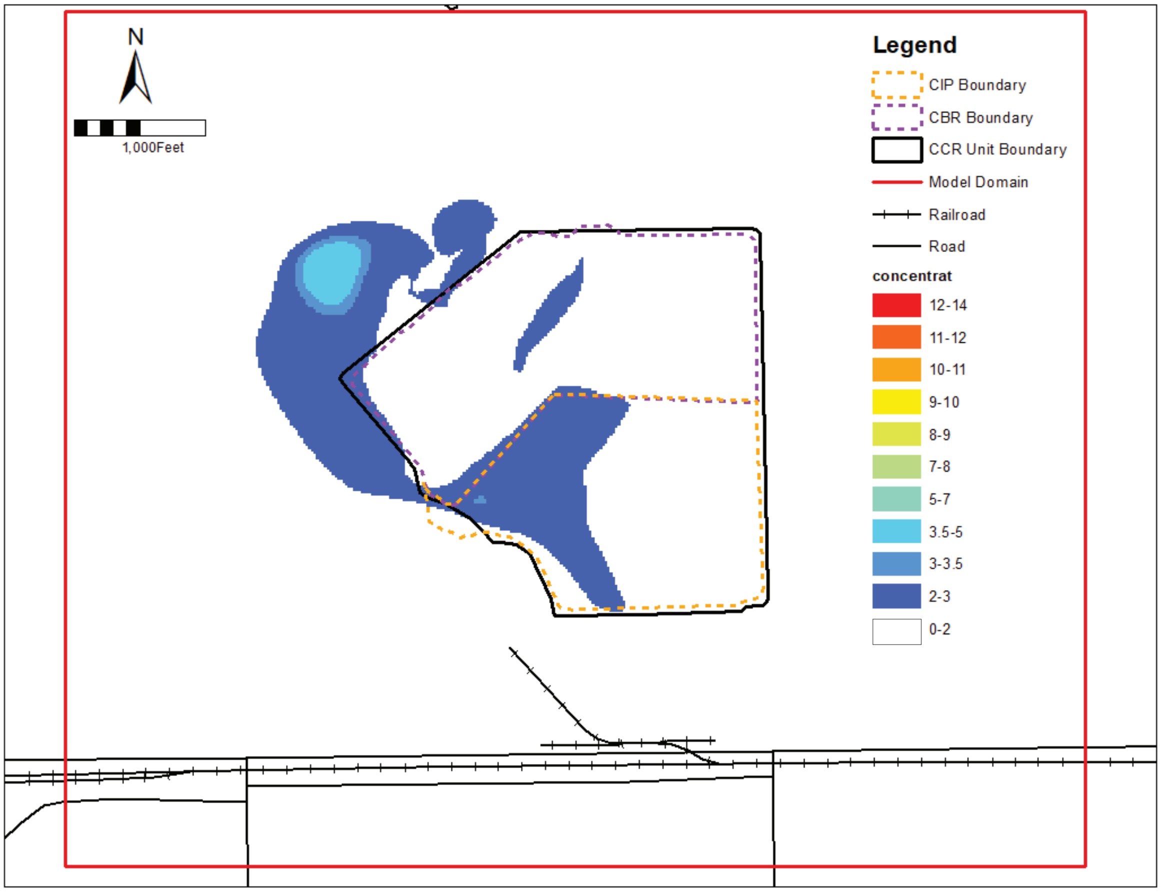


DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CIP SCENARIO LAYER 3 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

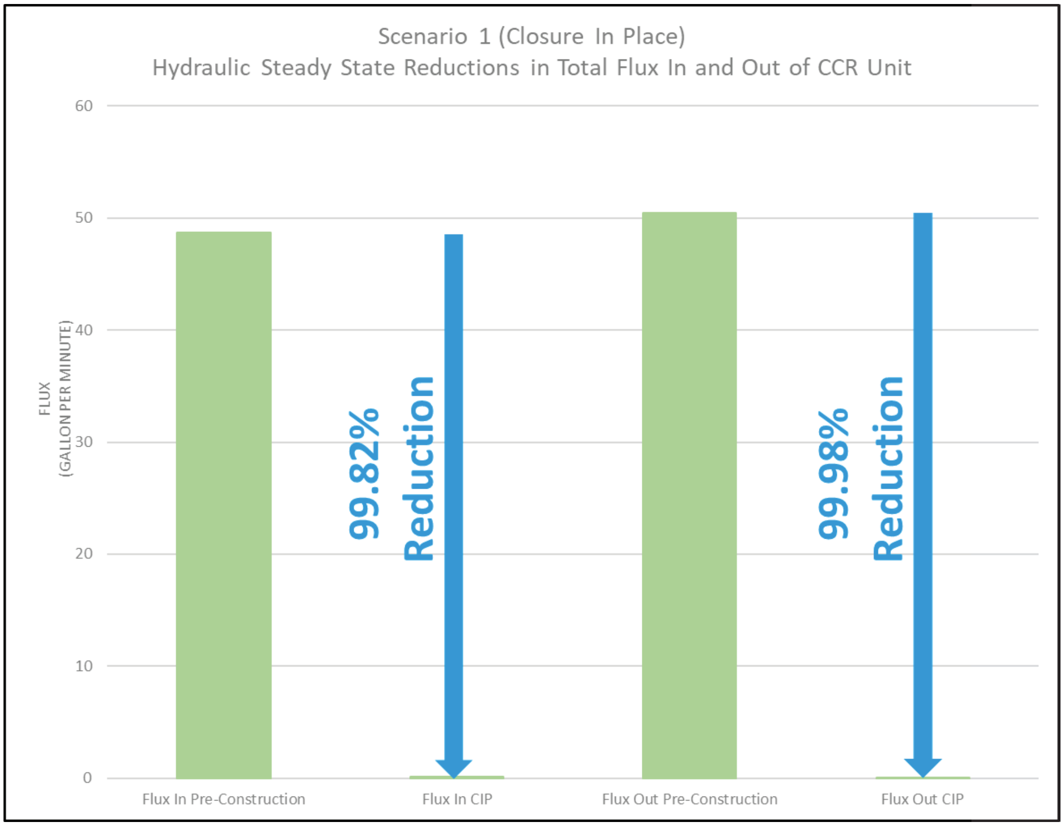
FIGURE 6-7



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CIP SCENARIO LAYER 4 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

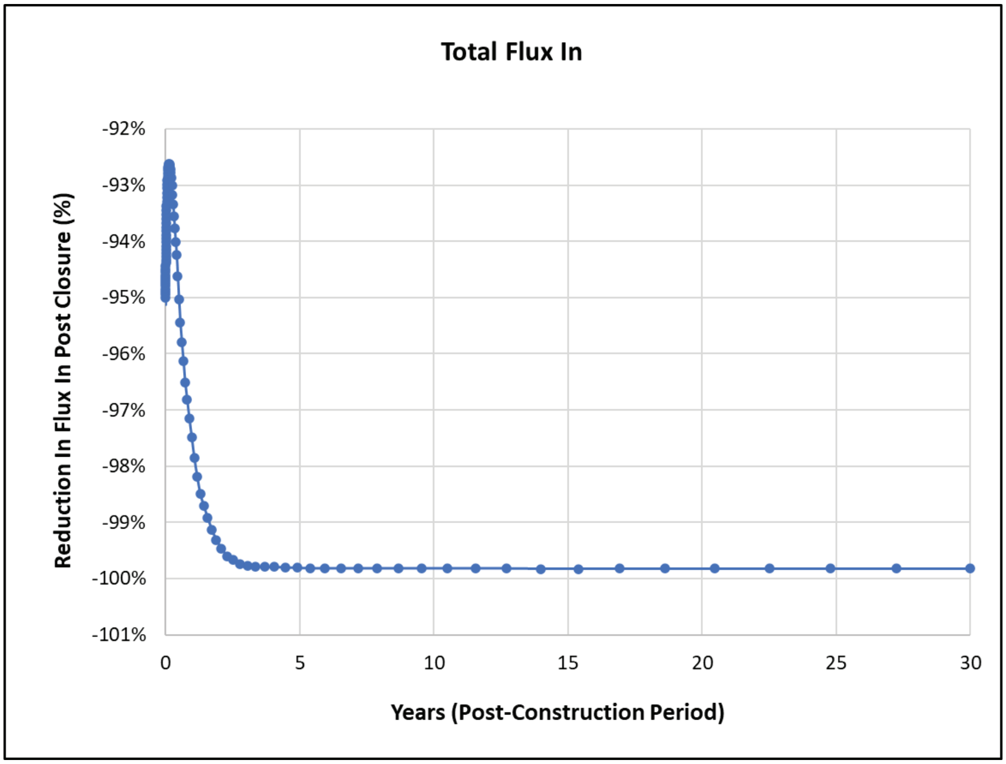
RAMBOLL

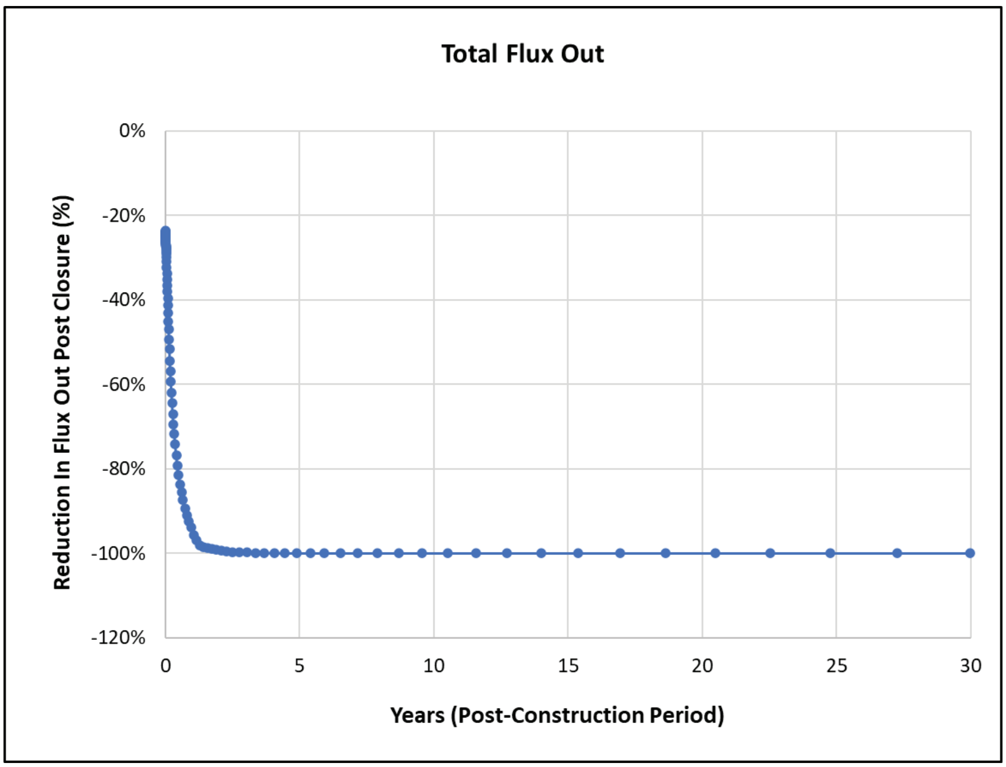


SCENARIO 1 (CIP) –
HYDRAULIC STEADY STATE REDUCTIONS IN TOTAL FLUX IN AND OUT OF CCR UNIT

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

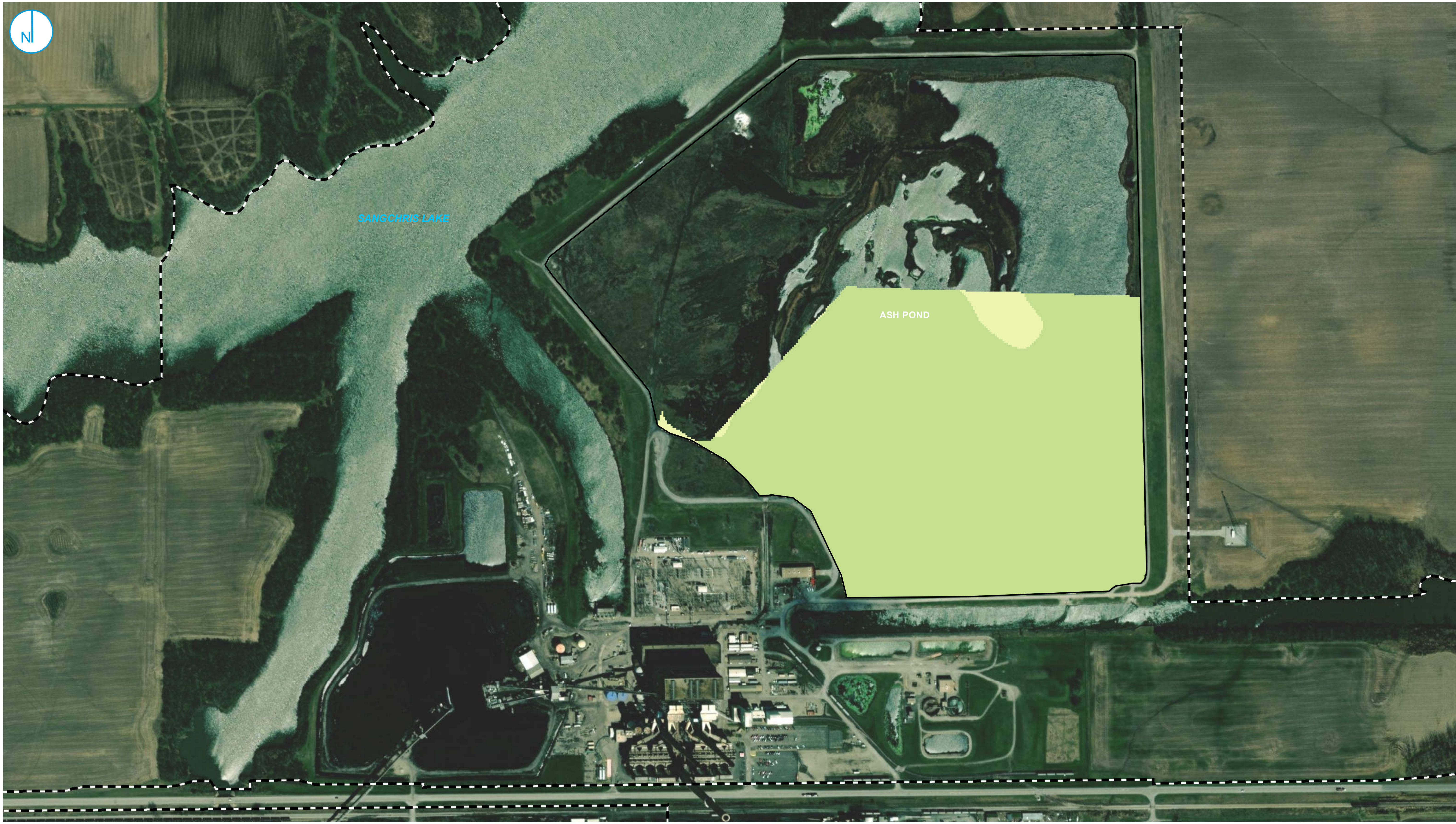




SCENARIO 1 (CIP) –
REDUCTIONS IN TOTAL FLUX IN AND OUT OF CCR UNIT

GROUNDWATER MODELING REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL



Y:\Mapping\Projects\22\2285\MXD\IntersectingGW_2022\KIN BOA Saturation CIP.mxd

PROJECT: 169000XXXX | DATED: 7/14/2022 | DESIGNER: galarnmc

SITE FEATURE

PROPERTY BOUNDARY

DIFFERENCE BETWEEN BOTTOM OF CCR AND SIMULATED GROUNDWATER SURFACE* (FEET, POSITIVE VALUES INDICATE SEPARATION)

0 - 5

5.1 - 10

0 250 500 Feet

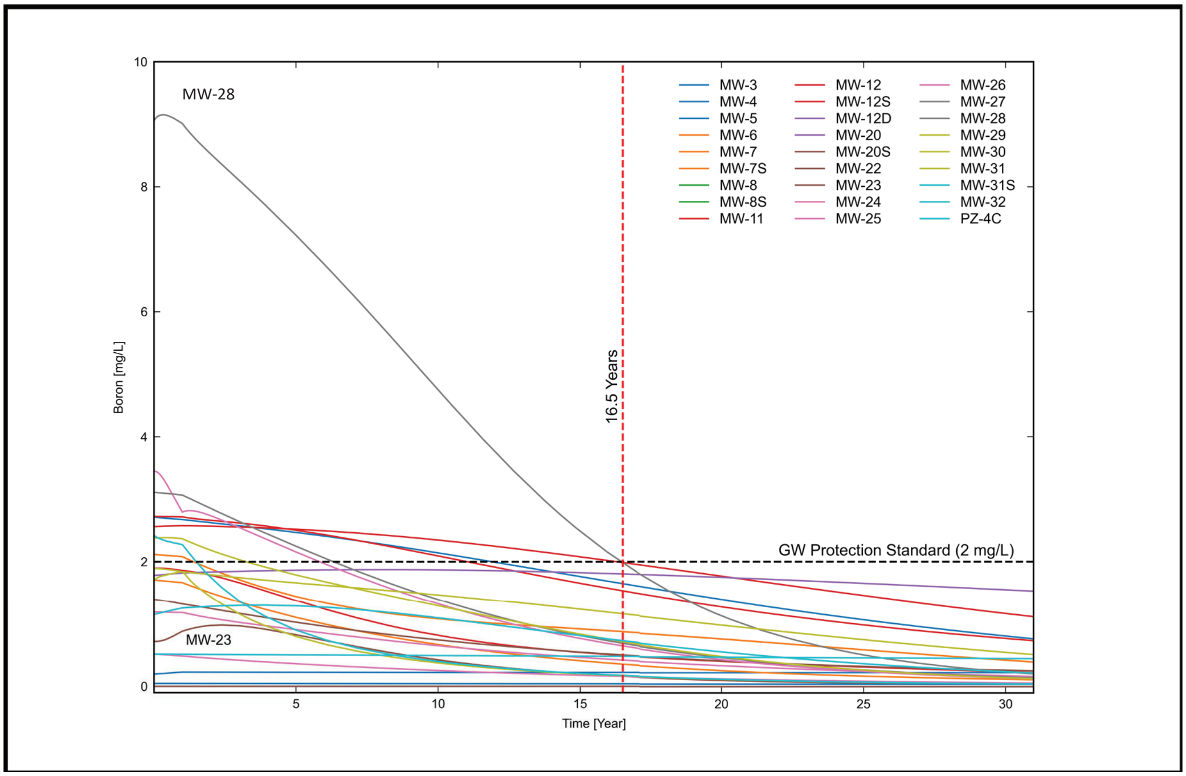
*GROUNDWATER SURFACE BASED ON SIMULATED CLOSURE IN PLACE SCENARIO AT HYDRAULIC STABILIZATION.

SIMULATED CLOSURE IN PLACE GROUNDWATER SEPARATION

KINCAID POWER PLANT
KINCAID, ILLINOIS

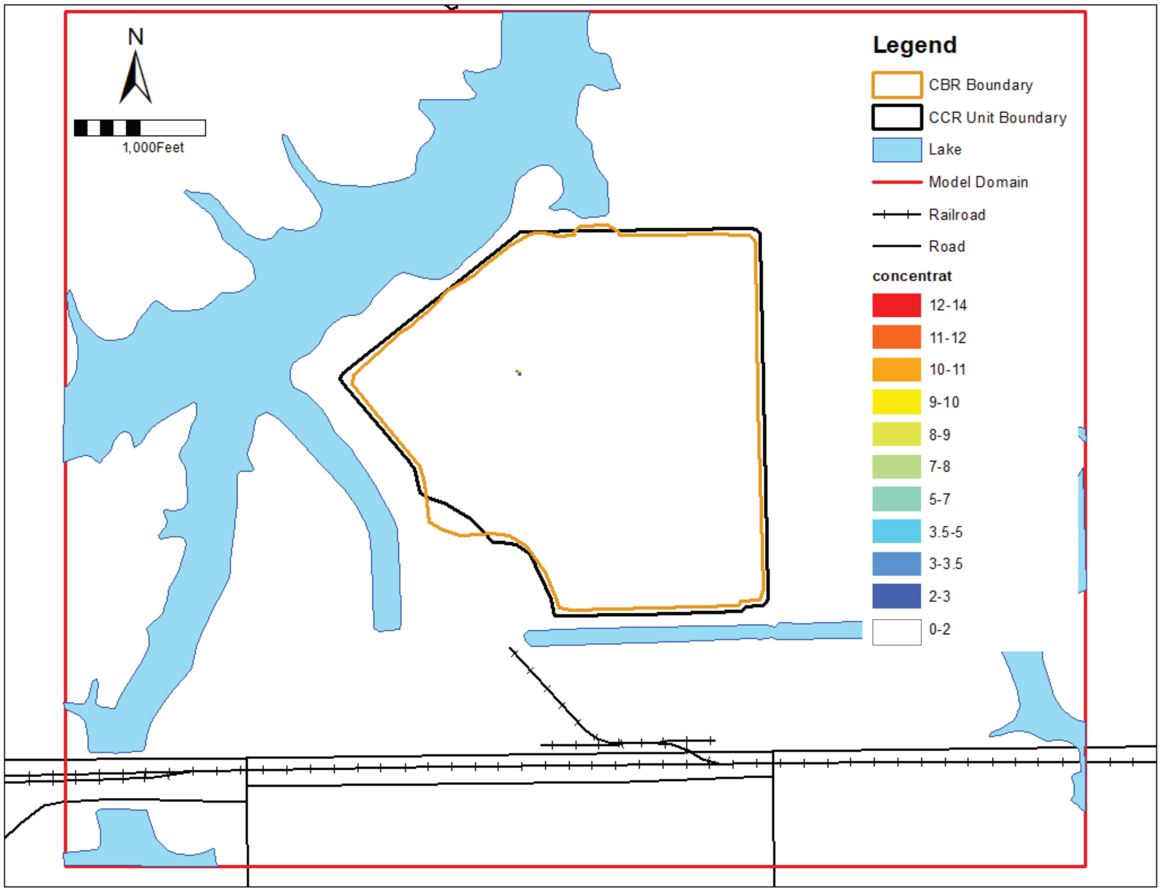
FIGURE 6-10

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.



CBR (SCENARIO 2) - MODEL PREDICTED BORON CONCENTRATION

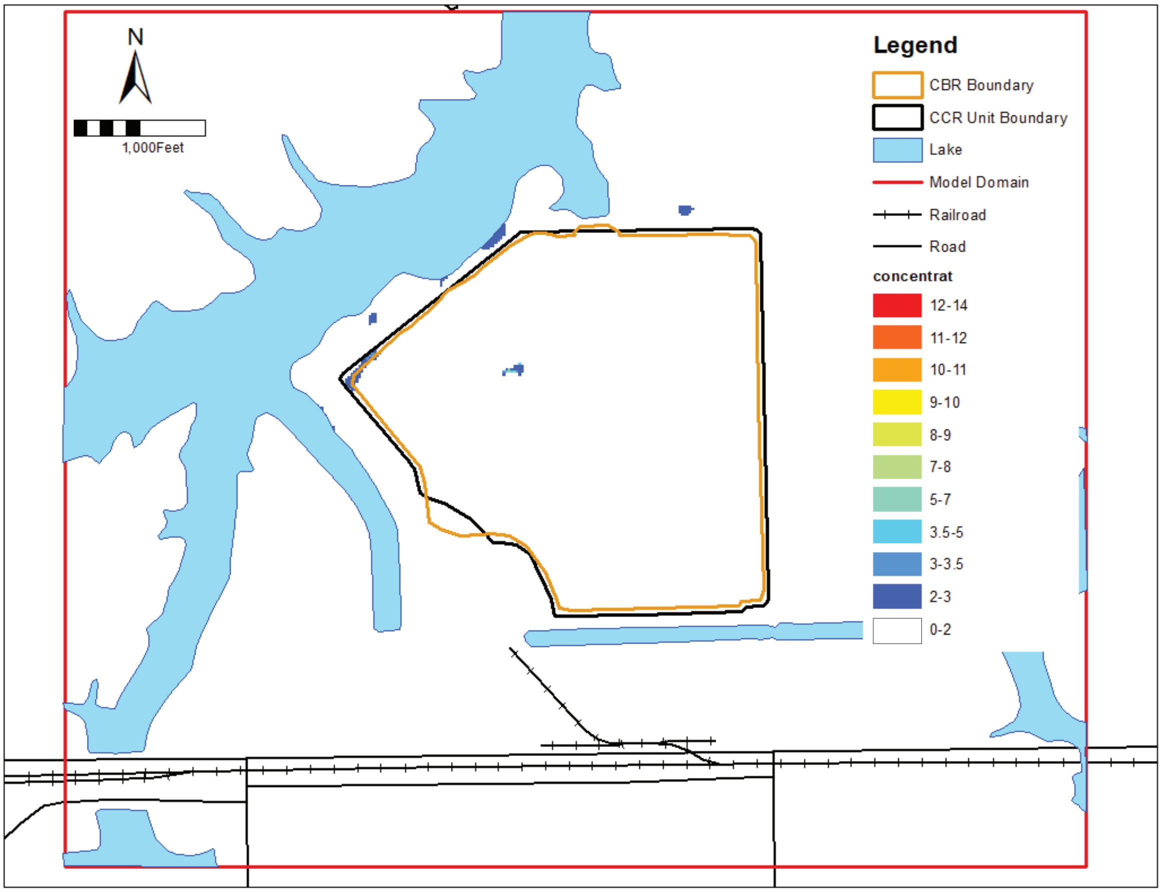
GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CBR SCENARIO LAYER 1 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

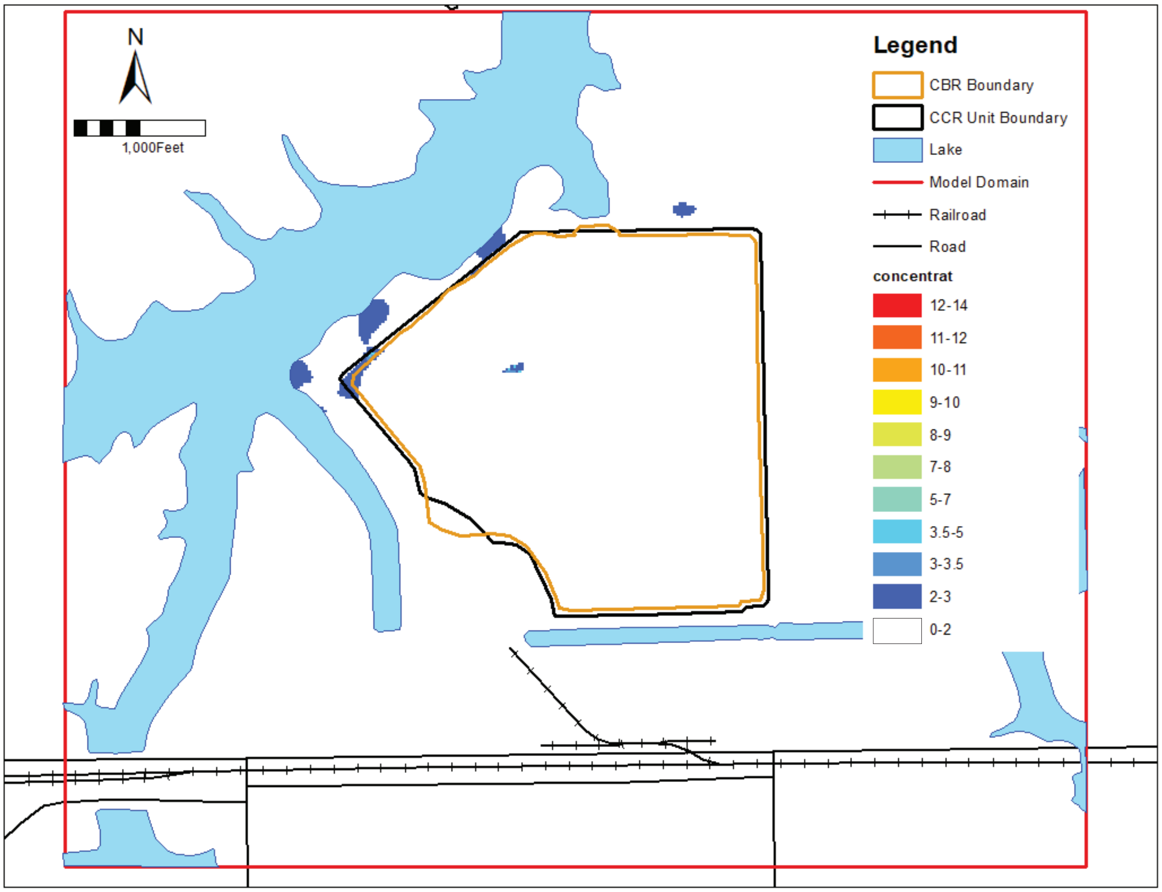
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CBR SCENARIO LAYER 2 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

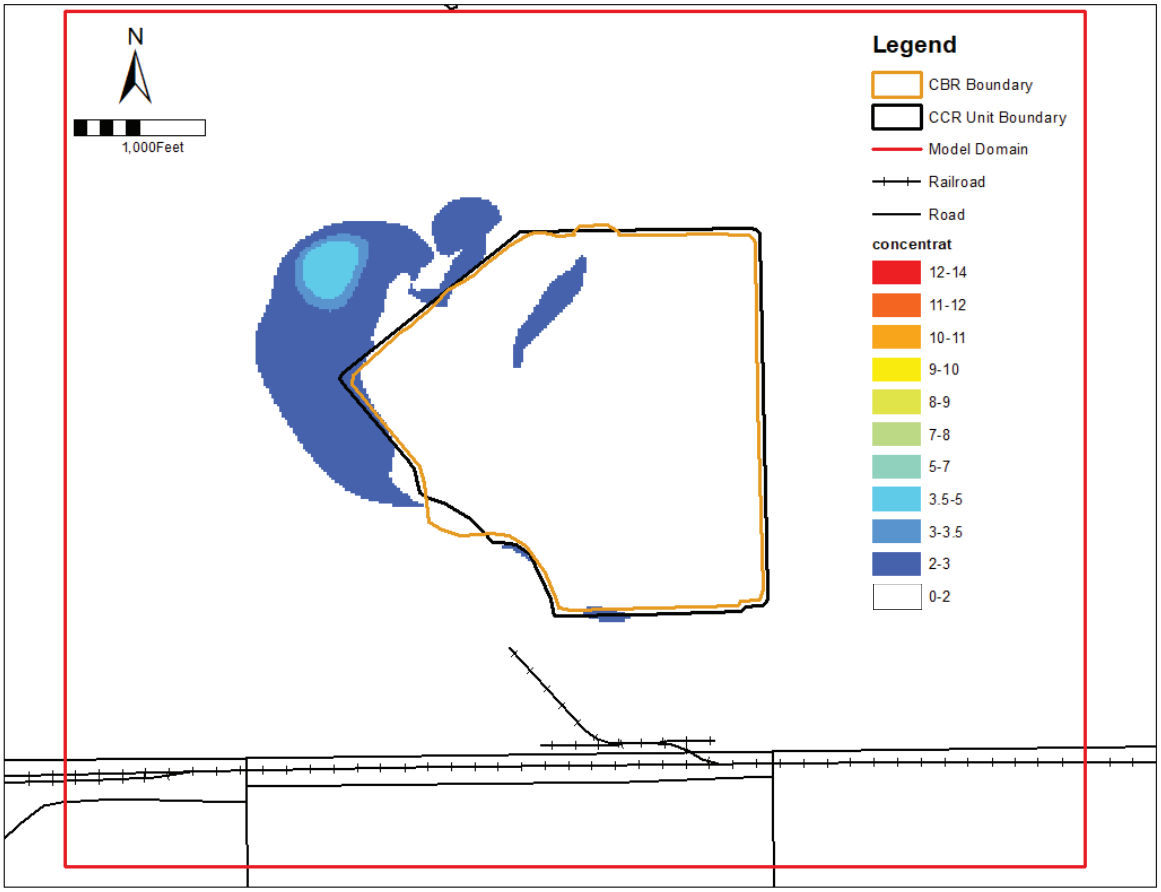
RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CBR SCENARIO LAYER 3 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL



DISTRIBUTION OF BORON CONCENTRATION (mg/L) IN CBR SCENARIO LAYER 4 (17 YEARS)

GROUNDWATER MODELING REPORT
KINCAID CCR ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL

APPENDICES

APPENDIX A
MODFLOW, MT3DMS, HELP MODEL, AND FLUX EVALUATION DATA EXPORT FILES (ELECTRONIC ONLY)

APPENDIX B
EVALUATION OF PARTITION COEFFICIENT RESULTS
(GOLDER, 2022)

TECHNICAL MEMORANDUM

DATE March 30, 2022 **Project No.** 21454831

TO David Mitchell, Stu Cravens, Vic Modeer
Kincaid Generation, LLC

CC Brian Henning - Ramboll

FROM Golder Associates USA Inc. **EMAIL Jeffrey_Ingram@golder.com**

EVALUATION OF PARTITION COEFFICIENT RESULTS, KINCAID POWER PLANT ASH POND (CCR UNIT 141), KINCAID POWER PLANT, CHRISTIAN COUNTY, ILLINOIS

1.0 INTRODUCTION

Kincaid Generation, LLC (KG) operates the Kincaid Power Plant (KPP) located in Christian County, Illinois. The Ash Pond (AP or Site), Illinois Environmental Protection Agency [IEPA] ID No. W0218140002 - 01 is a 178-acre unlined surface impoundment used to manage coal combustion residuals (CCRs) at the KPP. The AP is regulated under Part 845 *"Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments"* (State CCR Rule or Part 845) which was promulgated by the Illinois Pollution Control Board (IPCB) on April 21, 2021. WSP Golder (Golder) is assisting KG with Part 845 compliance at the Site.

KG is currently preparing a Construction Permit application for the AP as required under Section 845.220. As a part of the Construction Permit application, groundwater modeling is being conducted for known potential exceedances of groundwater protection standards (GWPS) as outlined in the Operating Permit application for the AP (Burns and McDonnell 2021). In the Operating Permit (October 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) identified potential GWPS exceedances for several compounds potentially associated with the AP, including boron and sulfate. Batch adsorption testing was performed to generate site-specific partition coefficient results for these parameters for use in the groundwater models. This Technical Memorandum summarizes the results of the batch adsorption testing.

2.0 OVERVIEW

In August 2021, Golder conducted a field investigation at the KPP which included the completion of eight (8) soil/rock borings ranging in depth from 20 to 40 feet below ground surface (ft bgs). As a part of that investigation, soil and groundwater samples were submitted to SiREM laboratories (Guelph, ON) for batch solid/liquid partitioning testing. A summary of the soil samples used for the batch testing is provided in Table 1.

Table 1: Batch Attenuation Testing Data Summary

Groundwater Sample ID	Soil Sample ID	Soil: Water Ratio
MW-12S	K-SB-02 (10.0-14.7 ft bgs)	2:1
		1:1

Groundwater Sample ID	Soil Sample ID	Soil: Water Ratio
		1:5
		1:10
		1:20
MW-28	K-SB-02 (14.7-17.5 ft bgs)	2:1
		1:1
		1:5
		1:10
		1:20

Notes:
1) ft bgs – Feet below ground surface

Site-specific partitioning coefficients were determined for constituents of interest (COIs) boron and sulfate, which were identified based on statistical evaluation of potential groundwater exceedances calculated at the Site (Burns and McDonnell 2021). Two groundwater samples (MW-12S and MW-28) and two soil samples (K-SB-02 (10.0-14.7) and K-SB-02 (14.7-17.5)) were used for batch attenuation testing at various ratios (Table 1). For each treatment, 0.1 L of groundwater was brought in contact with an amount of soil (0.003 to 0.17 kg, depending on the ratio) over a seven-day period. Each contact water/soil microcosm was amended (spiked) with meta-arsenite, boric acid, lithium chloride, and sodium sulfate to a target concentration of arsenic, boron, lithium, and sulfate, respectively (Table 2). Arsenic and lithium are not currently COIs at the Site and, therefore, were not evaluated as part of this report. However, arsenic and lithium may be revisited in the future, thus meta-arsenite and lithium chloride were included as additional amendments. After the seven-day contact period, COI concentrations were analyzed in the contact water. The control samples (i.e., groundwater samples MW-12S and MW-28) were only analyzed at the initiation of testing. The oxidation/reduction potential (redox) and pH were measured for each batch test at the beginning and end of the contact period and in the control samples.

Table 2: Microcosm amendment and target concentration for COIs

COI	Groundwater Sample	Amendment	Target Concentration (mg/L)
Arsenic	MW-12S	67.45 µL of a 2 g/L As(III) solution	0.04
	MW-28	68.67 of a 2 g/L As(III) solution	
Boron	MW-12S	17.78 mL of a 10 g/L H_3BO_3 solution	16.8
	MW-28	9.61 mL of a 10 g/L H_3BO_3 solution	
Lithium	MW-12S	2.42 mL of a 1 g/L LiCl solution	0.2

	MW-28	2.39 mL of a 1 g/L LiCl solution	
Sulfate	MW-12S	51.56 mL of a 100 g/L Na_2SO_4 solution	1,748
	MW-28	27.56 mL of a 100 g/L Na_2SO_4 solution	

Notes:

1) g/L – grams per liter
2) mL – milliliter
3) µg/L – micrograms per liter
4) mg/L – miligrams per liter
5) As(III) – arsenite
6) H_3BO_3 – boric acid
7) LiCl – lithium chloride
8) Na_2SO_4 – sodium sulfate

The results of batch attenuation testing (Tables 3 and 4) were used to calculate the following adsorption isotherms for each COI:

- Linear: $q_e = K_D * C_e$
- Langmuir: $C_e/q_e = 1/(K_L * q_m) + C_e/q_m$
- Freundlich: $\log(q_e) = \log(K_F) + (1/n)\log(C_e)$

Where

K_D, K_L, and K_F = the linear, Langmuir, and Freundlich partition coefficients, respectively (in liters per kilogram; L/kg).

q_e = concentration of the adsorbate in soil

C_e = aqueous concentration of the adsorbate

q_m = 1/slope in the linear expression of the isotherm

n = non-linearity constant

3.0 SUMMARY OF RESULTS

Figures that show the linear, Langmuir, and Freundlich isotherms for the two COIs are provided in Appendix A. The partition coefficient values for MW-12S and MW-28 are presented in Tables 5 and 6, respectively. The results of the batch adsorption testing can be summarized as follows:

- **Boron**: Calculated K_D values for MW-12S and MW-28 were 0.05 and 1.81 L/kg, respectively, K_L values -1.4E+6 and -1.5E+4 L/kg, respectively, and K_F values 112 and 27.5 L/kg, respectively. For comparison, in Strenge and Peterson (1989), partition coefficients for boron range from 0.19 to 1.3 L/kg, depending on pH conditions and the amount of sorbent (i.e. clay, organic matter, and iron and aluminum oxyhydroxide) present.
- **Sulfate**: Calculated K_D values for MW-12S and MW-28 were 0.23 and 15.5 L/kg, respectively, K_L values -454 and -750 L/kg, respectively, and K_F values 1.87 and 0.13 L/kg, respectively. In Strenge and Peterson (1989), partition coefficients for sulfate are 0.0 L/kg, regardless of pH conditions and the amount of sorbent present.

- **pH and Redox**: Generally, after the seven-day contact time, the pH of each contact water was consistent with the pH of the control samples (6.94 for MW-12S and 6.90 for MW-28, respectively), ranging from 6.93 to 6.97 across the batch tests. The redox values of the control samples after the seven-day contact time were -54 mV and 116 mV for MW-12S and MW-28, respectively. The redox value of contact water ranged from -131 to +236 mV across treatments.

4.0 REFERENCES

Burns and McDonnell, 2021. Initial Operating Permit Kincaid Power Plant Ash Pond.

Strenge, D. and Peterson, S. 1989. Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS) (No. PNL-7145). Pacific Northwest Lab., Richland, WA (USA).

5.0 CLOSING

Golder appreciates the opportunity to serve as your consultant on this project. If you have any questions concerning this technical memorandum or need additional information, please contact the undersigned.

Golder Associates USA Inc.

Jeffrey Ingram
Senior Consultant, Geologist

Pat Behling
Practice Leader

CK/JSI/PJB

Attachments Appendix A – Partition Coefficient Graphs

Table 3: Batch Attenuation Testing Results, MW-12S

Geologic Material Sample ID	Treatment	Date	Day	Replicate	Dissolved Boron	Dissolved Sulfate	pH	ORP
					mg/L	mg/L	SU	mV
	Groundwater Only Control	2/10/2022	0	MW-12S-1a	17	1,700	6.96	13
				MW-12S-2a	18	1,513	6.95	8
				Average Concentration (mg/L)	17	1,606	6.96	11
		2/17/2022	7	MW-12S-1	16	964	6.94	-59
				MW-12S-2	17	1,059	6.94	-48
				Average Concentration (mg/L)	16	1,012	6.94	-54
MW-12S K-SB-02 (10.0-14.7)	2:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 2:1-1	8.9	878	6.94	-110
				K-SB-02-(10.0-14.7) :MW-12S 2:1-2	8.0	921	6.92	-127
				Average Concentration (mg/L)	8.4	899	6.93	-119
	1:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:1-1	12	1,137	6.92	-131
				K-SB-02-(10.0-14.7) :MW-12S 1:1-2	12	1,284	7.01	--
				Average Concentration (mg/L)	12	1,211	6.97	-131
	1:5 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:5-1	16	1,268	6.95	-4
				K-SB-02-(10.0-14.7) :MW-12S 1:5-2	15	1,568	6.94	16
				Average Concentration (mg/L)	16	1,418	6.95	6
	1:10 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:10-1	16	1,216	6.93	53
				K-SB-02-(10.0-14.7) :MW-12S 1:10-2	17	1,527	6.95	22
				Average Concentration (mg/L)	17	1,372	6.94	38
	1:20 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:20-1	19	981	6.96	42
				K-SB-02-(10.0-14.7) :MW-12S 1:20-2	18	1,381	6.95	53
				Average Concentration (mg/L)	19	1,181	6.96	48

Notes:
1) mg/L- Miligrams per liter
2) SU - Standard Units
3) mV - milivolts
4) ORP - Oxidation Reduction Potential
5) ND - non-detect

Table 4: Batch Attenuation Testing Results, MW-28

Geologic Material Sample ID	Treatment	Date	Day	Replicate	Dissolved Boron	Dissolved Sulfate	pH	ORP
					mg/L	mg/L	SU	mV
	Groundwater Only Control	2/10/2022	0	MW-28-1a	18	1,515	6.92	-3
				MW-28-2a	17	1,582	6.93	3
				Average Concentration (mg/L)	18	1,549	6.93	0
		2/17/2022	7	MW-28-1	16	1,397	6.88	183
				MW-28-2	17	624	6.91	48
				Average Concentration (mg/L)	17	1,010	6.90	116
MW-12S K-SB-02 (14.7-17.5)	2:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 2:1-1	8.5	546	6.94	239
				K-SB-02-(14.7-17.5):MW-28 2:1-2	9.2	<1.4	6.92	232
				Average Concentration (mg/L)	8.8	546	6.93	236
	1:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:1-1	12	761	6.96	139
				K-SB-02-(14.7-17.5):MW-28 1:1-2	12	1,026	6.95	89
				Average Concentration (mg/L)	12	893	6.96	114
	1:5 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:5-1	17	1,023	6.99	106
				K-SB-02-(14.7-17.5):MW-28 1:5-2	16	999	6.95	107
				Average Concentration (mg/L)	16	1,011	6.97	107
	1:10 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:10-1	16	1,182	6.94	70
				K-SB-02-(14.7-17.5):MW-28 1:10-2	16	949	6.95	79
				Average Concentration (mg/L)	16	1,066	6.95	75
	1:20 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:20-1	17	1,112	6.94	73
				K-SB-02-(14.7-17.5):MW-28 1:20-2	17	915	6.93	41
				Average Concentration (mg/L)	17	1,013	6.94	57

Notes:
1) mg/L- Miligrams per liter
2) SU - Standard Units
3) mV - milivolts
4) ORP - Oxidation Reduction Potential
5) ND - non-detect

Table 5: Partition Coefficient Results, MW-12S

Analyte	Isotherm	Variable	With Soil Mass
Boron	Raw Data R^2		0.01
	Linear K_D (L/kg)		0.05
	Langmuir	R^2	0.63
		q_m (mg/g)	0.007
		K_L (L/kg)	-1.43E+06
	Freundlich	R^2	0.01
		1/n	0.049
		K_F (L/kg)	111.65
Sulfate	Raw Data R^2		0.00
	Linear K_D (L/kg)		0.23
	Langmuir	R^2	0.08
		q_m (mg/g)	-0.883
		K_L (L/kg)	-4.54E+02
	Freundlich	R^2	0.08
		1/n	2.111
		K_F (L/kg)	1.87

Note(s):

K_D: linear partition coefficient

K_L: Langmuir partition coefficient

K_F: Freundlich partition coefficient

q_m: 1/slope in the linear expression of the isotherm

n: non-linearity constant

Table 6: Partition Coefficient Results, MW-28

Analyte	Isotherm	Variable	With Soil Mass
Boron	Raw Data R^2		0.41
	Linear K_D (L/kg)		1.81
	Langmuir	R^2	0.02
		q_m (mg/g)	-0.043
		K_L (L/kg)	-1.54E+04
	Freundlich	R^2	0.43
		1/n	1.495
		K_F (L/kg)	27.53
Sulfate	Raw Data R^2		0.26
	Linear K_D (L/kg)		15.50
	Langmuir	R^2	0.34
		q_m (mg/g)	-1.013
		K_L (L/kg)	-7.50E+02
	Freundlich	R^2	0.50
		1/n	3.198
		K_F (L/kg)	0.13

Note(s):

K_D: linear partition coefficient

K_L: Langmuir partition coefficient

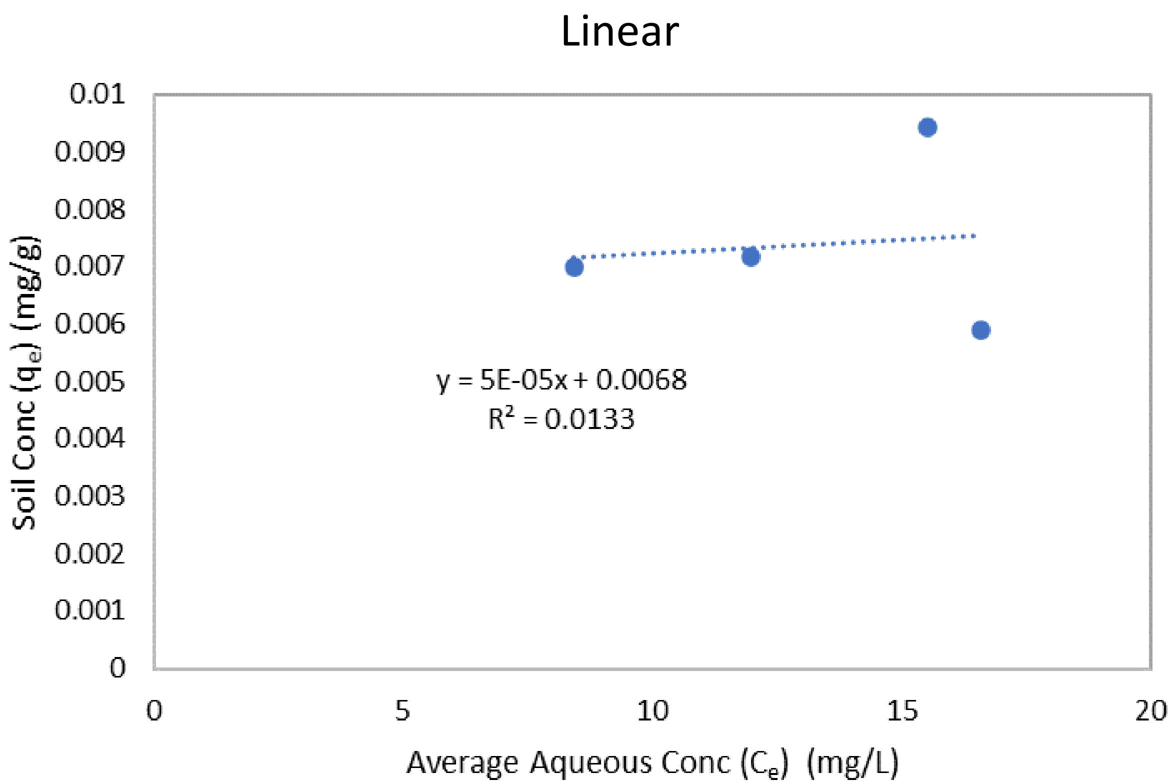
K_F: Freundlich partition coefficient

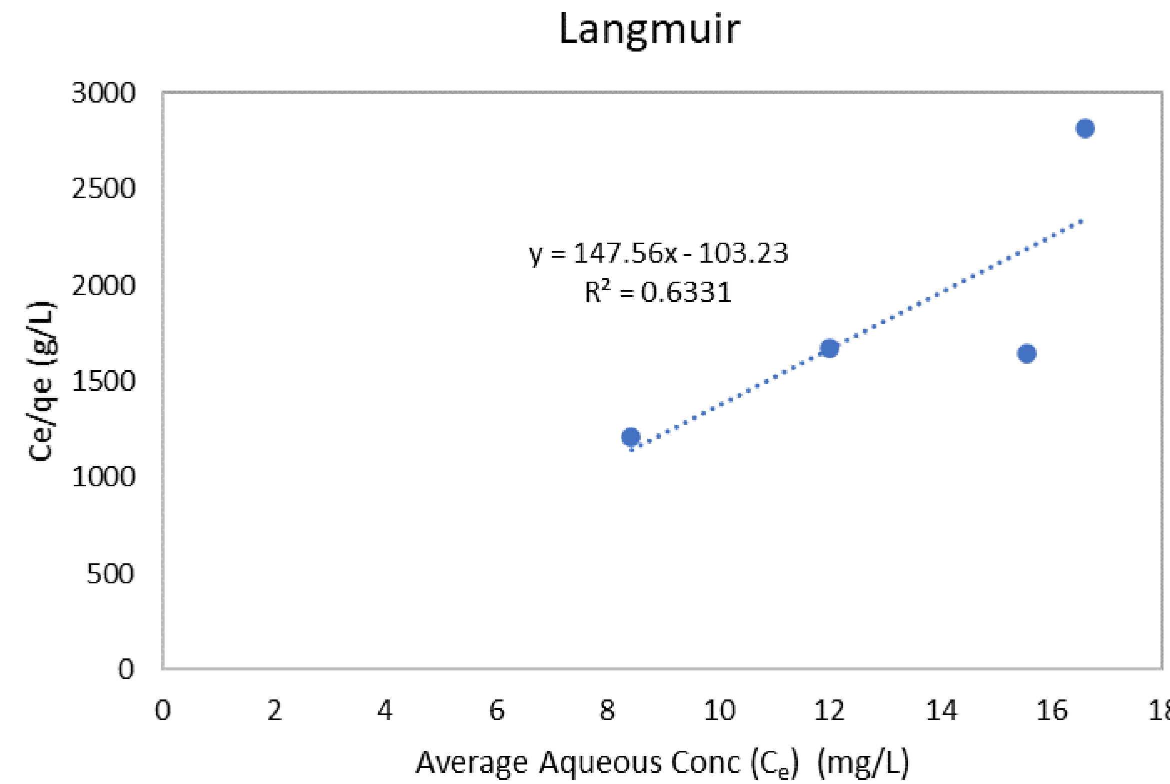
q_m: 1/slope in the linear expression of the isotherm

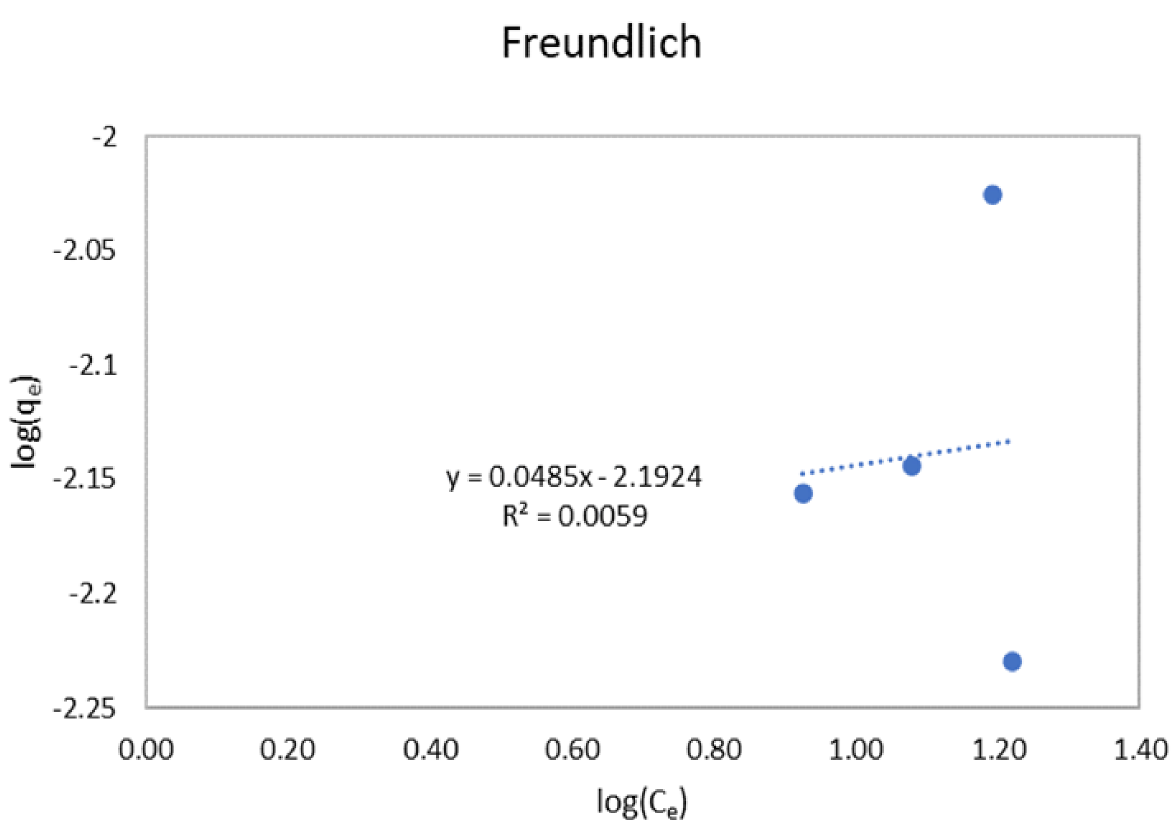
n: non-linearity constant

APPENDIX A

Partition Coefficient Graphs







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

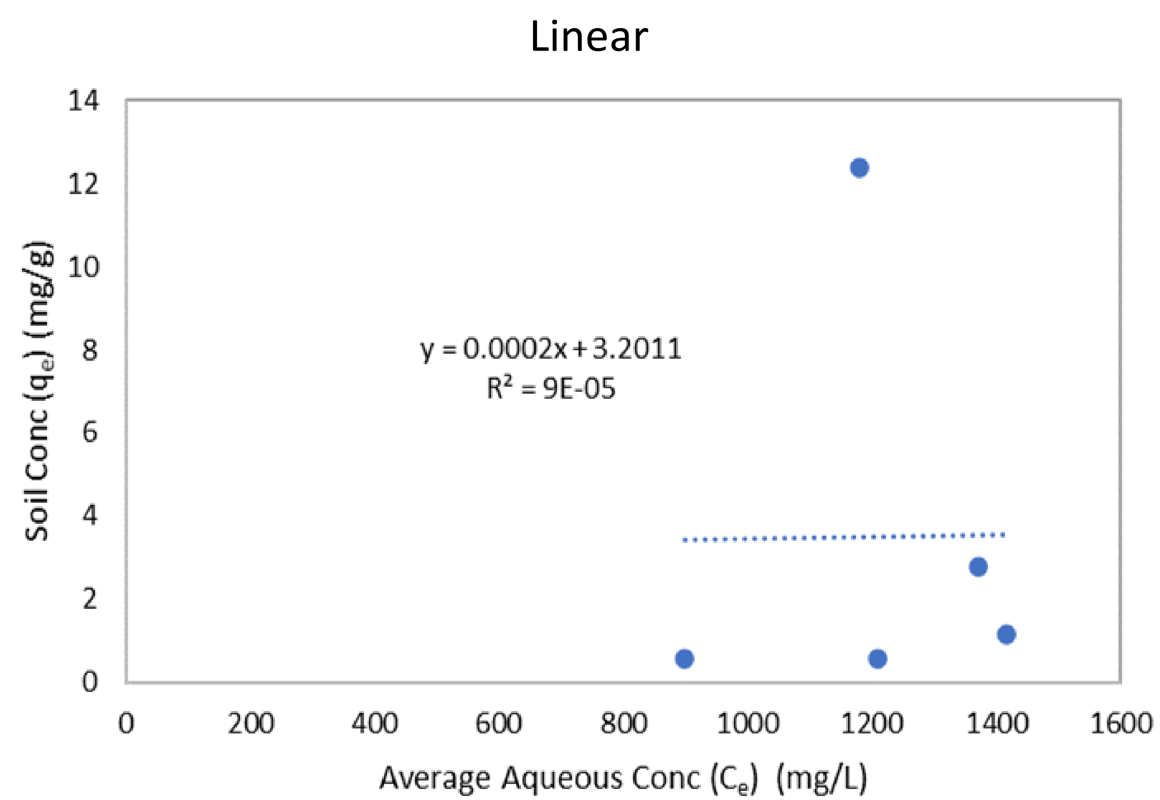
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

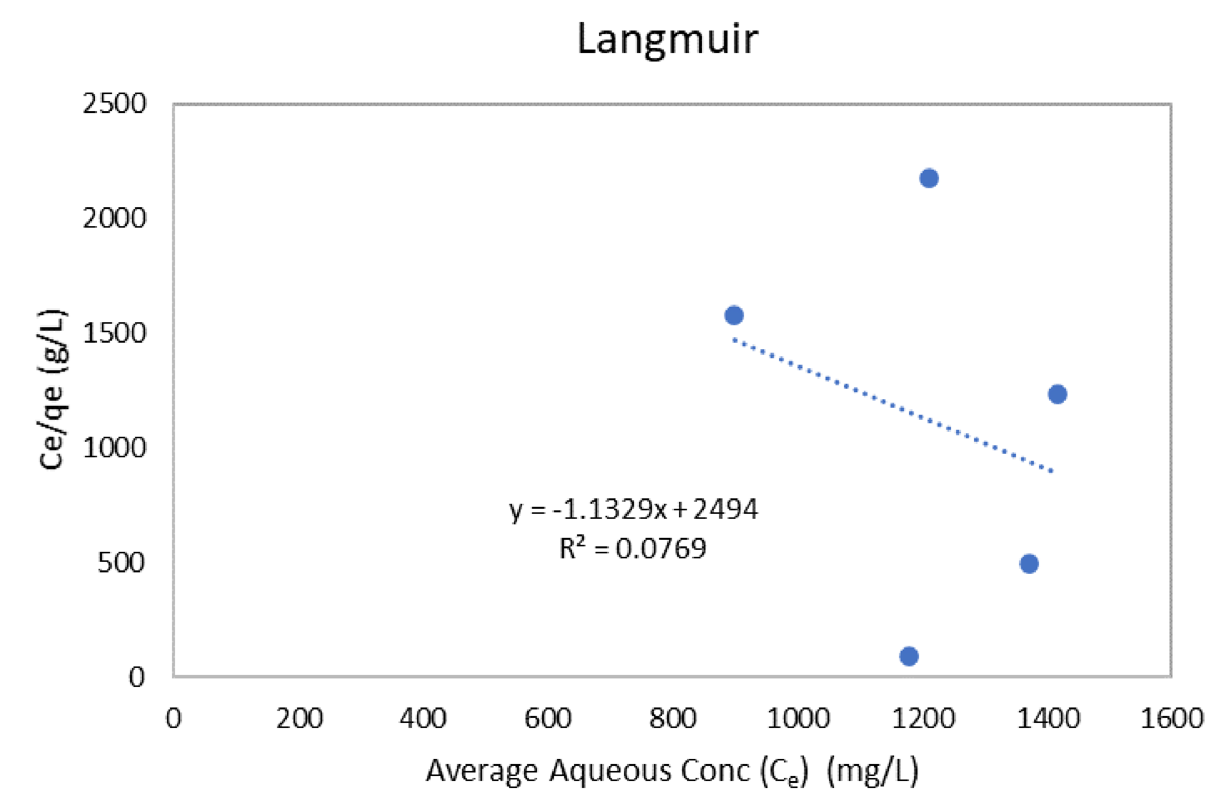
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

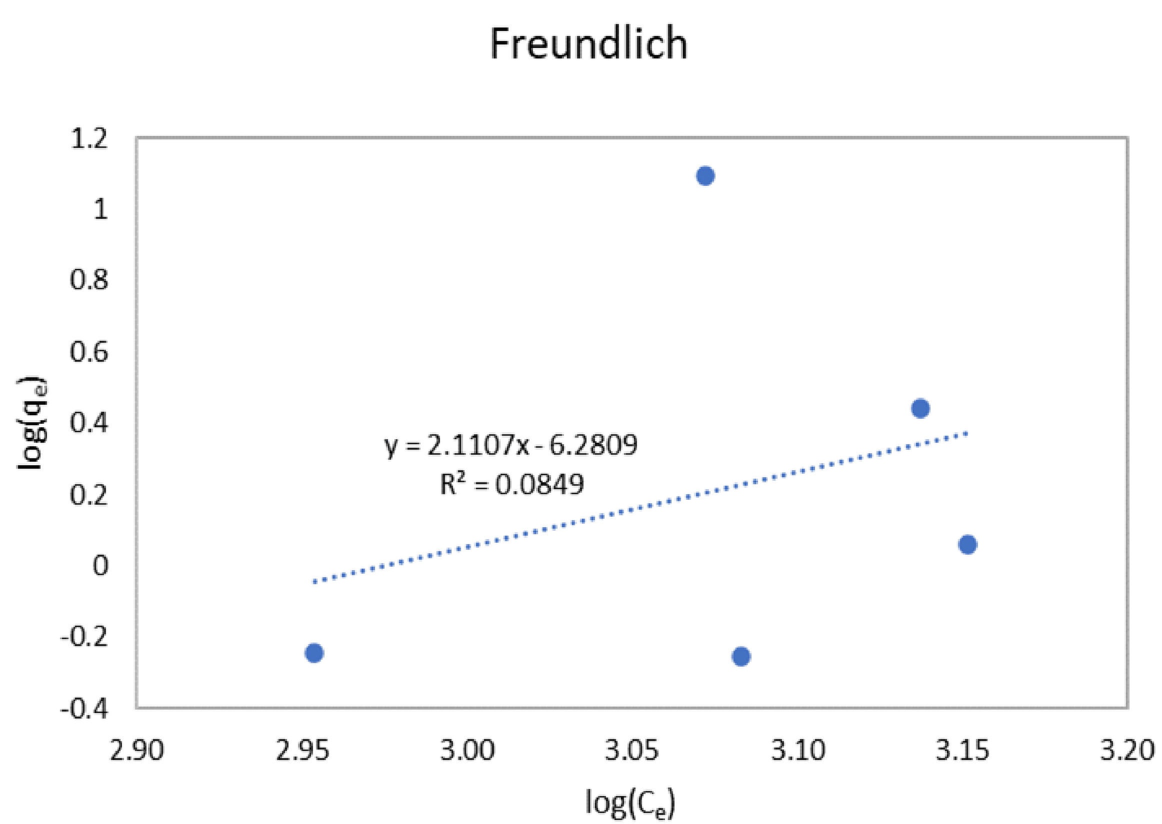
CONSULTANT
WSP GOLDER

TITLE
MW-12S BORON PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-1







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

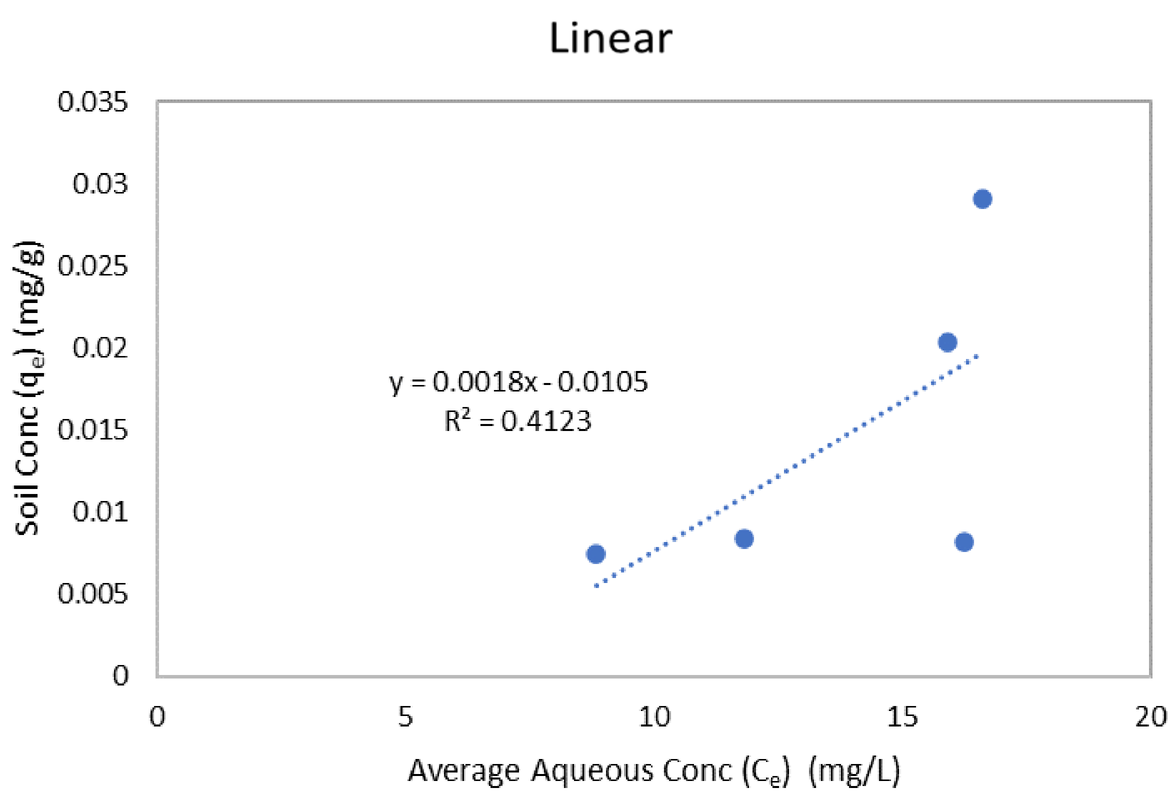
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

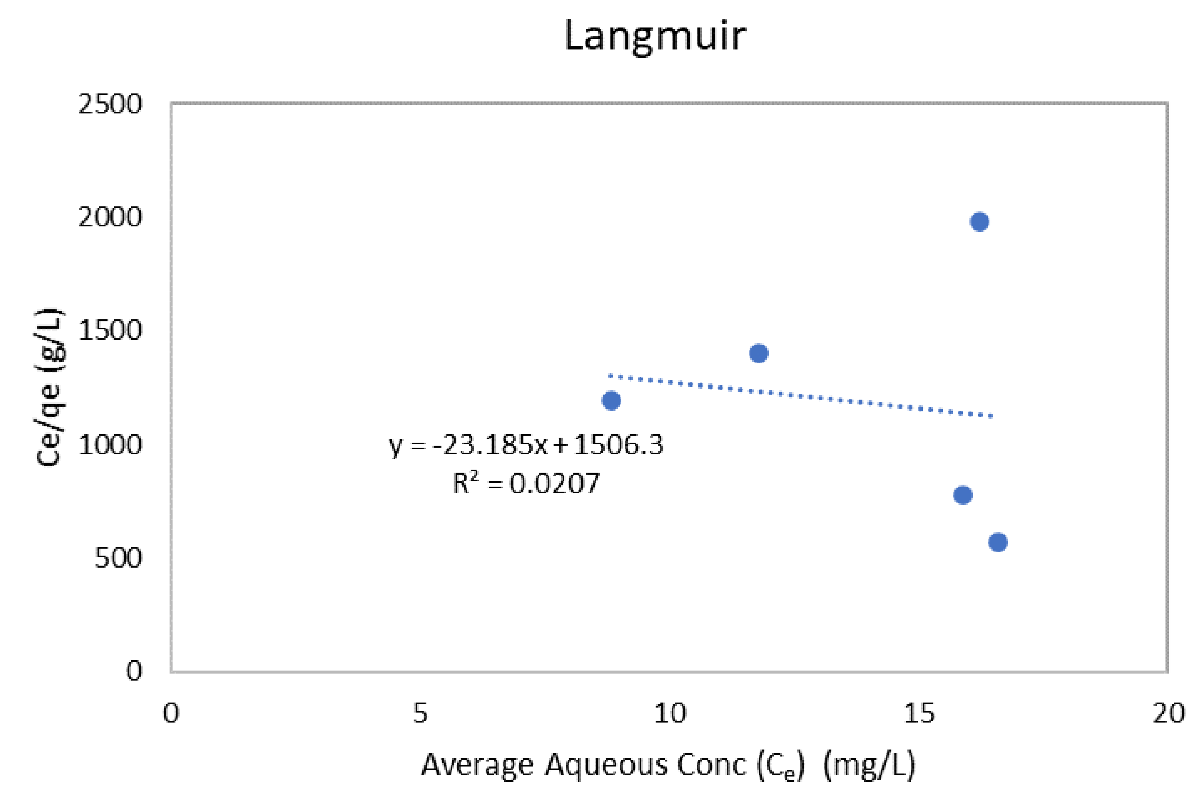
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

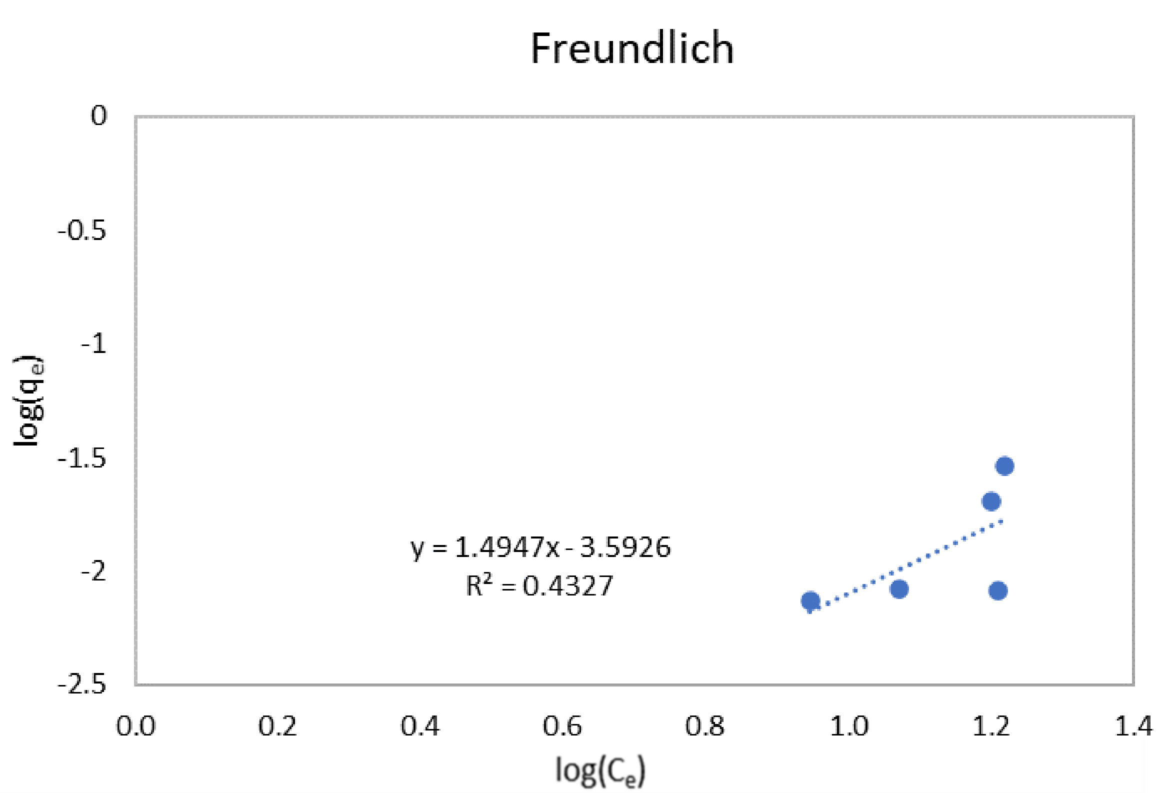
CONSULTANT
WSP GOLDER

TITLE
MW-12S SULFATE PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-2







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

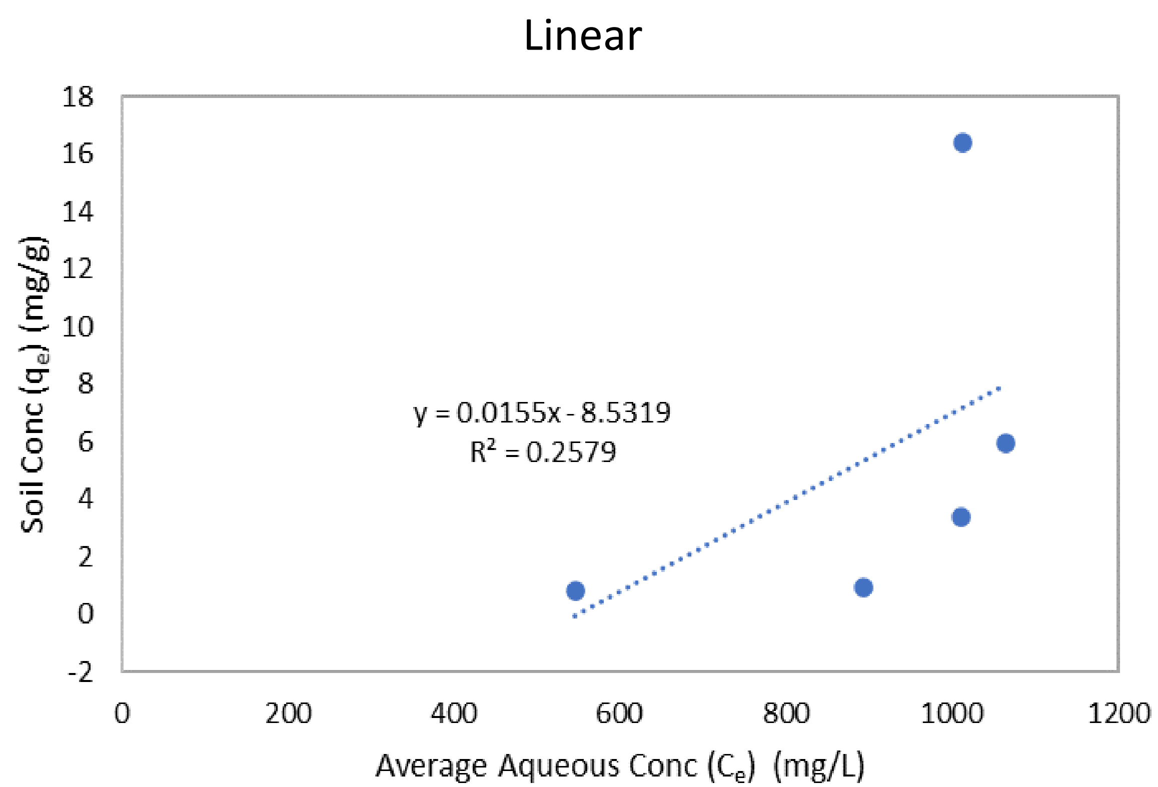
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

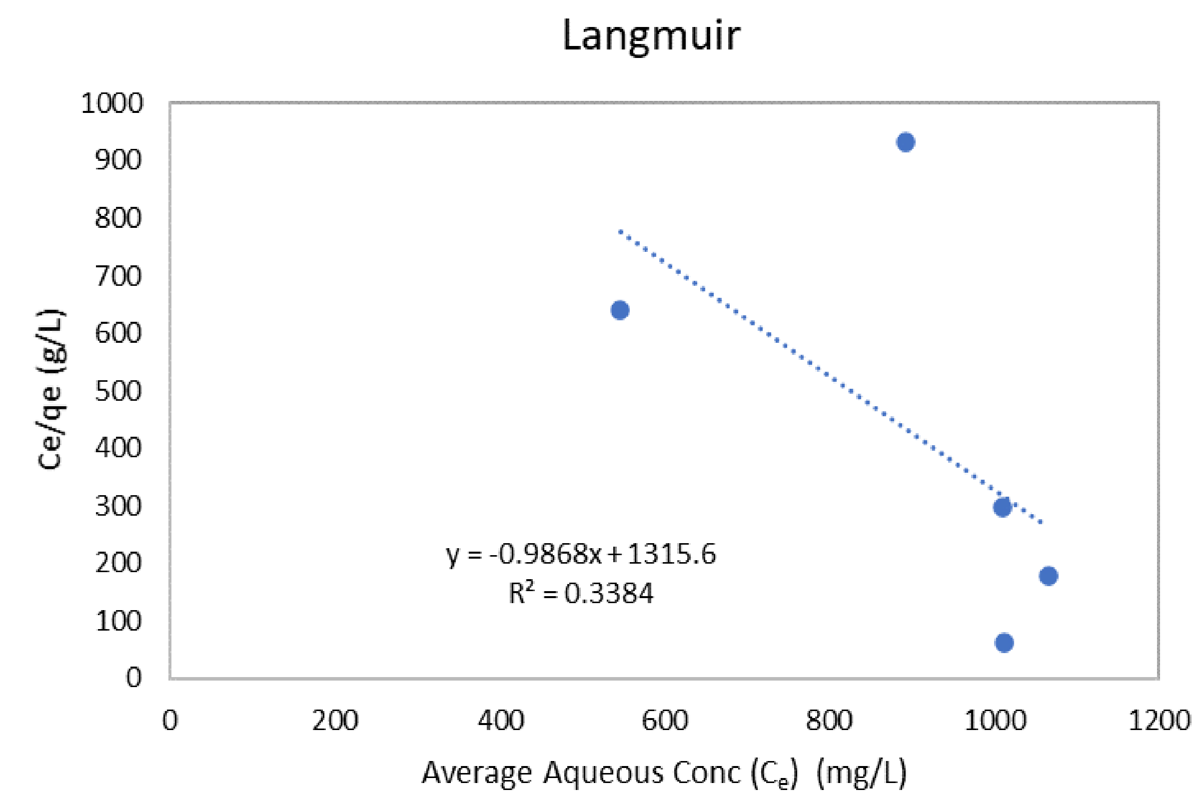
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

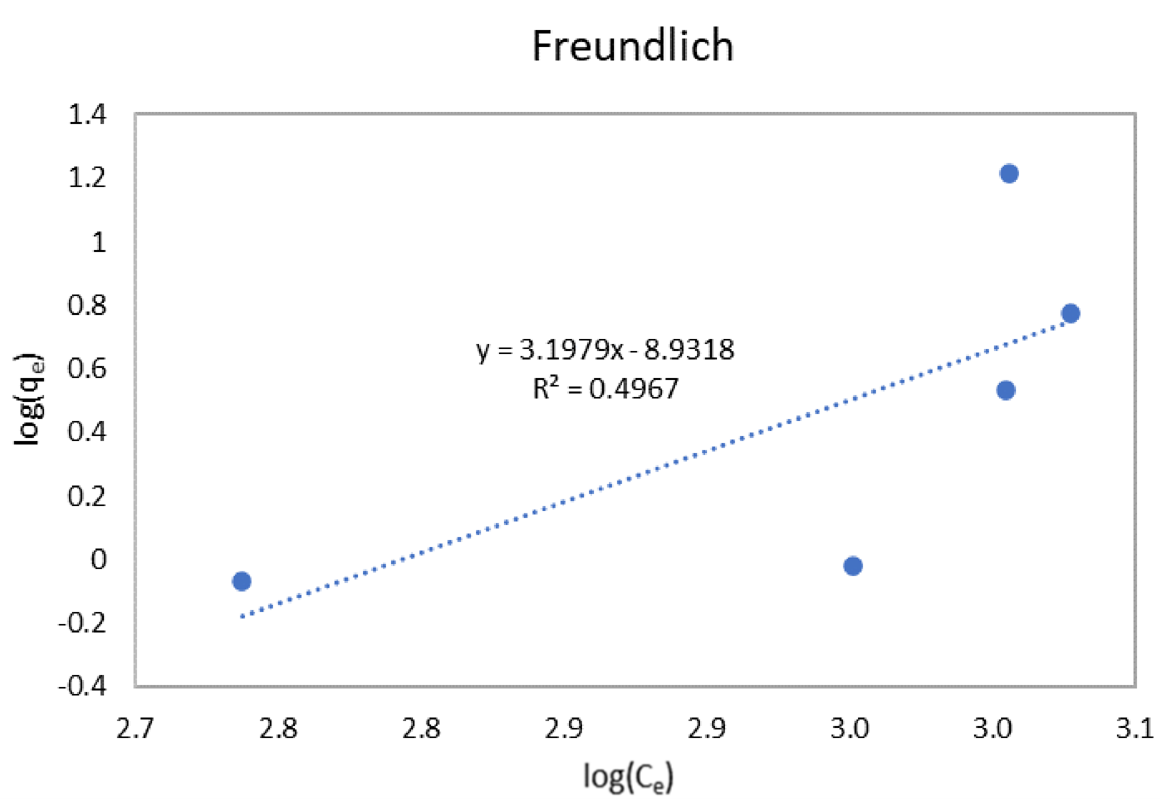
CONSULTANT
WSP GOLDER

TITLE
MW-28 BORON PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-3







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

CONSULTANT
WSP GOLDER

TITLE
MW-28 SULFATE PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-4

APPENDIX C
HELP MODEL OUTPUT FILES

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: KIN AP CBR **Simulated On:** 5/2/2022 12:26

Layer 1
Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	30	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.35	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2
Type 1 - Vertical Percolation Layer
Silty Clay
Material Texture Number 43

Thickness	=	72	inches
Porosity	=	0.479	vol/vol
Field Capacity	=	0.371	vol/vol
Wilting Point	=	0.251	vol/vol
Initial Soil Water Content	=	0.473	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-07	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	85.7	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	172	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	5.946	inches
Upper Limit of Evaporative Storage	=	8.478	inches
Lower Limit of Evaporative Storage	=	3.78	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	44.555	inches

Total Initial Water	=	44.555	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.59	Degrees
Maximum Leaf Area Index	=	4.5	
Start of Growing Season (Julian Date)	=	102	days
End of Growing Season (Julian Date)	=	292	days
Average Wind Speed	=	10	mph
Average 1st Quarter Relative Humidity	=	72	%
Average 2nd Quarter Relative Humidity	=	66	%
Average 3rd Quarter Relative Humidity	=	73	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Kincaid, Illinois

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
2.696568	2.105836	2.602577	3.411672	4.852763	3.801581
3.335953	3.024381	2.885088	4.052491	3.627085	2.799647

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
34.7	35.6	45.8	59.9	73	79.3
83.1	80.3	71.1	62	47.6	36.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Average Annual Totals Summary

Title: KIN AP CBR
Simulated on: 5/2/2022 12:27

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	39.20	[3.42]	24,472,191.2	100.00
Runoff	3.101	[1.481]	1,936,416.9	7.91
Evapotranspiration	30.236	[3.334]	18,877,997.4	77.14
Subprofile1				
Percolation/leakage through Layer 2	5.834288	[1.888298]	3,642,696.1	14.89
Water storage				
Change in water storage	0.0242	[1.1169]	15,080.9	0.06

* Note: Average inches are converted to volume based on the user-specified area.

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title:	KIN AP CIP Rem	**Simulated On:**	5/2/2022 12:49

Layer 1
Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	30	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.3511	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2
Type 1 - Vertical Percolation Layer
Silty Clay
Material Texture Number 43

Thickness	=	72	inches
Porosity	=	0.479	vol/vol
Field Capacity	=	0.371	vol/vol
Wilting Point	=	0.251	vol/vol
Initial Soil Water Content	=	0.4712	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-07	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	85.9	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	88	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	5.947	inches
Upper Limit of Evaporative Storage	=	8.478	inches
Lower Limit of Evaporative Storage	=	3.78	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	44.455	inches

Total Initial Water	=	44.455	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.59	Degrees
Maximum Leaf Area Index	=	4.5	
Start of Growing Season (Julian Date)	=	102	days
End of Growing Season (Julian Date)	=	292	days
Average Wind Speed	=	10	mph
Average 1st Quarter Relative Humidity	=	72	%
Average 2nd Quarter Relative Humidity	=	66	%
Average 3rd Quarter Relative Humidity	=	73	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Kincaid, Illinois

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
2.696568	2.105836	2.602577	3.411672	4.852763	3.801581
3.335953	3.024381	2.885088	4.052491	3.627085	2.799647

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
34.7	35.6	45.8	59.9	73	79.3
83.1	80.3	71.1	62	47.6	36.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Average Annual Totals Summary

Title: KIN AP CIP Rem
Simulated on: 5/2/2022 12:50

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	39.20	[3.42]	12,520,656.0	100.00
Runoff	3.130	[1.479]	999,968.8	7.99
Evapotranspiration	30.223	[3.318]	9,654,351.8	77.11
Subprofile1				
Percolation/leakage through Layer 2	5.815203	[1.893835]	1,857,608.5	14.84
Water storage				
Change in water storage	0.0273	[1.1202]	8,726.8	0.07

* Note: Average inches are converted to volume based on the user-specified area.

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: KIN AP CIP Cons **Simulated On:** 5/2/2022 13:27

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	6	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.4116	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer
Sandy Silty Clay
Material Texture Number 43

Thickness	=	18	inches
Porosity	=	0.4	vol/vol
Field Capacity	=	0.35	vol/vol
Wilting Point	=	0.3	vol/vol
Initial Soil Water Content	=	0.4	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05	cm/sec

Layer 3

Type 2 - Lateral Drainage Layer
10 oz Nonwoven Geotextile
Material Texture Number 123

Thickness	=	0.11	inches
Porosity	=	0.85	vol/vol
Field Capacity	=	0.01	vol/vol
Wilting Point	=	0.005	vol/vol
Initial Soil Water Content	=	0.85	vol/vol
Effective Sat. Hyd. Conductivity	=	3.00E-01	cm/sec
Slope	=	2.5	%
Drainage Length	=	800	ft

Layer 4

Type 4 - Flexible Membrane Liner
LDPE Membrane
Material Texture Number 36

Thickness	=	0.04	inches
Effective Sat. Hyd. Conductivity	=	4.00E-13	cm/sec
FML Pinhole Density	=	1	Holes/Acre
FML Installation Defects	=	1	Holes/Acre
FML Placement Quality	=	3	Good

Layer 5

Type 1 - Vertical Percolation Layer (Waste)
Electric Plant Coal Bottom Ash
Material Texture Number 83

Thickness	=	372	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.0791	vol/vol
Effective Sat. Hyd. Conductivity	=	1.40E-03	cm/sec

Layer 6

Type 1 - Vertical Percolation Layer
Silty CLay
Material Texture Number 44

Thickness	=	84	inches
Porosity	=	0.479	vol/vol
Field Capacity	=	0.371	vol/vol
Wilting Point	=	0.251	vol/vol
Initial Soil Water Content	=	0.371	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-07	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.2	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	84	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	7.27	inches
Upper Limit of Evaporative Storage	=	7.626	inches
Lower Limit of Evaporative Storage	=	4.86	inches
Initial Snow Water	=	0	inches

Initial Water in Layer Materials	=	70.336	inches
Total Initial Water	=	70.336	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.59	Degrees
Maximum Leaf Area Index	=	4.5	
Start of Growing Season (Julian Date)	=	102	days
End of Growing Season (Julian Date)	=	292	days
Average Wind Speed	=	10	mph
Average 1st Quarter Relative Humidity	=	72	%
Average 2nd Quarter Relative Humidity	=	66	%
Average 3rd Quarter Relative Humidity	=	73	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Kincaid, Illinois

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
2.696568	2.105836	2.602577	3.411672	4.852763	3.801581
3.335953	3.024381	2.885088	4.052491	3.627085	2.799647

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
34.7	35.6	45.8	59.9	73	79.3
83.1	80.3	71.1	62	47.6	36.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Average Annual Totals Summary

Title: KIN AP CIP Cons

Simulated on: 5/2/2022 13:28

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	39.20	[3.42]	11,951,535.3	100.00
Runoff	6.862	[2.069]	2,092,482.9	17.51
Evapotranspiration	29.792	[3.16]	9,084,143.3	76.01
Subprofile1				
Lateral drainage collected from Layer 3	1.6178	[0.1841]	493,301.7	4.13
Percolation/leakage through Layer 4	0.916182	[0.203854]	279,362.3	2.34
Average Head on Top of Layer 4	7.6738	[1.8164]	---	---
Subprofile2				
Percolation/leakage through Layer 6	0.004092	[0.002049]	1,247.6	0.01
Water storage				
Change in water storage	0.9195	[0.7973]	280,359.8	2.35

* Note: Average inches are converted to volume based on the user-specified area.

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: KIN AP Default **Simulated On:** 6/27/2022 17:07

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	6	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.4116	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer
Sandy Silty Clay
Material Texture Number 43

Thickness	=	18	inches
Porosity	=	0.4	vol/vol
Field Capacity	=	0.35	vol/vol
Wilting Point	=	0.3	vol/vol
Initial Soil Water Content	=	0.4	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05	cm/sec

Layer 3

Type 2 - Lateral Drainage Layer
10 oz Nonwoven Geotextile
Material Texture Number 123

Thickness	=	0.11	inches
Porosity	=	0.85	vol/vol
Field Capacity	=	0.01	vol/vol
Wilting Point	=	0.005	vol/vol
Initial Soil Water Content	=	0.85	vol/vol
Effective Sat. Hyd. Conductivity	=	3.00E-01	cm/sec
Slope	=	2.5	%
Drainage Length	=	800	ft

Layer 4

Type 4 - Flexible Membrane Liner
LDPE Membrane
Material Texture Number 36

Thickness	=	0.04	inches
Effective Sat. Hyd. Conductivity	=	4.00E-13	cm/sec
FML Pinhole Density	=	1	Holes/Acre
FML Installation Defects	=	1	Holes/Acre
FML Placement Quality	=	3	Good

Layer 5

Type 1 - Vertical Percolation Layer (Waste)
Electric Plant Coal Bottom Ash
Material Texture Number 83

Thickness	=	372	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.0791	vol/vol
Effective Sat. Hyd. Conductivity	=	1.40E-03	cm/sec

Layer 6

Type 1 - Vertical Percolation Layer
Silty CLay
Material Texture Number 44

Thickness	=	84	inches
Porosity	=	0.479	vol/vol
Field Capacity	=	0.371	vol/vol
Wilting Point	=	0.251	vol/vol
Initial Soil Water Content	=	0.371	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-07	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.2	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	84	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	7.27	inches
Upper Limit of Evaporative Storage	=	7.626	inches
Lower Limit of Evaporative Storage	=	4.86	inches
Initial Snow Water	=	0	inches

Initial Water in Layer Materials	=	70.336	inches
Total Initial Water	=	70.336	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.59	Degrees
Maximum Leaf Area Index	=	4.5	
Start of Growing Season (Julian Date)	=	102	days
End of Growing Season (Julian Date)	=	292	days
Average Wind Speed	=	10	mph
Average 1st Quarter Relative Humidity	=	72	%
Average 2nd Quarter Relative Humidity	=	66	%
Average 3rd Quarter Relative Humidity	=	73	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Kincaid, Illinois

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
2.696568	2.105836	2.602577	3.411672	4.852763	3.801581
3.335953	3.024381	2.885088	4.052491	3.627085	2.799647

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
34.7	35.6	45.8	59.9	73	79.3
83.1	80.3	71.1	62	47.6	36.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Average Annual Totals Summary

Title: KIN AP Default
Simulated on: 6/27/2022 17:09

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	39.20	[3.42]	11,951,535.3	100.00
Runoff	6.862	[2.069]	2,092,482.9	17.51
Evapotranspiration	29.792	[3.16]	9,084,143.3	76.01
Subprofile1				
Lateral drainage collected from Layer 3	1.6178	[0.1841]	493,301.7	4.13
Percolation/leakage through Layer 4	0.916182	[0.203854]	279,362.3	2.34
Average Head on Top of Layer 4	7.6738	[1.8164]	---	---
Subprofile2				
Percolation/leakage through Layer 6	0.004092	[0.002049]	1,247.6	0.01
Water storage				
Change in water storage	0.9195	[0.7973]	280,359.8	2.35

* Note: Average inches are converted to volume based on the user-specified area.

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: KIN AP Default Earth **Simulated On:** 6/27/2022 17:25

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	6	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.4189	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer
Sandy Silty Clay
Material Texture Number 43

Thickness	=	18	inches
Porosity	=	0.4	vol/vol
Field Capacity	=	0.35	vol/vol
Wilting Point	=	0.3	vol/vol
Initial Soil Water Content	=	0.4	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-05	cm/sec

Layer 3

Type 3 - Barrier Soil Liner
Liner Soil (High)
Material Texture Number 16

Thickness	=	36	inches
Porosity	=	0.427	vol/vol
Field Capacity	=	0.418	vol/vol
Wilting Point	=	0.367	vol/vol
Initial Soil Water Content	=	0.427	vol/vol
Effective Sat. Hyd. Conductivity	=	1.00E-07	cm/sec

Layer 4

Type 1 - Vertical Percolation Layer (Waste)
Electric Plant Coal Bottom Ash

Material Texture Number 83

Thickness	=	372	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.0805	vol/vol
Effective Sat. Hyd. Conductivity	=	1.40E-03	cm/sec

Layer 5

Type 1 - Vertical Percolation Layer

Material Texture Number 44

Thickness	=	84	inches
Porosity	=	0.479	vol/vol
Field Capacity	=	0.371	vol/vol
Wilting Point	=	0.251	vol/vol
Initial Soil Water Content	=	0.371	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-07	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.2	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	84	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	7.313	inches
Upper Limit of Evaporative Storage	=	7.626	inches
Lower Limit of Evaporative Storage	=	4.86	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	86.21	inches
Total Initial Water	=	86.21	inches
Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	39.59	Degrees
Maximum Leaf Area Index	=	4.5	
Start of Growing Season (Julian Date)	=	102	days
End of Growing Season (Julian Date)	=	292	days

Average Wind Speed	=	10	mph
Average 1st Quarter Relative Humidity	=	72	%
Average 2nd Quarter Relative Humidity	=	66	%
Average 3rd Quarter Relative Humidity	=	73	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Kincaid, Illinois

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
2.696568	2.105836	2.602577	3.411672	4.852763	3.801581
3.335953	3.024381	2.885088	4.052491	3.627085	2.799647

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
34.7	35.6	45.8	59.9	73	79.3
83.1	80.3	71.1	62	47.6	36.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 39.591502215865/-89.496388435364

Average Annual Totals Summary

Title: KIN AP Default Earth
Simulated on: 6/27/2022 17:26

	Average Annual Totals for Years 1 - 30*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	39.20	[3.42]	11,951,535.3	100.00
Runoff	7.634	[2.161]	2,327,765.2	19.48
Evapotranspiration	30.089	[3.257]	9,174,727.9	76.77
Subprofile1				
Percolation/leakage through Layer 3	1.459570	[0.141864]	445,052.2	3.72
Average Head on Top of Layer 3	9.8664	[1.889]	---	---
Subprofile2				
Percolation/leakage through Layer 5	0.079172	[0.302718]	24,141.2	0.20
Water storage				
Change in water storage	1.3935	[0.7761]	424,900.9	3.56

* Note: Average inches are converted to volume based on the user-specified area.

APPENDIX D
FLUX EVALUATION DATA

APPENDIX D. FLUX EVALUATION DATA

GROUNDWATER MODELING REPORT

KINCAID POWER PLANT

ASH POND

KINCAID, ILLINOIS

Calibration Model					
Model	**Years (Model Period)**	**HSU**	**Total Flux In[1] (ft^3/d)**	**Total Flux In (gpm)**	
Calibration Model	27	Fill Unit (CCR)	9375.80	48.71	
Model	**Years (Model Period)**	**HSU**	**Total Flux Out[1] (ft^3/d)**	**Total Flux Out (gpm)**	
Calibration Model	27	Fill Unit (CCR)	-9707.65	-50.43	
Scenario 1: CIP (CIP includes CCR removal from the north and west areas of the AP, consolidation to the central and southeast portions of the AP, and construction of a cover system over the remaining CCR)					
Prediction Model	**Years (Post-Construction Period)**	**HSU**	**Total Flux In[1] (ft^3/d)**	**Total Flux In (gpm)**	**Reduction in Flux In Post Closure[2] (Percentage, %)**
CIP	22	Fill Unit (CCR)	16.45	0.09	99.82%
Prediction Model	**Years (Post-Construction Period)**	**HSU**	**Total Flux Out[1] (ft^3/d)**	**Total Flux Out (gpm)**	**Reduction in Flux Out Post Closure[2] (Percentage, %)**
CIP	22	Fill Unit (CCR)	-1.59	-0.01	-99.98%

[O: PR 07/05/22; C: JJW 7/06/22]

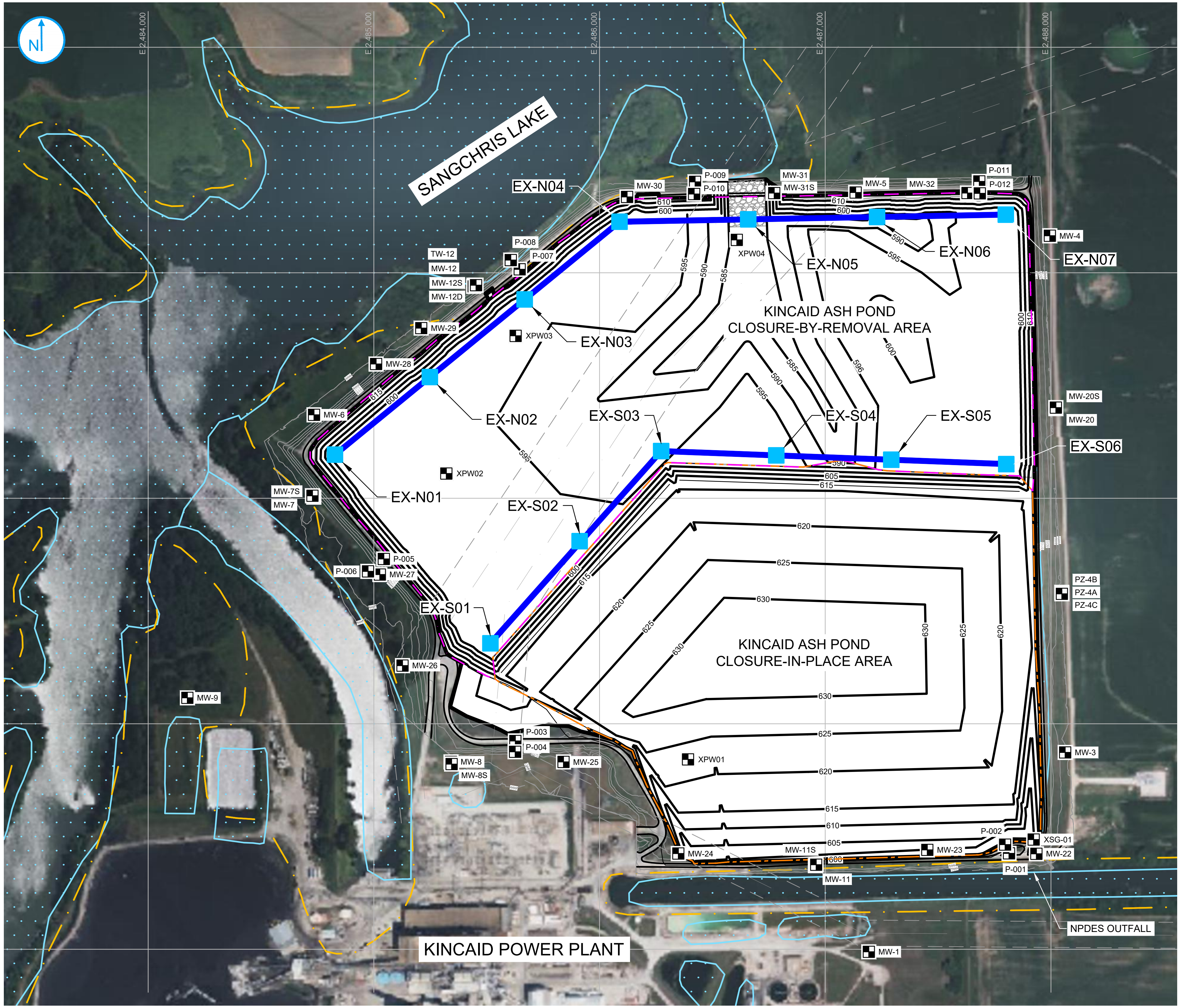
Notes:

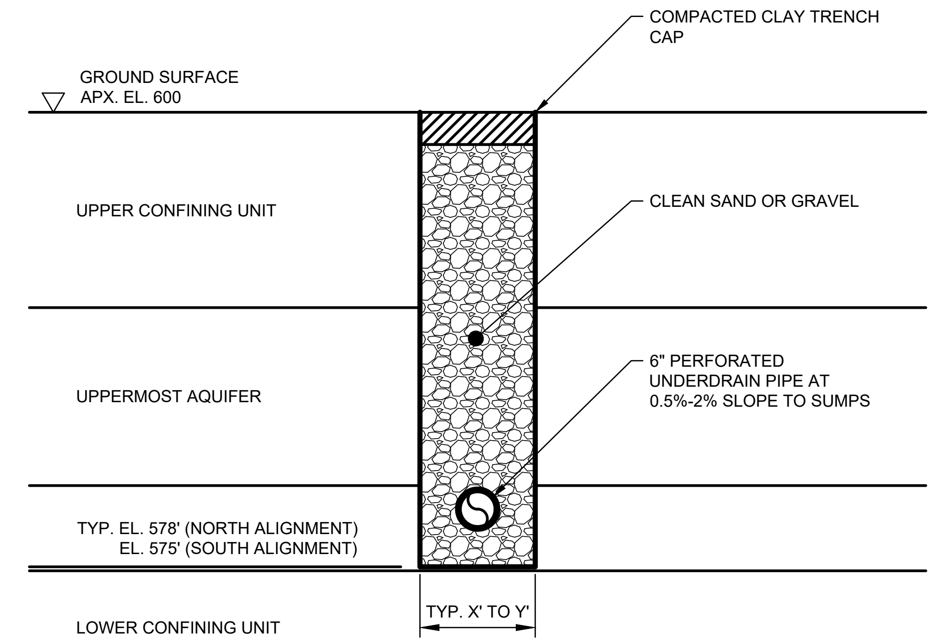
1. Reduction in flux in as compared to flux in at the end of calibration model (model period of 27 years).
2. Total flux in and out source data provided in flux calculation data files included in Appendix A.

CCR = coal combustion residuals
CIP = closure in place
HSU = Hydrostratigraphic Unit
% = percentage
ft^3/d = cubic feet per day
gpm = gallons per minute

RAMBOLL

APPENDIX B
FEASIBILITY-LEVEL DESIGN DRAWINGS FOR ALTERNATIVE 2 REMEDY





TRENCH DETAIL

NOT TO SCALE

NOTE:

1. SITE GRADING REPRESENTED PER FINAL CLOSURE DRAWINGS OF KINCAID ASH POND, COMPLETED BY BURNS & MAC, AUGUST 2022.
2. WETLANDS REPRESENTED AS PER ILLINOIS NATIONAL WETLANDS INVENTORY.
3. 100-YEAR FLOODPLAIN REPRESENTED AS PER FEDERAL EMERGENCY MANAGEMENT AGENCY,"FLOOD INSURANCE RATE MAP, JASPER COUNTY, ILLINOIS (UNINCORPORATED AREAS)," NATIONAL FLOOD INSURANCE PROGRAM, JANUARY 17, 1985.

Legend	
WETLANDS BOUNDARY (SEE NOTE 2)	MAJOR CONTOUR (360)
BODY OF WATER	CLOSURE IN PLACE WASTE BOUNDARY
100-YR FLOODPLAIN (SEE NOTE 3)	CLOSURE BY REMOVAL BOUNDARY
MONITORING WELLS (MW-9)	HIGH-VOLTAGE POWER LINES AND UTILITY EASEMENT
SUMP PUMP	GROUNDWATER EXTRACTION TRENCH

0 500 Feet

ALTERNATIVE 2 REMEDY: GROUNDWATER EXTRACTION

FEASABILITY-LEVEL DESIGN

Kincaid Ash Pond

Kincaid Power Plant 199 IL 104, Kincaid, IL 62540

FIGURE 1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: ---- DESIGNER: LEMMONBN DATED: 4/25/2024
ACCDocs\Ramboll Gruppen AS\RUS-1940103584-007 Vistra Energy KIN-AP\Project Files\4 Delivery\40 WIP\401 Civil\Drawings\CAAA-SIR\KIN-AP CAAA-SIR.dwg

APPENDIX C
MATERIAL QUANTITY, LABOR, AND MILEAGE ESTIMATES FOR ALTERNATIVE 2 REMEDY

KINCAID GENERATION - KINCAID POWER PLANT
CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT (CAAA-SIR)
ALTERNATIVE 2 - SOURCE CONTROL WITH GROUNDWATER EXTRACTION[1]

ITEM NO.	ENGINEERING, PRE-CONSTRUCTION, AND CONSTRUCTION SUPPORT TASKS	Units	Quantity	Crew	Daily Output	Labor Hours	Equipment Hours	Notes
1	Engineering Support and CQA During Construction	LS	1	Eng	12	1,128	1,128	Assumed labor and equipment hours based on Ramboll project experience.
	ENGINEERING, PRE-CONSTRUCTION, AND CONSTRUCTION SUPPORT ESTIMATED SUBTOTAL					**1,128**	**1,128**	
ITEM NO.	**SITE PREPARATION**	**Units**	**Quantity**	**Crew**	**Daily Output**	**Labor Hours**	**Equipment Hours**	**Notes**
2	Tree clearing in Excavation and Laydown Areas	-	-	-	-	137	91	Assumes some tree clearance and fine site preparation work is needed ahead of construction activities.
	Tree Clearing Down to Grade	Acre	2	B7	0.7	137	91	311110100200: Clearing and grubbing, medium trees to 12" diameter, cut and chip. Assumes 25 ft of tree clearance around the approximately 1.5 acre of excavation area.
3	Staging Area & Temporary Roads Preparation	-	-	-	-	591	91	Assumes some work general preparation of temporary access roads along the trench alignment will be needed specific to extraction trench construction.
	Subsurface Stabilization Nonwoven Geotextile	SY	7,000	2 Clab	2500	45	0	313219161550: Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb tensile strength includes scarifying and compaction. Assumes 0.5 acre staging area. Includes approximately 2,300 ft of temporary access road at approximately 15 foot wide.
	Construct Staging Area & Temporary Roads	SY	7,000	B14	615	546	91	015523500100: Temporary, roads, gravel fill, 8" gravel depth, excluding surfacing. Assumes 0.5 acre staging area and approximately 2,300 ft of temporary access road.
4	Construction Soil Erosion & Sediment Controls	-	-	-	-	791	264	Assumes soil erosion and sediment controls will be implemented only during the groundwater extraction trench construction.
	Silt Fence	LF	12,200	B62	650	450	150	312514161000: Synthetic erosion control, silt fence, install and remove, 3' high. Assumes silt fence is installed on downgradient side of the extraction trench alignments (6,100 ft total). Anticipates replacement one time during construction
	Sediment Log, Filter Sock	LF	14,200	A2	1000	341	114	312514160705: Sediment Log, Filter Sock, 9". Assume sediment log is needed along alignment of extraction trench (6,100 LF total) and settling pond perimeter (1,000 LF). Anticipates replacement one time during construction
5	Extraction Trench Alignment Preparation Work Pad	-	-	-	-	2,420	418	Assumes construction of a 40-ft wide work pad for the full length of the northern and southern trench. It is anticipated that only surface grading and stabilization will be required for the work pad.
	Surface Grading	MSF	244	B11L	30	130	65	312216103600: Fine grading, work pad area. Assumes grading along the northern (3,400 ft) and southern trench (2700 ft) alignments with additional area on each trench end.
	Subsurface Stabilization Nonwoven Geotextile	SY	27,111	2 Clab	2500	174	0	313219161550: Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb tensile strength includes scarifying and compaction; assume we need for working pad. At northern trench, work pad will span 3,400 ft long and 15 ft wide. At southern trench, work pad will span 2,700 ft long and 40 ft wide.
	Install Crushed Gravel Work Pad (8" Thick)	SY	27,111	B14	615	2,116	353	015523500100: Temporary, roads, gravel fill, 8" gravel depth, excluding surfacing. At northern trench, work pad will span 3,400 ft long and 40 ft wide. At southern trench, work pad will span 2,700 ft long and 15 ft wide.
	SITE PREPARATION ESTIMATED SUBTOTAL					**3,939**	**864**	
ITEM NO.	**GROUNDWATER EXTRACTION TRENCH CONSTRUCTION**	**Units**	**Quantity**	**Crew**	**Daily Output**	**Labor Hours**	**Equipment Hours**	**Notes**
6	Materials	-	-	-	-	1,460	1,460	Includes labor required for import backfill materials for groundwater extraction trench assuming two trenches with lengths totaling approximately 6,100 ft, 2 ft wide, and 22-25 ft deep. Sand backfill to be imported for majority of trench alignment, capped with 1 ft imported clay cap.
	Sand / Granular Backfill	CY	10,541	B13D	376	449	449	Sand/granular backfill for extraction trenches. Assumes northern trench is 3400 ft and 22 ft deep and southern trench is 2,700 ft and 25 ft deep. Assumes both trenches are 2 ft wide. Based on Ramboll experience.
	Clay for trench capping	CY	452	B13D	376	19	19	Imported clay for extraction trench caps. Assumes northern trench is 3400 ft and southern trench is 2,700 ft. Assumes both trenches are 2 ft wide and require 1 ft clay cap. Based on Ramboll experience.
	Haul Material to Site	LCY	10,993	B34C	99	888	888	312323203104: Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 16.5 C.Y. truck, cycle 50 miles, 45 mph, excludes loading equipment.
	Haul Material to Trench Locations	CY	10,993	B34G	850	103	103	312323206170: Hauling; no loading equipment, including hauling, waiting, loading/dumping; 34 C.Y. off-road, 15 min wait/ld./uld., 15 MPH, cycle 1 mile. Assumes stockpile location approximately 1/2 mile from each trench. Assumes hauling of granular material to trenches.

7	Installation of Groundwater Extraction Trench	-	-	-	-	1,551	1,542	Includes application of 1 ft imported clay cap over northern and southern trench alignments. Northern trench is 3400 ft and 22 ft deep and southern trench is 2,700 ft and 25 ft deep. Assumes both trenches are 2 ft wide.
	One-Pass Trencher excavation and slotted pipe placement	LF	6,100	OP	200	1,525	1,525	OP crew determined from crew information provided by specialty contractor. Assumes two trenches totaling 6,100 ft in length with an approximate depth of 22-25 ft. Includes removal of in-situ soils and replacement with a pre-determined sand and pea-gravel backfill mixture. 6-inch slotted pile with 0.040" slot installed at well depth (22 ft for northern GWET and 25 ft for southern GWET) as trench is excavated and backfilled.
	Stainless Steel Vertical Sump Installation	EA	10	OP	-	0	0	OP crew determined from crew information provided by specialty contractors. Sumps are set at start of trench with trencher working backwards. Sumps are placed every 600 feet with a sump placed at either end of the extraction trenches. Assumes two a northern trench length of 3,400 ft and southern trench length of 2,700 ft. Labor hours are included in One-Pass trench excavation and pipe placement daily output.
	Spread Lifts for Clay Trench Cap	CY - as excavated	452	B10B	250	22	14	312323170020: Spread dumped material, no compaction, by dozer. Daily output and rate edited based on limited volume to be managed under the task and previous experience with smaller volume management.
	Compaction of Clay Trench Cap	CY - in place	452	B10Y	1300	4	3	312323235060: Compaction; Riding, vibrating roller, 12" lifts, 2 passes.
8	Spoils Management	-	-	-	-	275	217	Assumes management of all spoils generated as part of Groundwater Extraction Trench construction to be managed on-site within the Consolidated Closure in Place (CIP) area at the southern extent of the existing KAP. Assumes spoils to be the volume of the northern and southern trench alignments (3400 ft and 2700 ft respectively) to depths of 22-25 ft and 2 ft wide.
	Loading	CY - as excavated	10,541	B14B	5000	25	17	312316435320: Excavating, large volume projects; excavation with truck loading; excavator, 6 C.Y. bucket, 100% fill factor (assume 10% fluff factor from ground to excavated).
	Hauling and Placement at CIP	CY - as excavated	10,541	B34G	850	99	99	312323206170: Hauling; no loading equipment, including hauling, waiting, loading/dumping; 34 C.Y. off-road, 15 min wait/ld./uld., 15 MPH, cycle 1 mile.
	Spreading Lifts	CY - as excavated	10,541	B10B	1000	126	84	312323170020: Spread dumped material, no compaction, by dozer. Daily output edited to match excavation based on experience.
	Compaction of Material	CY - in place	10,541	B10Y	5200	24	16	312323235060: Compaction; Riding, vibrating roller, 12" lifts, 2 passes.
9	Electrical Installation	EA	3	R1B	-	720	0	Electrical installation based on Ramboll experience to install two power drops for low-voltage (120V) power for the pneumatic extraction pumps along the extraction trenches, and one for secondary settling pond discharge of water to outfall. Assumes each power drop is due to the distances from existing power sources.
10	Groundwater Extraction Trench Mechanical Installation	-	-	-	-	1,646	526	Assumes installation of pneumatic pumping systems and associated piping network for GWETs to be installed by different contractor from specialty One-Pass contractor for Line Item 13. Assumes pneumatic pumps to be placed in stainless steel vertical sumps installed during One-Pass trenching methods.
	Install Pneumatic Pumps - North Trench	EA	6	Q1	1.8	53	0	Equipment and installation per pneumatic pump and appurtenances based on Ramboll experience. Assumes one pump per 600 ft of extraction trench with target flow rate of approximately 30-35 gpm for the overall trench.
	Install Pneumatic Pumps - South Trench	EA	5	Q1	1.5	53	0	Equipment and installation per pneumatic pump and appurtenances based on Ramboll experience. Assumes one pump per 600 ft of extraction trench with target flow rate of approximately 80-85 gpm for the overall trench.
	Install Equalization Tank	EA	2	B6	1.0	48	16	Installation of equalization tank at each trench and associated site preparation and instrumentation assumes 2 days for installation.
	Install Transfer Pumps and Controllers	EA	2	R30	1.0	52	0	Installation of transfer pump and pump controller at each extraction trench to convey water from settling pond to discharge outfall based on Ramboll project experience. Assumes inclusion of housing structure and 2 days for installation.
	Excavate Utility Trench for Lines to Compressors and Extraction Pumps	LF	6,980	B54	860	65	65	312316142750: Utility trench excavating, chain trencher, 40 HP operator riding, 12" wide trench and backfill, 18" deep. Trench installed from power drop/compressor shed to extraction trench to supply compressed air and power to sump pits.
	Install Mechanical Elements and Piping	EA	1	R30	-	390	0	Assumes furnishing all mechanical elements (air compressors, pneumatic extraction pumps, transfer pumps) and associated HDPE housing piping for distribution of power and housing of mechanical elements throughout the extraction trench system. Assumes approximately 15 days of work.
	Excavate Utility Trench for Conveyance to Settling Pond	LF	6,980	B54	860	65	65	312316142750: Utility trench excavating, chain trencher, 40 HP operator riding, 12" wide trench and backfill, 18" deep. Trench installed from groundwater extraction trench to convey extracted water to the settling pond.
	Install 8" HDPE Conveyance Pipe to Settling Pond	LF	6,980	B22A	320	873	349	331413350300: Water supply distribution piping, piping HDPE, butt fusion joints, 40' lengths, 8" diameter, SDR 21. Includes labor, materials, and machine for installation and welding of HDPE pipe for conveying extracted water from trenches to settling pond.
	Backfill Conveyance Line Trench with Granular Trench Backfill	LCY	388	B10R	100	47	31	312316133060: Backfill trench, F.E. loader, wheel mtd., 1 C.Y. bucket, 200' haul. Backfill with granular trench backfill. Quantity based on trench dimensions 12" wide, 18" deep, approximately 7,000 ft long.
11	Construction of Compressor & Mechanical Sheds	-	-	-	-	540	180	Based on Ramboll experience for construction of housing unit for air compressor sheds.
	Construct Compressor Shed	EA	3	B6	-	540	180	Assumes pre-fabricated mechanical instrumentation shelter, installed primarily by hand with light equipment assistance. Hours are based on Ramboll experience. Two sheds will include extraction equipment (air compressor and transfer pump) and will be located at the trenches (2) and settling pond (1). Accounts for concrete bases.

ITEM NO.	Item	Units	Quantity	Crew	Daily Output	Labor Hours	Equipment Hours	Notes
12	Installation of Settling Pond	-	-	-	-	1,066	376	Quantity based on 1-acre pond, 5 feet deep. Assume all excavated material is reused for berm construction.
	Excavation and Loading of Settling Pond Material	BCY	8,333	B12D	2080	64	32	312316420300: Excavating, bulk bank measure, hydraulic, crawler mtd., 3 C.Y. cap (300 CY/hr).
	Hauling and Placement of Settling Pond Material	LCY	8,333	B34G	986	68	68	312323206130: Hauling; no loading equipment, including hauling, waiting, loading/dumping; 34 C.Y. off-road, 15 min wait/ld./uld., 15 MPH, cycle 2,000 ft. Daily output extrapolated down to 600 ft cycle.
	Spreading/Drying Material in Berm	CY	8,333	B10B	1000	100	67	312323170020: Spread dumped material, no compaction, by dozer. Daily output edited to match excavation based on experience.
	Compaction of Material in Berm	BCY	8,333	B10G	5200	19	13	312323235680: Compaction, 2 passes, 12" lifts, sheepsfoot or wobbly wheel roller
	Fine Grading of Berm	MSF	9	B11L	30	5	2	312216103600: Fine grading, tops of lagoon banks for compaction. Assumes 10 ft-wide berm around perimeter of 1-acre settling pond.
	Subsurface Stabilization Nonwoven Geotextile	SY	5,000	2 Clab	2500	32	0	313219161550: Geosynthetic soil stabilization, geotextile fabric, non-woven, 120 lb tensile strength includes scarifying and compaction. Assumes 1 acre settling pond.
	Settling Pond Liner	SF	45,000	B63B	1850	778	195	310519531100: Reservoir liners, membrane lining, 40 mil, LLDPE. Assumes 1 acre ft pond.
13	Extracted Water Discharge Management	-	-	-	-	94	19	Based on approximate 300 ft distance from assumed settling pond location to discharge outfall proposed in CIP Construction Plan.
	Install Transfer Pump and Controller	EA	1	R30	1	52	0	Installation of transfer pump and pump controller to convey water from settling pond to discharge outfall based on Ramboll project experience. Assumes inclusion of housing structure and 2 days for installation.
	Excavate Utility Trench for Conveyance to Discharge	LF	300	B54	860	3	3	312316142750: Utility trench excavating, chain trencher, 40 HP operator riding, 12" wide trench and backfill, 18" deep. Trench installed from settling pond to convey settled water to outfall for discharge.
	Install 8" HDPE Conveyance Pipe to Discharge	LF	300	B22A	320	38	15	331413350300: Water supply distribution piping, piping HDPE, butt fusion joints, 40' lengths, 8" diameter, SDR 21. Includes labor, materials, and machine for installation and welding of HDPE pipe for conveying water from settling pond to discharge point.
	Backfill with Granular Trench Backfill	LCY	17	B10R	100	2	1	312316133060: Backfill trench, F.E. loader, wheel mtd., 1 C.Y. bucket, 200' haul. Backfill with granular trench backfill. Quantity based on trench dimensions 12" wide, 18" deep, 300 ft long.
	GROUNDWATER EXTRACTION TRENCH CONSTRUCTION					**7,352**	**4,320**	

ITEM NO.	SITE RESTORATION	Units	Quantity	Crew	Daily Output	Labor Hours	Equipment Hours	Notes
14	Site Restoration	-	-	-	-	444	72	Assumes restoration of grade surface following extraction trench installation and targeted source removal activities.
	Erosion Control Blanket	SY	38,720	B1	2500	372	0	312514160100: Rolled erosion control mats and blankets, plastic nettling stapled, 2" x 1" mesh, 20 mil. Assumes approximately 8 acres of erosion control for disturbed area associated with GWET area.
	Lime	MSF	348	B66	700	4	4	329113234250: Soil preparation, structural soil mixing, spread soil conditioners, ground limestone, 1#/S.Y., tractor spreader. Assumes soils possibly being void of nutrients. Assumes approximately 8 acres of erosion control for disturbed area associated with GWET area.
	Fertilizer	MSF	348	B66	700	4	4	329113234150: Soil preparation, structural soil .mixing, spread soil conditioners, fertilizer, 0.2#/S.Y., tractor spreader. Assumes soils possibly being void of nutrients. Assumes approximately 8 acres of erosion control for disturbed area associated with GWET area.
	Grassland Mix	MSF	348	B66	52	54	54	329219142300: Seeding athletic fields, seeding fescue, tall, 5.5 lb. per M.S.F., tractor spreader. Assumes approximately 8 acres of erosion control for disturbed area associated with GWET area.
	Mulch	MSF	348	B65	530	11	11	329113160350: Mulching, Hay, 1" deep, power mulcher, large. Assumes approximately 8 acres of erosion control for disturbed area associated with GWET.
	SITE RESTORATION ESTIMATED SUBTOTAL					**444**	**72**	

ITEM NO.	Corrective Action Operation and Maintenance	Units	Quantity	Crew	Daily Output	Labor Hours	Equipment Hours	Notes
Corrective Action Operation and Maintenance (O&M)								
15	Groundwater Extraction Trench Operation & Maintenance	-	-	-	-	12,800	12,800	Assumes a continuous operation life span of 16-years for the GWET to achieve GWPS.
	Operation and Maintenance	Day	640	TM	-	12,800	12,800	Assumes monthly monitoring visits and quarterly maintenance on pneumatic pumps and air compressors over 16 years of operation. Each monthly monitoring visit assumes 2 staff for 2 day and each quarterly maintenance event assumes 2 staff for 4 days to check, clean, and service all mechanical parts.
	Electrical Distribution and Service Charges	MO	192	-	-	-	-	Assumes electrical distribution and usage charges for operating the extraction and transfer pumps.
16	Non-routine System O&M	-	-	-	-	1,760	400	Assumes non-routine tasks including flushing of groundwater conveyance lines and periodic site visits (e.g., alarm responses or equipment troubleshooting).
	Groundwater Conveyance Line Flushing - Vacuum Truck	LF	116,800	VT	-	800	400	330130116140: Pipe, internal cleaning and inspection, cleaning, power rodder with header & cutts, 4"-12" diameter. Assumes one 5-day cleaning event of 7,300 LF of 8" HDPE pipe per year for a total of 16 years.
	Non-Routine Site Visits/Alarm Responses	LS	96	OM	-	960	0	Assumes 6 non-routine site visits per year over 16 years of operation. Each non-routine event assumes 2 staff for 1 day.
17	Engineering Oversight/Monitoring	LS	16	Eng	-	160	0	Assumes office-based engineering support over 16 years of operation.
	CORRECTIVE ACTION OPERATION AND MAINTENANCE SUBTOTAL					**14,720**	**13,200**	

			Total Labor Hours	Total Equipment Hours
ENGINEERING AND CONSTRUCTION SUBTOTAL			**12,860**	**6,380**
CORRECTIVE ACTION OPERATION AND MAINTENANCE SUBTOTAL			**14,720**	**13,200**
ENGINEER'S ESTIMATE OF TOTAL CONSTRUCTION, O&M, AND MONITORING HOURS			**27,600**	**19,600**

NOTES:

1. Alternative 2: Source Control with Groundwater Extraction is estimated to take approximately 16 years to achieve groundwater protection standards (GWPS-35 I.A.C Section 845.600) at all perimeter wells associated with the Ash Pond (AP) following AP hybrid consolidation and closure in place (CIP).
2. RS Means refers to the 2024 online edition of RS Means Heavy Construction.
3. See crew tab (Alt 2 - Crews) for assumptions regarding crew size, total labor hours and required construction equipment, as needed, for each task.
4. See mileage tab (Alt 2 - Mileage) for assumptions regarding total mileage for tasks outlined in this alternative.

ACRONYMS:

AC = Acre
AP = Ash Pond
CIP = Consolidated closure in place
CY = Cubic Yard
LCY = Loose Cubic Yards
BCY = Bank Cubic Yards
SF = Square Feet
SY = Square Yard
EA = Each
GWET = Groundwater Extraction Trench
GWPS = groundwater protection standards
IEPA = Illinois Environmental Protection Agency
LF = Linear Foot
LS = Lump Sum
MNA = Monitored Natural Attenuation
MO = Month
MSF = square feet divided by 1000
O&M = Operation and Maintenance
OMM = Operation, Monitoring, Maintenance
ROM = Rough Order of Magnitude

CREW CODES
KINCAID GENERATION - KINCAID POWER PLANT
CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT (CAAA-SIR)
ALTERNATIVE 2 - SOURCE CONTROL WITH GROUNDWATER EXTRACTION

Item No.	Crew Code	Labor	Daily Labor Hours	Equipment	Daily Equipment Hours	Onsite Labor Hours	Onsite Heavy Equipment Hours
Construction							
3,5,12	2 Clab	Laborer x2	16	None	0	250	0
7	A2	Laborer x2 Truck Driver (light) x1	24	Flatbed Truck, Gas, 1.5 ton	8	341	114
14	B1	Labor Foremanx1 Laborer x2	24	None	0	372	0
10,11	B6	Laborer x 2 Operator (light) x 1	24	Backhoe Loader, 48 H.P.	8	588	196
2	B7	Labor Foreman x 1 Operator (med) x 1 Laborer x 4	48	Brush Chipper 12", 130 H.P. Crawler Loader, 3 C.Y. 2 Chain Saws, Gas, 36" Long	32	137	91
7,8,12	B10B	Operator (med) x1 Laborer x0.5	12	Dozer, 200 H.P.	8	248	165
10,13	B10R	Operator (med) x 1 Laborer x 0.5	12	Frontend loader, W.M., 1 C.Y.	8	49	32
7,8	B10Y	Operator (med) x1 Laborer x0.5	12	1 Vibr. Roller, Towed, 12 ton	8	28	19
5,12	B11L	Operator (med) x 1 Laborer x 1	16	Grader, 30,000lb	8	135	67
12	B12D	Operator (crane) x 1 Laborer x 1	16	Hydraulic excavator, 3.5 C.Y.	8	64	32
12	B10G	Operator (med) x 1 Laborer x 0.5	12	1 Sheepsfoot Roller, 240 HP	8	19	13
6	B13D	Operator (crane) x 1 Laborer x 1	16	Hydraulic excavator, 1 C.Y. Trench Box	16	468	468
3,5	B14	Labor Foreman x 1 Operator (light) x1 Laborer x 4	48	Backhoe Loader, 48 H.P.	8	2,662	444
8	B14B	Operator (crane) x 1 Laborer x 0.5	12	Hydraulic excavator, 6. C.Y.	8	25	17
10,13	B22A	Labor Foreman x1 Skilled Worker x1 Laborer x2 Operator (crane) x1	40	S.P. Crane, 4x4, 5 ton Butt Fusion Machine, 4-12" diam.	16	910	364
6,8,12	B34G	Truck Driver x1	8	Dump Truck, Off Hwy., 50 ton	8	270	270
6	B34C	Truck Driver x1	8	Truck Tractor, 6x4, 380 H.P. Dump Trailer, 16.5 C.Y.	8	888	888
10,13	B54	Operator (light) x1	8	Trencher, Chain, 40 H.P.	8	133	133
4	B62	Laborer x2 Operator (light) x 1	24	Loader, Skid Steer, 30 H.P.	8	450	150
12	B63B	Labor Foreman x1 Laborer x2 Operator (light) x1	32	Loader, Skid Steer, 78 H.P.	8	778	195
14	B65	Laborer x1 Truck Driver (light) x1	16	Power Mulcher (large) Flatbed Truck, Gas, 1.5 ton	16	11	11
14	B66	Operator (light) x1	8	Loader-Backhoe, 40 H.P.	8	62	62
14	B81A	Laborer x 1 Truck Driver (light) x1	16	1 Hydromulcher, T.M. 600 gal 1 Flatbed Truck, Gas, 3 ton	16	0	0

CREW CODES
KINCAID GENERATION - KINCAID POWER PLANT
CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT (CAAA-SIR)
ALTERNATIVE 2 - SOURCE CONTROL WITH GROUNDWATER EXTRACTION

Item No.	Crew Code	Labor	Daily Labor Hours	Equipment	Daily Equipment Hours	Onsite Labor Hours	Onsite Heavy Equipment Hours
10	Q1	Plumber x1 Plumber Apprentice x1	16	None	0	107	0
9	R1B	Electrician x1 Electrician Apprentice x2	16	None	0	720	0
10,13	R30	Electrician Foreman x0.25 Electrician x1 Laborer (Semi-Skilled) x2	26	None	0	494	0
1	Eng	Engineering Staff x1.2	10	Side by Side x1	10	1,128	0
7	OP	Operator X 3 Laborer x 2	50	CAT 950 Loader x 3, CAT 374 Excavator x 1 CAT 349 Excavator x 1 Manlift x 1, Telehandlers x 2	50	1,525	1,525
				Construction Subtotals		12,860	5,260
Corrective Action Operation & Maintenance							
17	Eng	Engineering Staff x1.2	10	None	0	160	0
16	OM	Laborer x1	10	Service Truck x1	0	960	0
15	TM	Maintenance Crew x2	20	Service Truck x2 Hand Tools	20	12,800	12,800
16	VT	Laborer x1 Operator x1	20	Vacuum Truck with Flushing Capabilities	10	800	400
				O&M Subtotals		14,720	13,200
					Totals	**27,580**	**18,460**

Note: Blue shaded crew codes were created by Ramboll based on experience (not pulled from RS Means).

RAMBOLL

CONSTRUCTION MILEAGE AND LABOR ESTIMATES
KINCAID GENERATION - KINCAID POWER PLANT
CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT (CAAA-SIR)
ALTERNATIVE 2 - SOURCE CONTROL WITH GROUNDWATER EXTRACTION

Construction Mileage and Labor Estimates

Item	Quantity	Assumptions
Labor Total Hours	12,860	Per projected Construction total in cost estimate (does not include contingency)
Duration of Onsite Construction Days	94	Total Days based on specialty contractor recommendation for one-pass trenching, site preparation & mobilization, and restoration.
Average Daily Crew Size	8	Assumes multiple crew sizes and a 10 hour work day Assumes 1 Ramboll personnel daily for construction oversight
Daily Labor Mobilization Miles	52,640	Includes light and medium commercial vehicles Average of 70 miles round trip per day, as proposed in construction permit for KAP Closure
Vehicles Miles Onsite	3,760	Includes light and medium commercial vehicles 5 miles per day for onsite miles No contingency Included
Equipment Mobilization Miles - Unloaded	3,447	Average of 220 miles round trip for equipment hauling (from Chicago, IL) Average 1 load of equipment per working week
Equipment Mobilization Miles - Loaded	3,447	Average of 220 miles round trip for equipment hauling (from Chicago, IL) Average 1 load of equipment per working week
Onsite Haul Truck Miles - Unloaded	439	34 CY Off Road Dump Truck 1/2 mile one way trip per load
Onsite Haul Truck Miles - Loaded	439	34 CY Off Road Dump Truck 1/2 mile one way trip per load
Offsite Haul Truck Miles - Unloaded	71,231	Assumes 16 CY loads of fill materials (gravel/sand backfill and clay cap) are delivered to the site from a regional supplier located within 100 miles of the site
Offsite Haul Truck Miles - Loaded	71,231	Assumes truck is returning to the regional supplier located within 100 miles of the site
Material Delivery Miles - Unloaded	3,133	Misc. construction materials (erosion controls, piping, geotextile) Assumes 100 mile one way trip, average 2 trips per working week
Material Delivery Miles - Loaded	3,133	Misc. construction materials (erosion controls, piping, geotextile) Assumes 100 mile one way trip, average 2 trips per working week

CONSTRUCTION MILEAGE AND LABOR ESTIMATES
KINCAID GENERATION - KINCAID POWER PLANT
CORRECTIVE ACTION ALTERNATIVES ANALYSIS SUPPORTING INFORMATION REPORT (CAAA-SIR)
ALTERNATIVE 2 - SOURCE CONTROL WITH GROUNDWATER EXTRACTION

O&M Mileage and Labor Estimates

Item	Quantity	Assumptions
Labor Total Hours	14,720	Per projected O&M total in cost estimate (does not include contingency)
Duration of Onsite O&M Days	736	Total Days
Average Daily Crew Size	2	Assumes multiple crew sizes and a 10 hour work day
Daily Labor Mobilization Miles	206,080	Includes mob/demob from Chicago (220 miles round trip) and local daily commute mileage (60 miles per day)
Vehicles Miles Onsite	22,080	Includes light and medium commercial vehicles 15 miles per day for onsite miles No contingency Included
Equipment Mobilization Miles - Unloaded	0	Normal work vehicles only for this alternative & phase No heavy equipment to mobilize
Equipment Mobilization Miles - Loaded	0	Normal work vehicles only for this alternative & phase No heavy equipment to mobilize
Onsite Haul Truck Miles - Unloaded	0	-
Onsite Haul Truck Miles - Loaded	0	-
Offsite Haul Truck Miles - Unloaded	0	-
Offsite Haul Truck Miles - Loaded	0	-
Material Delivery Miles - Unloaded	0	-
Material Delivery Miles - Loaded	0	-

O&M = Operations and Maintenance

Appendix C

Corrective Measures Assessment

Intended for
Illinois Power Generating Company

Date
May 12, 2024

Project No.
1940103584-007

35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT

KINCAID POWER PLANT, ASH POND, IEPA ID: W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT KINCAID POWER PLANT, ASH POND, IEPA ID: W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940103584-007**
Recipient	**Kincaid Generation, LLC**
Document type	**35 I.A.C. § 845 Corrective Measures Assessment**
Revision	**Final**
Date	**May 12, 2023**
Prepared by	**Frances Ackerman, RG, PE**
Checked by	**Lucas P. Carr, PE**
Approved by	**Brian G. Hennings, PG**

Frances Ackerman, RG, PE
Senior Managing Engineer

Brian Hennings, PG
Project Officer, Hydrogeology

CONTENTS

TABLES

FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
ASD	alternative source demonstration
CAAA	Corrective Action Alternatives Analysis
CAP	Corrective Action Plan
CCR	coal combustion residuals
CIP	closure-in-place
CMA	Corrective Measures Assessment
cm/s	centimeters per second
CSM	conceptual site model
EPRI	Electric Power Research Institute
E001	Event 1
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard(s)
ID	identification
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
ITRC	National Research Council, Interstate Technology & Regulatory Council
KPP	Kincaid Power Plant
LCU	lower confining unit
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	number
NPDES	National Pollutant Discharge Elimination System
NRT/OBG	Natural Resource Technology, an OBG Company
PRB	Permeable Reactive Barrier
PMP	Potential Migration Pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SI	surface impoundment
TDS	total dissolved solids
UA	Uppermost Aquifer
USCU	Upper Semi-Confining Unit
USEPA	United States Environmental Protection Agency
ZVI	zero-valent iron

1. INTRODUCTION

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has developed this assessment of groundwater corrective measures on behalf of the Kincaid Power Plant (KPP), operated by Kincaid Generation, LLC, to assist in the compliance with the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments. This assessment applies specifically to the coal combustion residuals (CCR) surface impoundments (SI) referred to as the Ash Pond (AP), also referred to as CCR Unit Identification (ID) Number (No.) 141, Illinois Environmental Protection Agency (IEPA) ID No. W0218140002-01, and National Inventory of Dams (NID) No. IL50706. This report addresses content requirements specific to 35 I.A.C. § 845.660 (Assessment of Corrective Measures) for exceedances of boron, sulfate, and total dissolved solids (TDS) at the AP.

1.1 Source Control and Residual Plume Management

Kincaid Generation, LLC intends to initiate significant source control and residual plume management efforts as part of the AP closure, as documented in the Construction Permit Application that was submitted to IEPA in July of 2022 (Burns & McDonnell Engineering Company, Inc., 2022). The proposed closure exceeds the minimum Closure Performance Standards listed in 35 I.A.C. § 845.750. The closure will include removing free liquids in accordance with the performance standard in 35 I.A.C. § 845 and maintaining that condition during the closure construction period. The closure will control infiltration in accordance with the performance standard in 35 I.A.C. § 845, thus removing the hydraulic head that can force leachate into subsurface soils and is the mechanism that can drive risk (United States Environmental Protection Agency [USEPA], 2015a, p. 21342):

> *EPA's risk assessment shows that the highest risks are associated with CCR surface impoundments due to the hydraulic head imposed by impounded water. Dewatered CCR surface impoundments will no longer be subjected to hydraulic head so the risk of releases, including the risk that the unit will leach into the groundwater, would be no greater than those from CCR landfills.*

The AP will be closed using a consolidate-and-cap approach consisting of excavating nearly 2 million cubic yards of CCR and placing it in a consolidated CCR footprint at an elevation greater than 12 feet above the uppermost aquifer (UA) and above the estimated post-closure water table. The consolidated CCR will be covered with an alternate geomembrane final cover system having performance that exceeds the 35 I.A.C. § 845.750(c)(2) minimum final cover requirements. The proposed source control is predicted to reduce water flux into and out of the AP by greater than 99 percent and allow the groundwater protection standards (GWPS) to be achieved within approximately 17 years (Ramboll, 2022). These source control activities will serve as the primary groundwater corrective measure at the AP. The potentially feasible corrective measures presented herein are intended to be supplementary to the primary source control and are intended to serve as management measures to address any residual plumes that remain after completion of source control.

Attachment A includes summary figures from the Construction Permit Application that show the proposed final source control and primary corrective action.

1.2 Adaptive Site Management

Adaptive site management strategies will be employed as an integral part of ongoing corrective action at the AP. The adaptive site management approach will allow timely incorporation of new site information over the closure and post-closure life cycle of the AP to ensure the achievement of the GWPS. The adaptive site management approach is proposed to expedite progress toward meeting the GWPS while acknowledging uncertainties, such as the persistence of current groundwater flow directions and flux quantities and potential related changes in geochemical conditions. A structured decision-making process and explicitly planned iterations between the implemented corrective measures and monitoring results will ensure that remediation is occurring. System performance and the condition of the residual plume will be monitored as the corrective measure(s) selected through the 35 I.A.C. § 845.710 Corrective Action Plan (CAP) process are implemented to supplement the source control measures described above. If the groundwater concentrations do not decrease consistent with the modeling prediction, the adaptive site management approach will facilitate timely modifications or enhancements to the corrective measure(s), as needed in accordance with 35 I.A.C. § 845.680(b). This approach will be employed to provide continuous improvement to the AP groundwater remediation in response to new site information and/or the performance of the selected corrective measure(s).

The planned adaptive site management strategies are generally consistent with National Research Council, Interstate Technology & Regulatory Council (ITRC) and USEPA methodologies developed to address sites with long remediation times and high levels of uncertainty regarding the remedial actions necessary to achieve final and protective remediation goals (USEPA, 2022). The elements of the proposed adaptive site management strategy at the AP will be responsive to the changing conditions associated with pond closure and performance of the selected corrective measure(s) and will include the following:

1. Implementing the groundwater corrective measure(s) selected as part of the CAP for the current conditions at the AP. The selected corrective measures may include a combination of the technologies presented in this Corrective Measures Assessment (CMA).

2. Establishing both the absolute remedial objective and functional (interim) goals to monitor progress toward the remedial objective. Achieving the GWPS for 35 I.A.C. § 845.600 constituents at the downgradient waste boundary is the remedial objective for the AP. Specific functional goals will be developed as part of the CAP process. The functional goals will be measurable thresholds for future action and may include short-term or technology-specific objectives and triggers. Functional goals may vary for different locations, CCR constituents or other site-specific considerations (ITRC, 2017) and will serve as benchmarks for comparison to ongoing groundwater monitoring at the AP.

3. Ongoing groundwater monitoring at the AP will continue throughout the implementation of source control and residual plume management activities. Post-closure monitoring will continue for a period of at least 30 years, in accordance with 35 I.A.C. § 845.780(c). A comprehensive groundwater monitoring plan (GMP) will be developed as part of the CAP process in accordance with 35 I.A.C. § 845.670 and 35 I.A.C. § 845.220(c)(4). The GMP will include the functional goals and proposed action levels.

4. Groundwater monitoring information will be used to guide decisions regarding whether progress toward the remedial goal is advancing as expected and/or whether additional actions may be needed to achieve the remedial objective, in conjunction with IEPA, as required by 35 I.A.C. § 845.680(b).

2. SITE INFORMATION

The KPP is located in the southwest quarter of Section 1, and the northeast quarter of Section 12, Township 13 North, Range 4 West, along West Route 104 Christian County, Illinois and approximately four miles west of the Village of Kincaid (**Figure 2-1**). The KPP operates as a coal-fired power plant and consists of one CCR unit, the AP, with a total storage capacity of approximately 3,560 acre-feet.

The AP is located between two lobes of Sangchris Lake, which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River (**Figure 2-2**). Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of the AP and is connected to the eastern lobe of Sangchris Lake.

Construction of the AP began in 1964 and the impoundment was commissioned for use in 1967. The AP primarily contains bottom ash and boiler slag, and other minor materials including water and wastewater treatment solids, excavation spoils, and dredge spoils. Discharge for the AP is located at the southeast corner of the unit. A construction permit application for the closure of the AP (*e.g.,* source control) was submitted to IEPA on July 28, 2022 (Burns & McDonnell Engineering Company, Inc., 2022); permit approval is pending at this time.

2.1 Conceptual Site Model

Significant site investigation has been completed at the KPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the AP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (Ramboll, 2021), which was prepared to comply with the requirements specified in 35 I.A.C. § 845.620 and expands upon the Hydrogeologic Monitoring Plan (Natural Resource Technology/O'Brien & Gere Engineers, Inc. [NRT/OBG], 2017). The conceptual site model (CSM) is presented below.

In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU)**: Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses within the USCU with higher permeability within the USCU have a higher probability of contaminant transport and these materials are referred to as the potential migration pathways (PMPs).
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.

- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet[1]. The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit). Includes the lithologic layers identified as the Vandalia Till.
- **Bedrock**: This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and underlies the entire AP.

In the vicinity of the AP, groundwater generally flows north and northwest through the USCU toward the western lobe of Sangchris Lake. There also appears to be a component of groundwater flow to the south and east toward the discharge flume that flows towards the eastern lobe of Sangchris Lake, as evidenced by groundwater elevations on the southern side of the AP. These two components of groundwater flow suggest a groundwater divide beneath the AP. Groundwater elevations and contours for the first quarterly sampling event (Event 1 [E001]) are presented in **Figure 2-3**.

2.2 Groundwater Quality

Groundwater monitoring in accordance with the proposed GMP and sampling methodologies provided in the operating permit application for the AP began in the second quarter of 2023. The 35 I.A.C. § 845 groundwater monitoring system is displayed on **Figure 2-4** and consists of 16 wells screened in the UA (two background and 14 compliance), five compliance wells screened in the USCU, and two temporary water level only surface water staff gages. The groundwater samples collected from the 21 wells are used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards listed in 35 I.A.C. § 845.600(a). The proposed monitoring wells yield groundwater samples that represent the quality of downgradient groundwater at the CCR boundary (as required in 35 I.A.C. § 845.630(a)(2)).

The E001 sampling event was completed on June 13, 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), statistically derived values were compared with the GWPSs summarized in 35 I.A.C. § 845.600 to determine exceedances of the GWPS. The statistical determination initiated during E001 identified the following GWPS exceedances at compliance groundwater monitoring wells (Ramboll, 2023):

- Boron in MW-12, MW-28 and MW-7S
- Sulfate in MW-28, MW-32 and MW-7S
- TDS in MW-28

The boron, sulfate, and TDS exceedances are addressed in this CMA, in accordance with 35 I.A.C. § 845.660.

[1] All elevations in this report are referenced to North American Vertical Datum of 1988 (NAVD88) unless otherwise noted.

3. CORRECTIVE MEASURES ASSESSMENT METHODOLOGY

This section describes the CMA methodology initiated in response to the identification of exceedances of the GWPSs for 35 I.A.C. § 845.600 constituents at the downgradient waste boundary of the AP during the E001 groundwater monitoring event (Ramboll, 2023). The CMA was initiated on December 14 2023, within 90 days after the detection of exceedance(s) of GWPS. Under 35 I.A.C. § 845, owners and operators of existing CCR SI must initiate the assessment of corrective measures in accordance with 35 I.A.C. § 845.660 if one or more constituents are detected, and confirmed by an immediate resample, to be in exceedance of a GWPS in 35 I.A.C. § 845.600, and the owner or operator has not demonstrated that: a source other than the CCR SI caused the exceedance, 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 (an alternative source demonstration [ASD]).

The CMA is the first step in developing a long-term CAP to address the GWPS exceedances at CCR SIs. The process provides a systematic, rational method for evaluating potential corrective measures by first identifying potentially viable technologies and assessing them using qualitative information to eliminate from consideration infeasible or otherwise unacceptable remedial technologies (*i.e.,* the 35 I.A.C. § 845.660 CMA). The remaining technologies will be evaluated individually, or assembled into combined alternatives, and further evaluated under the 35 I.A.C. § 845.670 CAP process.

This CMA identified applicable corrective measure technologies and evaluated them for viability, given the site-specific conditions and considerations at the AP, by addressing the following 35 I.A.C. § 845.660 evaluation criteria:

- Performance, reliability, ease of implementation and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
- Time required to begin and complete the CAP; and
- Institutional requirements, such as State or local permit requirements or other environmental or public health requirements, that may substantially affect implementation of the CAP.

The evaluation included qualitative and/or semi-quantitative screening of the potential corrective measures (technologies) relative to their general performance, reliability, and ease of implementation characteristics and their potential impacts, timeframes, and institutional requirements to assess the viability of each technology to address the GWPS exceedances at the AP. This approach provided a reasoned set of corrective measures that could be used, either individually or in combination, to supplement the primary source control measures described in **Section 1.1**. This set of corrective measures will be further evaluated in the Corrective Action Alternatives Analysis (CAAA).

4. DESCRIPTION OF POTENTIAL CORRECTIVE MEASURE TECHNOLOGIES

The potential groundwater corrective measures summarized below are applicable to the AP and were included in the CMA development and analysis. Site-specific considerations provided in **Section 2** were used to evaluate potential groundwater corrective measures. Each of the corrective measures evaluated may be capable of satisfying the requirements and objectives, listed in **Section 3**, to varying degrees of effectiveness. The corrective measure review process was intended to yield a set of applicable corrective measures that could be used to supplement the primary corrective action, which will be the source control activities described in **Section 1.1** (consolidate-and-cap approach with a geomembrane final cover system). The source control is expected to reduce downgradient concentrations in the UA to less than the GWPS via naturally occurring physical and chemical processes over an approximately 17-year timeframe. Ongoing monitoring will be an integral part of all corrective measures to verify and document the remedial process. The corrective measures ultimately advanced to the CAAA and selected in the CAP will be used to enhance the effectiveness of the source control and may be used independently or combined into specific remedial alternatives to leverage the advantages of multiple corrective measures to attain GWPSs.

Source control measures will be initiated for the AP, as described in **Section 1.1**; all of the evaluated additional corrective measure technologies are proposed to be supplemental and complementary to source control activities. The following potential corrective measures, commonly used to mitigate groundwater impacts, were considered as a part of the CMA process:

- Source Control with Groundwater Polishing;
- Source Control with Groundwater Extraction (groundwater pumping wells or collection trenches);
- Source Control with a Cutoff Wall; and
- Source Control with In-Situ Treatment (Permeable Reactive Barrier [PRB] or In-Situ Chemical Treatment).
- Source Control with Phytoremediation

4.1 Source Control with Groundwater Polishing

Both federal and state regulators have long recognized that natural geochemical processes can be an acceptable component of a remedial action when it can achieve remedial action objectives in a reasonable timeframe. In 1999, the USEPA published a final policy directive (USEPA, 1999a) for groundwater remediation and described the process as follows:

> *"The reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. The natural attenuation processes that are at work in such a remediation approach include a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization;*

radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants."

The USEPA has stated that source control is the most effective means of ensuring the timely attainment of remediation objectives (USEPA, 1999a). Natural geochemical processes may be appropriate as a "finishing step" after effective source control implementation (*i.e.*, groundwater polishing), to reduce the residual mass remaining in the groundwater after closure, if there are no risks to receptors and/or the contaminant plume is not expanding. Thus, groundwater polishing would be used in conjunction with the significant planned source control effort at the site, which will consist of a hybrid consolidate-and-cap approach with a final cover system described in **Section 1.1**.

In 2015, USEPA addressed remediation of inorganic compounds in groundwater and noted that the use of natural geochemical processes to address inorganic contaminants: (1) is not intended to constitute a treatment process for inorganic contaminants; (2) when appropriately implemented, can help to restore an aquifer to beneficial uses by immobilizing contaminants onto aquifer solids and providing the primary means for attenuation of contaminants in groundwater; and (3) is not intended to be a "do nothing" response (USEPA, 2015b). Rather, documenting the applicability of natural geochemical processes for groundwater remediation should be thoroughly and adequately supported with site-specific characterization data and analysis (USEPA, 1999a; USEPA, 2007; USEPA, 2015b):

Both physical and chemical processes can contribute to the reduction of the small amount of residual mass remaining after closure of the AP, and the toxicity, mobility, volume, or concentration of contaminants in groundwater. Physical processes applicable to CCR constituents in groundwater include dilution, dispersion, and flushing. Chemical processes applicable to CCR constituents in groundwater include precipitation and coprecipitation (*e.g.,* incorporation into sulfide minerals), sorption (*e.g.,* to iron, manganese, aluminum; to other metal oxides or oxyhydroxides; or to sulfide minerals or organic matter), and ion exchange.

All inorganic compounds are subject to physical processes and under typical environmental conditions, the physical mechanisms most often exert the dominant control on the CCR constituents of interest. Chemical mechanisms are also likely to be active, though not often dominant, such as adsorption, ion exchange, and organic complexation. In combination with source control, these natural controls can provide an effective means to polish residual loading and achieve the GWPS in a reasonable timeframe. Additional data collection and analysis may be required to support the USEPA's evaluation framework (USEPA, 2015b) and obtain regulatory approval.

4.2 Source Control with Groundwater Extraction

Groundwater extraction is one of the most widely used groundwater corrective technologies and has a long history of performance. This corrective measure includes installation of one or more groundwater pumping wells or an extraction trench to control and extract impacted groundwater. Groundwater extraction captures and contains impacted groundwater and can limit plume expansion and/or off-site migration. Construction of a groundwater extraction system typically includes, but is not limited to, the following primary components:

- Designing and constructing a groundwater extraction system consisting of one or more extraction wells or trenches and operating at a rate to allow capture of CCR impacted groundwater within the UA and or the PMP.
- Management of extracted groundwater, which may include modification to the existing National Pollutant Discharge Elimination System (NPDES) permit.
- Ongoing inspection and maintenance of the groundwater extraction system.

Remediation of inorganics by groundwater extraction can be effective, but systems do not always perform as expected. A combination of factors, including geologic heterogeneities, difficulty in flushing low-permeability zones, and rates of contaminant desorption from aquifer solids can limit effectiveness. Groundwater extraction systems require ongoing operation and maintenance to address issues such as iron bacteria and well fouling and to ensure optimal performance. The extracted groundwater must be managed, either by ex-situ treatment or disposal.

Groundwater extraction may reduce the timeframe to achieve GWPS and limit the off-site migration of constituents that exceed the GWPS. Extraction could be accomplished using a groundwater pumping well system or an extraction trench.

4.3 Source Control with Groundwater Cutoff Wall

Since the late 1970s and early 1980s, vertical cutoff walls have been used to control and/or isolate impacted groundwater. Low-permeability cutoff walls can be used to prevent horizontal off-site migration of potentially impacted groundwater. Cutoff walls act as barriers to lateral transport of impacted groundwater and can isolate soils that have been impacted by CCR to prevent mixing with unimpacted groundwater. Cutoff walls are often used in conjunction with an interior pumping system to establish an inward gradient within the cutoff wall. The gradient imparted by the pumping system maintains an inward flow through the wall, keeping it from acting as a groundwater dam and controlling potential end-around or breakout flow of contaminated groundwater. Constructing the cutoff wall such that it intersects a low-permeability material at its base, referred to as "keying", greatly increases its effectiveness.

A commonly used cutoff wall construction technology is the slurry trench method, which consists of excavating a trench and backfilling it with a soil-bentonite mixture, often created with the excavated soils, or, for deeper walls, a cement-bentonite mixture that is produced at an onsite batch plant. The trench is temporarily supported with bentonite slurry pumped into the trench during excavation (D'Appolonia & Ryan, 1979). Cutoff wall excavation uses conventional hydraulic excavators, hydraulic excavators equipped with specialized booms to extend their reach (*i.e.,* long-stick excavators), clamshells, or more specialized equipment such as hydromills, secant-pile drill rigs, or one-pass machines, depending upon trench depth, material excavated, and type of material that the wall is keyed into.

Cutoff walls are a widely accepted technology for containing impacted groundwater. Combining groundwater polishing with a limited cutoff wall and groundwater extraction in specific areas may provide advantages over independent use of these potential corrective technologies. Cutoff walls can be used in combination with groundwater extraction or as part of a PRB system (as the "funnel" in a funnel-and-gate system; **Section 4.4**).

4.4 Source Control with In-Situ Chemical Treatment

The use of in-situ treatment, either by injection or PRBs is a widely used technology for treating impacted groundwater. However, in-situ treatment techniques for boron and sulfate are not well established, therefore performance is unknown.

Chemical treatment could consist of injection of reactive materials into the subsurface to treat contaminants at specific, targeted locations. Alternatively, treatment could be accomplished via PRB, where subsurface barriers (*i.e.,* cutoff walls) are placed at locations designed to direct the contaminant plume along a flow path through the reactive media. In either system, the contaminants are transformed or otherwise rendered into environmentally acceptable forms to attain remediation concentration goals downgradient of the barrier (Electric Power Research Institute [EPRI], 2006).

As groundwater passes through the PRB under natural gradients, dissolved constituents in the groundwater react with the reactive media and are transformed or immobilized. A variety of media have been used or proposed for use in PRBs. Zero-valent iron (ZVI) is a chemical treatment that has been shown to effectively immobilize some CCR constituents, including arsenic, chromium, cobalt, molybdenum, selenium, and sulfate. Use of a combination media consisting of ZVI and a boron-selective ion exchange resin to treat boron has been documented in a pilot-scale test (EPRI, 2006).

System configurations include continuous PRBs, in which the reactive media extends across the entire path of the contaminant plume; and funnel-and-gate systems, where low-permeability barriers are installed to control groundwater flow through a permeable gate containing the reactive media. Continuous PRBs intersect the entire contaminant plume and do not materially impact the groundwater flow system. Design may or may not include keying the PRB into a low-permeability unit at depth. Funnel-and-gate systems utilize a system of barriers to groundwater flow (funnels) to direct the contaminant plume through the reactive gate. The barriers, typically some form of cutoff wall, are keyed into a low-permeability unit at depth to prevent short circuiting of the plume. Funnel-and-gate design must consider the residence time to allow chemical reactions to occur. Directing the contaminant plume through the reactive gate can significantly increase the flow velocity, thus reducing residence time.

Design of in-situ treatment systems requires rigorous site investigation to characterize the site hydrogeology and to delineate the contaminant plume. A thorough understanding of the geochemical and redox characteristics of the plume is critical to assess the feasibility of the process and select appropriate reactive media. Laboratory studies, including batch studies and column studies using samples of site groundwater, are needed to determine the effectiveness of the selected reactive media at the site (EPRI, 2006). The main considerations in selecting reactive media are as follows (Gavaskar et al., 1998; cited by EPRI, 2006):

- Reactivity - The media should be of adequate reactivity to immobilize a contaminant within the residence time of the design.
- Hydraulic performance - The media should provide adequate flow through the PRB, meaning a greater particle size than the surrounding aquifer materials. Alternatively, gravel beds have been emplaced in front of barriers to direct flow through the barrier.
- Stability - The media should remain reactive for an amount of time that makes its use economically advantageous over other technologies.

- Environmentally compatible by-products - Any by-products of media reaction should be environmentally acceptable. For example, iron released by zero-valent iron corrosion should not occur at levels exceeding regulatory acceptance levels.
- Availability and price: The media should be easy to obtain in large quantities at a price that does not negate the economic feasibility of using a PRB.

4.5 Source Control with Phytoremediation

Phytoremediation has been shown to be effective for treating groundwater up to 30 feet below ground surface when correctly implemented. Phytoremediation is an accepted and proven remedial technology that refers to several ways in which plants are used to remediate sites by removing pollutants from soil and water. Phytoremediation can provide an aesthetically pleasing, solar-energy driven technique that can be used to clean up sites with shallow, low to moderate levels of contamination (USEPA, 1999b).

The specific mechanisms that contribute to phytoremediation are largely a function of the site conditions, plant species, and the nature of the contaminant. Phytoremediation can be an effective treatment for boron (Bañuelos et al., 1999), and boron is an essential micronutrient for plant growth. However, if boron concentrations in irrigation water become too elevated (greater than approximately 20 mg/L for poplars and willows), the water can be toxic to plants (Yıldırım & Kasım, 2018). While sulfate phytoremediation is not well documented, sulfate is a necessary nutrient for plant growth, and phytoremediation would likely reduce sulfate concentrations in groundwater. Boron and sulfate (and TDS) impacts to groundwater would also be reduced via increased groundwater uptake by the phytoremediation plantation.

Several different phytoremediation mechanisms can contribute to contaminant degradation, removal (through accumulation or dissipation), or immobilization:

- Degradation (for destruction or alteration of organic contaminants)
  - Rhizodegradation: enhancement of biodegradation in the below-ground root zone by microorganisms;
  - Phytodegradation: contaminant uptake and metabolism above or below ground, within the root, stem, or leaves;
- Accumulation (for containment or removal of organic and/or metal contaminants)
  - Phytoextraction: contaminant uptake and accumulation for removal;
  - Rhizofiltration: contaminant adsorption on roots for containment and/or removal;
- Dissipation (for removal of organic and/or inorganic contaminants into the atmosphere)
  - Phytovolatilization: contaminant uptake and volatilization;
- Immobilization (for containment of organic and/or inorganic contaminants)
  - Hydraulic Control: control of ground-water flow by plant uptake of water;
  - Phytostabilization: contaminant immobilization in the soil.

In most circumstances, multiple mechanisms act simultaneously and synergistically to remediate contaminants.

Phytoremediation requires more effort than simply planting vegetation with minimal maintenance and assuming that the contaminant will disappear. Phytoremediation requires an understanding of the applicable remediation mechanisms, careful plant species selection, and the provision of an environment conducive to successful plant growth to achieve optimal results. Site specific verification of the applicability and efficacy of phytoremediation would be required (USEPA, 2001).

At the AP, two phytoremediation mechanisms would be the predominant contributors to reduction of contaminants in groundwater: phytoextraction and hydraulic control. Phytoextraction would consist of uptake of impacted groundwater through tree roots and storage of the contaminants in the above-ground tree tissues (predominantly leaves). Simultaneously, the plantings would improve hydraulic control of impacted groundwater due to the root systems impeding the downgradient groundwater flux and thereby reducing the downgradient contaminant mass flux.

Phytoremediation could be implemented in a variety of different ways. One straightforward approach involves planting directly into contaminated soil or in areas where roots can directly contact contaminated groundwater. This strategy provides a simple approach under the proper conditions (roots can naturally reach contamination, environment is not toxic to plants, etc.); however, in some cases contaminated groundwater cannot be easily accessed by plant roots and other strategies are required.

Where groundwater is too deep for roots to naturally access it, specialized planting systems can be utilized to provide access to the groundwater. At each planting location the groundwater wells or soil borings are backfilled with a coarse grained material, allowing groundwater to rise to its potentiometric surface elevation. When designed correctly, these systems provide significantly increased access to groundwater for the tree roots, especially when combined with other cultivation techniques to encourage deep root growth such as deep irrigation during the tree establishment, aeration tubes to provide oxygen to the subsurface, and utilizing long tree cuttings planted deeply. An additional technique to encourage deep root growth is to install a casing or liner around the root zone that requires tree roots to advance downward toward groundwater.

Phytoremediation implementation at the AP would consist of planting phreatophytes (plants that thrive with roots submerged in water) in downgradient area(s) where elevated concentrations of boron, sulfate, and TDS have been observed in groundwater. Following installation, the trees would require an initial establishment period of several (3 to 5) years to grow large enough for roots to reach the groundwater table and begin uptake of groundwater. During this establishment period supplemental irrigation would be necessary. Once the trees have sufficiently matured to uptake groundwater, boron (and possibly sulfate and TDS) would be incorporated into tree tissues, including the leaves of the trees. Leaves from the trees would be collected and removed from the tree plantation, thereby providing for a mechanism of boron (and possibly sulfate and TDS) removal from the site.

Since phytoremediation is dependent upon the tree roots contacting and extracting groundwater, enhancements could be implemented to promote downward root growth. Examples include planting long tree cuttings deeper in the ground, having deep irrigation systems that encourage downward root growth, and planting boron accumulating grass cover or utilizing impermeable membranes to reduce infiltration and thereby encourage tree root growth toward the groundwater table. Phreatophytes are favored for their ability to grow deep root systems quickly as well as their capability to utilize high volumes of water once established. Phytoremediation using phreatophytes has been shown to be effective for treating groundwater up to 30 feet below ground surface if appropriate measures are implemented.

Phytoremediation can offer several advantages over traditional remedial technologies. When properly applied, phytoremediation can be a low cost, low maintenance, environmentally friendly, and aesthetically pleasing technology while also providing effective contaminant reduction. Phytoremediation can be well-suited for projects with longer time frames (tens of years) or low concentration contaminant fluxes. However, under some conditions, clean-up can be achieved in shorter time frames (several years).

5. ASSESSMENT OF CORRECTIVE MEASURE TECHNOLOGIES

This CMA was initiated to address exceedances of the 35 I.A.C. § 845.600 GWPS for boron, sulfate and TDS at the downgradient waste boundary of the AP identified during the E001 groundwater monitoring event (**Section 2.2**).

5.1 Requirements

The potential groundwater corrective technologies described in the previous section were evaluated relative to the requirements presented in **Section 3** and reiterated below:

- Performance, reliability, ease of implementation and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
- Time required to begin and complete the CAP; and
- Institutional requirements, such as State or local permit requirement or other environmental or public health requirements that may substantially affect implementation of the CAP.

Table 5-1 presents the qualitative CMA evaluation of each corrective technology relative to these requirements, as well as their ability to address boron, sulfate, and TDS GWPS exceedances. The following sections provide a summary of these evaluations and a discussion of the potential groundwater corrective measure technologies that may be viable, either independently or in combination, to address GWPS exceedances. This section also provides a summary of corrective measure technologies that have been retained and advanced for evaluation as part of the 35 I.A.C. § 845.670 CAAA process for selecting the final remedy for the AP.

5.2 Groundwater Corrective Technology Assessment

Source control, consisting of CCR consolidation and closure-in-place (CIP) with a final cover system, will be the primary groundwater corrective measure for the AP. Closure is expected to be completed in 2028 and each of the potential groundwater corrective measure technologies would supplement the positive impact of the closure activities. The following sections evaluate groundwater corrective measure technologies that, when combined with site closure, may be viable to address the boron, sulfate, and TDS GWPS exceedances. Technologies that are not viable for addressing the GWPS at the AP will be eliminated from further evaluation and viable technologies will be advanced for further evaluation as part of the 35 I.A.C. § 845.600 CAAA process.

5.2.1 Source Control with Groundwater Polishing

Source control corrective measures (**Section 1.1**) will reduce the mass loading to the groundwater system and the groundwater polishing process could decrease the timeframe for attainment of GWPS in the UA. Groundwater flow and fate and transport modeling incorporating only physical processes indicate that source control is expected to meet GWPS in approximately 17 years. Physical processes are expected to perform well in the UA, as discussed below.

Groundwater polishing by natural geochemical processes is a widely accepted component of groundwater remediation and is routinely approved by the IEPA when paired with source control. The performance of groundwater polishing as a groundwater corrective measure varies based on site-specific conditions and additional data collection may be needed to support the design and regulatory approval. The sandy nature of the UA suggests good performance by physical processes in addressing the boron, sulfate, and TDS in the UA. The chemical processes in the fine-grained USCU require further evaluation.

Naturally occurring geochemical processes are ongoing at the AP and will continue to affect groundwater constituent concentrations during and after AP closure. Ongoing monitoring of groundwater conditions is needed to better understand the mechanisms and efficacy of the groundwater polishing process and to confirm the effectiveness over time. Thus, additional groundwater sample collection and analyses would be required to characterize potential mechanisms, as discussed above, and to provide long term monitoring of the remedial progress. Enhancements to the groundwater monitoring system may be required to ensure that groundwater polishing is occurring as predicted by the groundwater and consistent with the adaptive site management approach. The reliability of groundwater polishing as a groundwater corrective measure is high because operation and maintenance requirements are limited. However, the reliability can also vary based on site-specific hydrogeologic and geochemical conditions.

Following characterization and approval of the CAP, monitoring of the groundwater polishing processes and comparison to functional goals established to monitor progress toward the remedial objective could begin prior to, or concurrently with, site closure activities. Installing additional monitoring wells could begin as quickly as within a few months of CAP approval. The time required could be reduced if existing groundwater monitoring well systems could be utilized for monitoring.

No potential safety impacts or exposure to human health or environmental receptors are expected to result from the groundwater polishing processes. Timeframes to achieve GWPS are dependent on site-specific conditions, which require detailed technical analysis which are ongoing and will be evaluated in connection with the CAAA. Selecting groundwater polishing as a corrective measure for the AP will require approval of the closure and CAP permits by the IEPA.

Monitoring the groundwater polishing to track progress toward achievement of the GWPS, in conjunction with source control at the AP, would require long-term maintenance and monitoring of the groundwater monitoring system to confirm source control and verify the effectiveness in reducing groundwater concentrations to levels below the GWPS. System design could begin immediately after approval of the CAP permit. Additional investigations to characterize site conditions and installation of the final monitoring system could be performed concurrently with the source control (unit closure) activities, which are currently expected to be completed in 2028.

Groundwater polishing processes will continue before and after source control implementation and may be a viable corrective measure for the boron, sulfate, and TDS exceedances at the AP. Therefore, these processes are being advanced to the CAAA for further evaluation.

5.2.2 Source Control with Groundwater Extraction

Source control will reduce the mass loading to the groundwater system and implementing a groundwater extraction system may reduce the time required to attain the GWPS in the UA. However, the groundwater impacts already present in the low permeability PMP may limit the reduction in time to attain the GWPS that can be achieved by a groundwater extraction system.

Groundwater extraction is a widely accepted corrective measure with a long track record of performance and reliability. It is routinely approved by the IEPA as a remedial approach. For a corrective measure using groundwater extraction to effectively control off-site flow and/or to remove potentially contaminated groundwater, horizontal and vertical capture zone(s) must be created. However, the low permeability PMP would restrict the ability to pump at rates high enough to establish the required capture zone(s) or would require a high density of wells or a trench drainage system. Variable performance of a groundwater extraction system would be expected in the UA due to the heterogeneous nature of the UA. In addition, the proximity and influence of Sangchris Lake would potentially result in large volumes of extracted groundwater and lake water. Cutoff walls (**Section 4.3**) could also be used in conjunction with a pumping system to control potential groundwater movement from the lake. A groundwater extraction system in the PMP would be limited by its low permeability; however, a low volume extraction trench in the PMP could be used to enhance groundwater capture from the PMP.

Implementation of a groundwater extraction system presents design challenges due to the heterogeneous and varied nature of the UA as well as the potential for extracting unimpacted lake water. Extracted groundwater (and potentially lake water, depending on the required trench depths relative to lake levels) would need to be managed, which may include modification to the existing NPDES permit and treatment prior to discharge, if necessary. Specialized treatment equipment may be required, and ongoing operations and maintenance activities would be necessary.

There could be some impacts associated with constructing and operating a groundwater extraction system, including some limited exposure to extracted groundwater. Additional data collection and analyses would be required to design an extraction system. Construction could be completed within 1 year following completion of a final design. Time of implementation is approximately 3 to 4 years after approval of the CAP permit, including characterization, design, permitting, and construction. Timeframes to achieve GWPS are dependent on site-specific conditions. An extraction system may reduce the time to attain GWPS in the UA relative to the post-closure timeframe predicted by the groundwater modeling. However, accelerated attainment of the GWPS is expected to be limited by the low permeability of the PMP.

Implementing a groundwater extraction system at the AP would require IEPA approval of the CAP permit, and discharge of extracted groundwater may require a modification to the NPDES permit, as well as possibly permitting and construction of a new outfall. Depending upon the location of the extraction system, an Illinois Department of Natural Resources (IDNR) dam safety modification permit may also be required to construct an extraction system. The potential for wetlands impacts would require evaluation, depending upon the location of the extraction system.

Groundwater extraction could be a viable corrective measure for the boron, sulfate, and TDS exceedances at the AP. Implementation of groundwater extraction may require combining an extraction system with a cutoff wall to prevent potential inflow of water from Sangchris Lake. Therefore, groundwater extraction is being advanced to the CAAA for further evaluation.

5.2.3 Source Control with Groundwater Cutoff Wall

Source control will reduce the mass loading to the groundwater system and implementing additional groundwater corrective measures may reduce the time required to attain the GWPS in the UA. A low permeability cutoff wall could be used in combination with a groundwater extraction system in the UA to reduce the potentially high volumes of extracted groundwater that would be captured by an extraction system between the AP and Sangchris Lake. A cutoff wall could reduce the water management and treatment requirements for an extraction system.

Groundwater cutoff walls are a widely accepted corrective measure used to control and/or isolate impacted groundwater and are routinely approved by the IEPA. Cutoff walls have a long history of reliable performance as hydraulic barriers, provided they are properly designed and constructed. However, if not coupled with a groundwater extraction system, a cutoff wall will provide directional groundwater control only and may result in redistribution of contaminants and potentially GWPS exceedances at new locations.

Cutoff walls are designed to act as hydraulic barriers; as a result, cutoff walls inherently alter the existing groundwater flow system. Changes to the existing groundwater flow system may need to be controlled to maximize the effectiveness of the remedy by, for example, combining a cutoff wall with groundwater extraction to control build-up of hydraulic head upgradient and around the cutoff walls. The effectiveness of a cutoff wall as a hydraulic barrier also relies on the contrast between the hydraulic conductivity of the aquifer and the cutoff wall. The most effective barriers have hydraulic conductivity values that are several orders of magnitude lower than the geologic materials they are in contact with. A cutoff wall designed with hydraulic conductivity of 1×10^{-7} centimeters per second (cm/s) would be two orders of magnitude lower than the PMP and UA, which have mean horizontal hydraulic conductivities around 5×10^{-5} cm/s (Ramboll, 2021) and could improve the performance of a UA extraction system.

Additional data collection and analyses would be required to design a cutoff wall. Construction could be completed within 2 to 3 years. Time of implementation is approximately 4 to 5 years, including characterization, design, permitting and construction. Construction could possibly be accelerated by combining with site closure activities. To attain GWPS, cutoff walls require a separate groundwater corrective measure to operate in concert with the cutoff wall(s). Cutoff walls are commonly coupled with groundwater polishing and/or groundwater extraction as groundwater corrective measures. The time to attain GWPS is dependent on the selected groundwater corrective measure or measures that are coupled with the cutoff walls.

Constructing a cutoff wall at the AP would require IEPA approval of the CAP permit and, depending on the location, an IDNR dam safety modification permit may be required. The potential for wetlands impacts would require evaluation, depending upon the location of the cutoff wall.

A cutoff wall alone would not be a viable corrective measure for the boron, sulfate, and TDS exceedances at the AP. Although a cutoff wall could serve to increase the efficiency of a groundwater extraction system by preventing inflow of water from Sangchris Lake, it would provide directional control only and the likely location of the proposed groundwater extraction system may not benefit from inclusion of a cutoff wall. Therefore, the cutoff wall is not being advanced to the CAAA for further evaluation.

5.2.4 Source Control with In-Situ Chemical Treatment

Source control will reduce the mass loading to the groundwater system and implementing additional groundwater corrective measures may reduce the time required to attain the GWPS in the UA. Use of in-situ treatment, either through targeted injection of reactive media or in PRB systems, to transform contaminants into environmentally acceptable forms to attain the GWPS was considered.

In-situ treatment using ion exchange to address boron, sulfate, and TDS exceedances in groundwater is not an established or widely accepted groundwater corrective measure; therefore, its performance and reliability are unknown. Regulatory acceptance of this innovative approach to achieving the GWPS is uncertain.

In-situ treatment presents design and construction challenges, including targeted reactive media delivery via injection to the low permeability PMP and to the heterogeneous and discontinuous UA. Complicated construction, if feasible, may be required for a PRB system in close proximity to Sangchris Lake. Depending upon the location of the PRB system, construction may affect the AP embankment and/or final cover system and periodic change-outs of ion exchange resin media may be required.

Additional data collection and analyses would be required to design an in-situ treatment system, and bench scale and/or pilot scale testing may be required to demonstrate performance and reliability. Time of implementation is approximately 4 to 6 years after approval of the CAP permit, including characterization, design, permitting, and construction. Timeframes to achieve GWPS are dependent on demonstrations of performance and reliability and on ultimate regulatory acceptance. It is not known whether in-situ treatment would reduce the time to attain GWPS in the UA relative to the post-closure timeframe predicted by the groundwater modeling.

Due to the uncertain performance, reliability and potential for regulatory acceptance, in-situ chemical treatment is not a viable corrective measure for the boron, sulfate, and TDS exceedances at the AP and is not being advanced to the CAAA for further evaluation.

5.2.5 Source Control with Phytoremediation

Source control will reduce the mass loading to the groundwater system, and implementing a groundwater phytoremediation system may reduce the time required to attain the GWPS in the UA and in the PMP. Groundwater extraction via phytoremediation ("phytoextraction") is a proven and accepted corrective measure with a track record of performance and reliability and has been approved by the IEPA. However, phytoremediation has not been widely implemented to reduce groundwater contaminant migration from CCR impoundments to date. For phytoextraction to effectively control off-site flow and/or to remove potentially contaminated groundwater, horizontal and vertical capture zone(s) must be created. Implementation of phytoremediation may be viable for boron, sulfate, and TDS impacts in the post-closure CCR removal areas of the AP.

Phytoremediation design may be less complicated than a groundwater extraction system or a cutoff wall, but specialty contractors may be required. Uptake of impacted groundwater would occur through the tree roots and contaminants would be stored in the above-ground tree tissues (stems and leaves), which would need to be managed and/or disposed of following extraction. Specialized treatment equipment may be required, and ongoing operations and maintenance activities would be necessary, including leaf collection and disposal, and possible tree replacement, depending upon the time required to achieve GWPS.

Additional data collection and analyses would be required to design a phytoextraction system. Construction could be completed within 1 year following design. Time of implementation is approximately 3 to 4 years after approval of the CAP permit, including characterization, design, pilot-scale testing of phytoremediation at the site, permitting, and construction. Timeframes to achieve GWPS are dependent on site-specific conditions. A phytoextraction system may reduce the time to attain GWPS in the UA relative to the post-closure timeframe predicted by the groundwater modeling depending upon the ability of the root structures to access the UA.

Implementing a groundwater phytoextraction system at the AP would require IEPA approval of the CAP permit. An IDNR dam safety modification permit and special design considerations may also be required, depending upon the location of the trees.

Groundwater phytoextraction could be viable corrective measure for the boron (and possibly sulfate and TDS) exceedances at the AP. Therefore, phytoremediation is being advanced to the CAAA for further evaluation.

5.3 Technologies Advanced to CAAA

Based on the evaluations presented above, the following potential corrective technologies are being advanced to the CAAA, individually or in combination, for more detailed evaluations:

- Source control with groundwater polishing;
- Source control and with groundwater extraction; and
- Source control with phytoremediation.

6. REFERENCES

Bañuelos, G. S., Shannon, M. C., Ajwa, H., Draper, J. H., Jordahl, J., and Licht, J., 1999, *Phytoextraction and Accumulation of Boron and Selenium by Poplar (Populus) Hybrid Clones*, International Journal of Phytoremediation, 1:1, 81-96, DOI: 10.1080/15226519908500006

Burns & McDonnell Engineering Company, Inc., 2022. *Construction Permit Application, Kincaid Power Plant Ash Pond, (IEPA ID W0218140002-01), Kincaid, Illinois*, Burns & McDonnell, July 28, 2022.

D'Appolonia, D.J., and Ryan, C.R., 1979. *Soil-Bentonite Slurry Trench Cut-Off Wall*s, Geotechnical Exhibition and Technical Conference, Chicago, Illinois.

Electric Power Research Institute (EPRI), 2006. *Groundwater Remediation of Inorganic Constituents at Coal Combustion Project Management Sites, Technical Report #1012584*, October 2006.

Gavaskar, A.R., N Gupta, B.M. Sass, R.J. Janosy and D. O'Sullivan, 1998. *Permeable Reactive Barriers for Groundwater Remediation: Design, Construction and Monitoring*. Battelle Press.

Interstate Technology & Regulatory Council (ITRC), 2017. *Remediation Management of Complex Sites*. RMCS-1. Washington, D.C.: Interstate Technology & Regulatory Council, Remediation Management of Complex Sites Team. https://rmcs-1.itrcweb.org.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017. *Hydrogeologic Monitoring Plan, Kincaid Ash Pond – CCR Unit ID 141, Kincaid Power Station, Kincaid, Illinois*. October 17, 2017.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. *Hydrogeologic Site Characterization Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois*. October 25, 2021.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022. *Groundwater Modeling Report, Ash Pond, Kincaid Power Plant Ash Pond, Kincaid, Illinois*. July 28, 2022.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2023. 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2, Ash Pond, Kincaid Power Plant, Kincaid, Illinois. September 15, 2023.

USEPA (United States Environmental Protection Agency), 1999a. *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. Directive No. 9200.U-17P*. Washington, D.C.: EPA, Office of Solid Waste and Emergency Response.

USEPA (United States Environmental Protection Agency), 1999b. *Phytoremediation Resource Guide*, EPA 542-B-99-003. Washington, D.C.: EPA, Office of Solid Waste and Emergency Response. June 1999.

USEPA (United States Environmental Protection Agency), 2001. *Phytoremediation of Contaminated Soil and Ground Water at Hazardous Waste Sites,* EPA/540/S-01/500. Washington, D.C.: EPA, Technology Innovation Office, Office of Solid Waste and Emergency Response. February 2001.

USEPA (United States Environmental Protection Agency), 2007*. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water, Volume 1 – Technical Basis for Assessment. EPA/600/R-07/139*. National Risk Management Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio. October 2007.

United States Environmental Protection Agency (USEPA), 2015a. *80 FR 21302 - Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities*. Federal Register Volume 80, Issue 74. April 17, 2015.

USEPA (United States Environmental Protection Agency), 2015b. *Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. Directive No. 9283.1-36*. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. August 2015.

USEPA (United States Environmental Protection Agency), 2022. *Adaptive Site Management – A Framework for Implementing Adaptive Management at Contaminated Sediment Superfund Sites. Directive No. 9200.1-166*. U.S. Environmental Protection Agency. June 2022.

Yıldırım, K., Kasım, G.Ç., 2018. *Phytoremediation potential of poplar and willow species in small scale constructed wetland for boron removal*. Chemosphere. 2018 Mar;194:722-736. doi: 10.1016/j.chemosphere.2017.12.036. Epub 2017 Dec 7. PMID: 29247932.

Tables

TABLE 5-1. CORRECTIVE MEASURES ASSESSMENT MATRIX
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS
5/12/2024

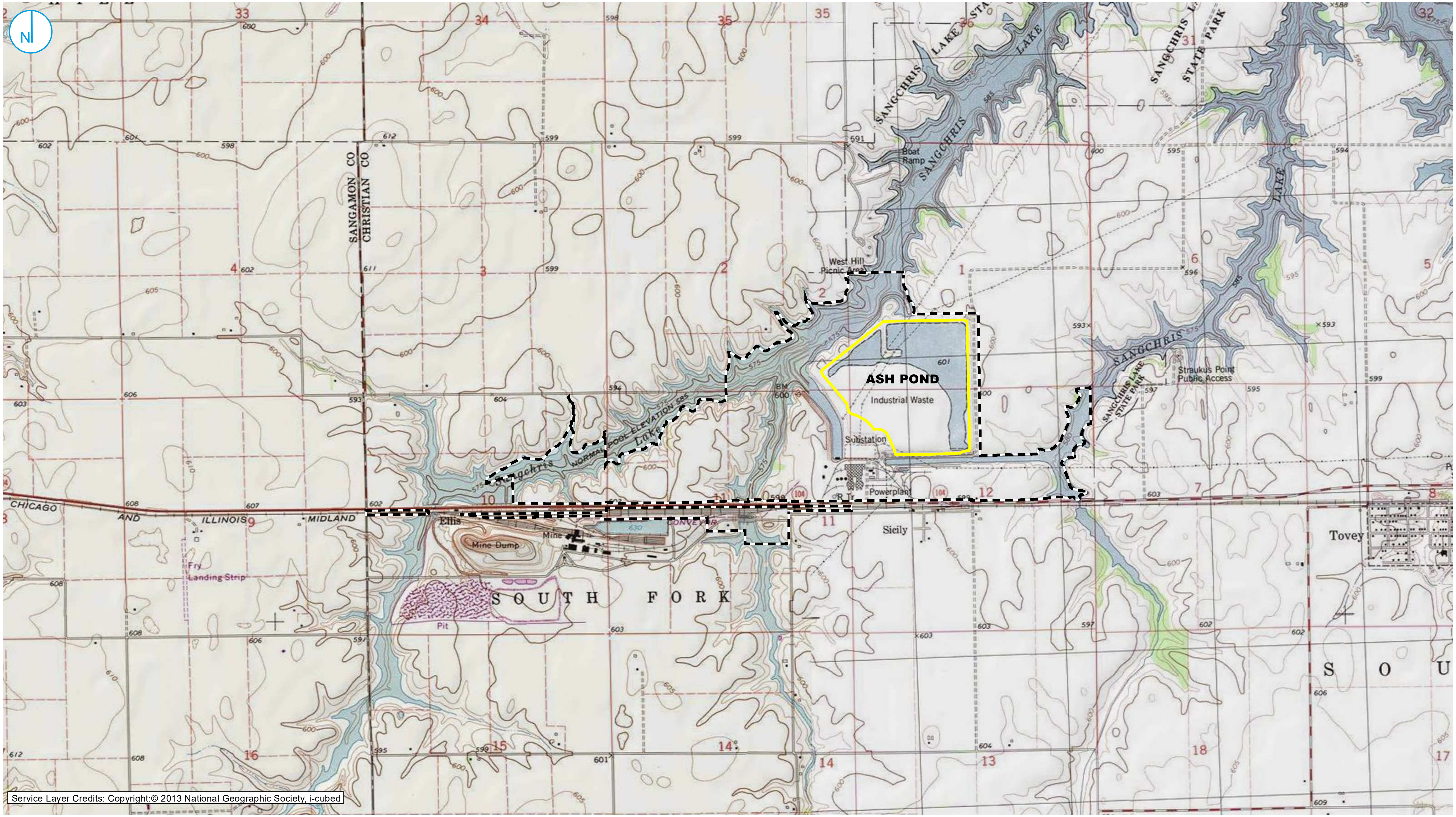
Remedy	Evaluation Factors					
	Performance	**Reliability**	**Ease of Implementation**	**Potential Impacts of Remedy (safety impacts, cross-media impacts, control of exposure to any residual contamination)**	**Time Required to Begin and Implement Remedy[1]**	**Time to Attain Groundwater Protection Standards**	**Institutional Requirements (state/local permit requirements, environmental/public health requirements that affect implementation of remedy)**
Source Control with Groundwater Polishing	Performs best paired with source control, which is expected to be completed prior to 2028. Site conditions are favorable for physical processes, while chemical processes may limited under normal aquifer conditions.	Ongoing analysis will evaluate if the attenuation mechanism has low reversibility, the aquifer has sufficient capacity, and the hydrogeology is favorable for dilution/dispersion.	Long-term monitoring would be required. Implementing would not require extensive specialized equipment or contractors	None identified.	Approximately 90 days after closure is completed (consolidation of the northern portion).	Estimated to be 17 years post-closure, as predicted by the groundwater model.	IEPA approval of the closure and CAP permits is required.
Source Control with Groundwater Extraction	Widely accepted, routinely approved technology; variable performance anticipated due to the heterogeneous, varied nature of uppermost aquifer. An extraction trench may be more effective than a pumping system. Proximity to the lake may require groundwater extraction to be combined with a cutoff wall to prevent capturing lake water.	Reliable if properly designed, constructed and maintained. However, the heterogeneous, varied nature of uppermost aquifer may present reliability challenges for pumping wells.	Design challenges due to heterogenous, varied nature of uppermost aquifer. Specialized contractors not needed for construction of a pumping well system but may be required for an extraction trench. The extraction system would require ongoing routine operation and maintenance activities and extracted groundwater would require management, possibly including treatment, which may also require specialized equipment/contractors and higher maintenance costs.	Alters groundwater flow system and there is the some limited potential for contact exposure to extracted groundwater. Groundwater extraction may induce settlement, which could cause structural impacts to adjacent structures.	Design, permitting and construction is expected to take 3 to 4 years after CAP permit approval.	Dependent on site-specific conditions not yet fully characterized. May be similar to the 17 years predicted by the groundwater model due to the low permeability Semi-Confining Unit (PMP).	IEPA approval of the closure and CAP permits is required. Extracted groundwater may require modification to the NPDES permit. IDNR dam safety modification permit might also be required, depending on location of the extraction system and settlement potential. May require permitting for wetlands impacts, if determined to be necessary.
Source Control with Groundwater Cutoff Wall	Widely accepted and routinely approved technology with good performance if properly designed and constructed. If not combined with groundwater extraction, a cutoff wall will provide directional control only, thus redirecting flow to other areas where GWPS may be exceeded.	Reliable for groundwater directional control if properly designed and constructed.	Widely used, established technology. May require specialized contractors depending upon the construction/implementation method.	Alters groundwater flow system but does not provide any treatment. Can result in unintended consequences resulting from redirecting contaminants to areas where they are not currently present. May cause structural impacts to existing embankments, depending on the location of the cutoff wall.	Design, permitting and construction is expected to take 4 to 5 years after CAP approval. Implementation could be accelerated by combining with closure construction activities.	Provides groundwater directional control only. Combination with other groundwater corrective measure(s), such as groundwater extraction or a permeable reactive barrier, may reduce the time required to achieve and attain GWPS. Time required may be similar to the 17 years predicted by the groundwater model due to the low permeability Upper Semi-Confining Unit.	IEPA approval of the closure and CAP permits is required. IDNR dam safety modification permit might also be required, depending on location of wells and potential impacts to embankments. May require permitting for wetlands impacts, if determined to be necessary.
Source Control with In-Situ Treatment	PRB or in-situ treatment using IX is not well established for sulfate or boron, therefore performance is unknown.	Unknown reliability for sulfate or boron.	Design challenges related to reactive material delivery due to heterogenous, discontinuous nature of uppermost aquifer. Could require periodic change-outs of resin media.	May cause structural impacts to existing embankments, depending on the location of the PRB.	May require bench scale and/or pilot scale testing as part of design. Design, permitting and construction is expected to take 4 to 6 years after CAP approval.	There is uncertainty regarding whether a in-situ treatment would reduce sulfate or boron concentrations to achieve the GWPS. Dependent on conditions specific to the reactive media used and the site. Treatment technology is not well understood.	IEPA approval of the CAP permit is required. IEPA approval of this innovative and relatively unproved solution may be challenging. IDNR dam safety modification permit might also be required, depending on location of wells/PRB and impacts to existing embankments. May require permitting for wetlands impacts, if determined to be necessary.
Source Control with Phytoremediation	Accepted and proven remedial strategy. Physical removal without active treatment (sequestration). May be viable for boron and sulfate impacts in the portion of the Ash Pond undergoing closure by removal.	Reliable for hydraulic control of groundwater and phytoextraction of boron if tree variety is properly selected for site conditions. Unknown reliability of phytoremediation mechanisms for sulfate that may compliment hydraulic control.	Less complicated engineering design but may require specialized contractors depending upon the construction/implementation method.	Potential need for future management/disposal of trees following extraction of contaminant mass.	Permitting and construction would take 3 to 4 years after closure. Could be combined with closure.	Phytoremediation has the potential to reduce the time required to achieve and attain GWPS. Time required is dependent on ability of root structure to access the UA.	IEPA approval of the CAP permit is required. IEPA approval of this innovative and relatively unproved solution may be challenging. May require a IDNR dam safety permit and special design considerations, depending on location of the trees.

Notes:
[1] Time required to begin and implement remedy includes design, permitting, and construction.

RAMBOLL

Figures

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\GMP\Figure 1-1_Site Location Map.mxd



PROJECT: 169000XXXX | DATED: 8/5/2021 | DESIGNER: galarnmc

REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 2-1

35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\GMP\Figure 1-2_Site_Map.mxd

PROJECT: 169000XXXX | DATED: 8/5/2021 | DESIGNER: galarnmc

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 250 500 Feet

SITE MAP

35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE (SG-02). ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. THE AVERAGE ELEVATION FROM JUNE 12, 2023 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
PORE WATER WELL
MONITORING WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 250 500 Feet

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP JUNE 12, 2023

35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-3

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/27/2023 | DESIGNER: egreaves

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Kincaid\2023_04_Kincaid_Pot_Map.aprx

Y:\Mapping\Projects\22\2285\MXD\GMP\Kincaid\Figure 2-1. Expanded Part 257 GW Monitoring Well Network.mxd

PROJECT: 169000XXXX | DATED: 1/19/2023 | DESIGNER: galarmmc

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
STAFF GAGE, CCR UNIT
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

MONITORING WELL LOCATION MAP

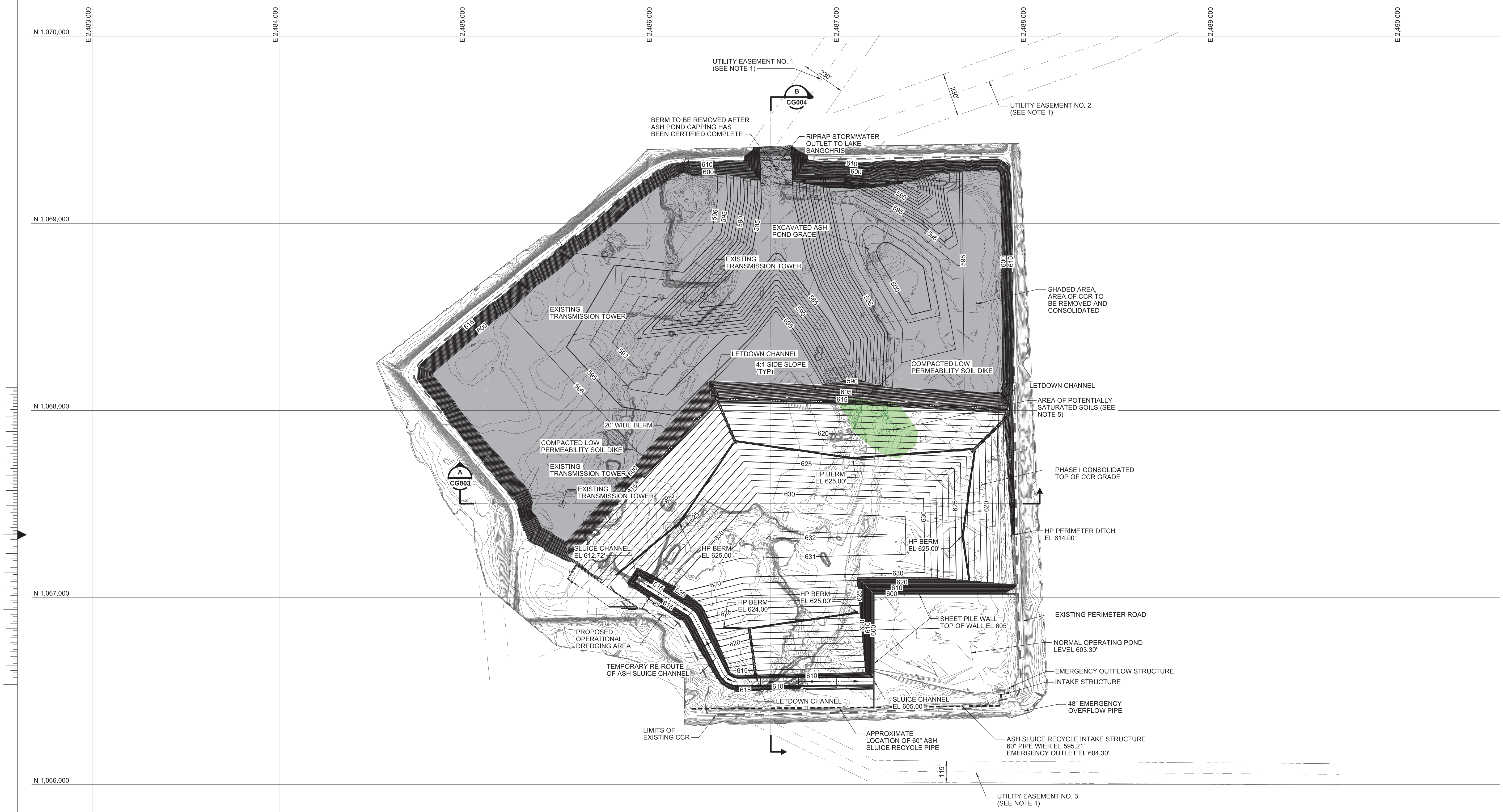
35 I.A.C. § 845 CORRECTIVE MEASURES ASSESSMENT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Attachment A - Selected Construction Permit Application Plans



NOTES:

1. UTILITY EASEMENT DELINEATION DESCRIPTION CAN BE FOUND ON DOCUMENT NO. 1998R1245.
2. EXISTING CONTOURS SHOWN ARE FROM TOPOGRAPHY AND BATHYMETRY SURVEY PROVIDED BY INGENAE DATED 2/226/2021.
3. EXISTING TRANSMISSION LINES WILL BE RELOCATED, RAISED, OR MODIFIED TO ALLOW FOR CONSTRUCTION ACCESS.
4. THIS DRAWING REPRESENTS THE CONFIGURATION OF THE 84-ACRE CLOSE-IN-PLACE CONFIGURATION, BUT DOES NOT FULLY DEPICT THE INTERIM CONDITIONS NEEDED TO ACHIEVE THIS CONFIGURATION, THE PHASE 2 GRADING PLAN (SEE DWG CG002) REPRESENTS THE FINAL CLOSE-IN-PLACE CONFIGURATION, INCLUDING THE TOTAL QUANTITY OF CCR MATERIAL TO BE CONSOLIDATED WITHIN THE 84-ACRE CLOSE-IN-PLACE AREA.
5. AREA OF POTENTIALLY SATURATED CCR. SATURATED CCR UNDER LOW PERMEABILITY DIKE WILL BE REMOVED AND REPLACED WITH LOW PERMEABLE SOIL.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT REVIEW
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184,001310-0006

designed R. OWENS | detailed S. NICHOLS

Luminant

SOUTH FORK TOWNSHIP, ILLINOIS

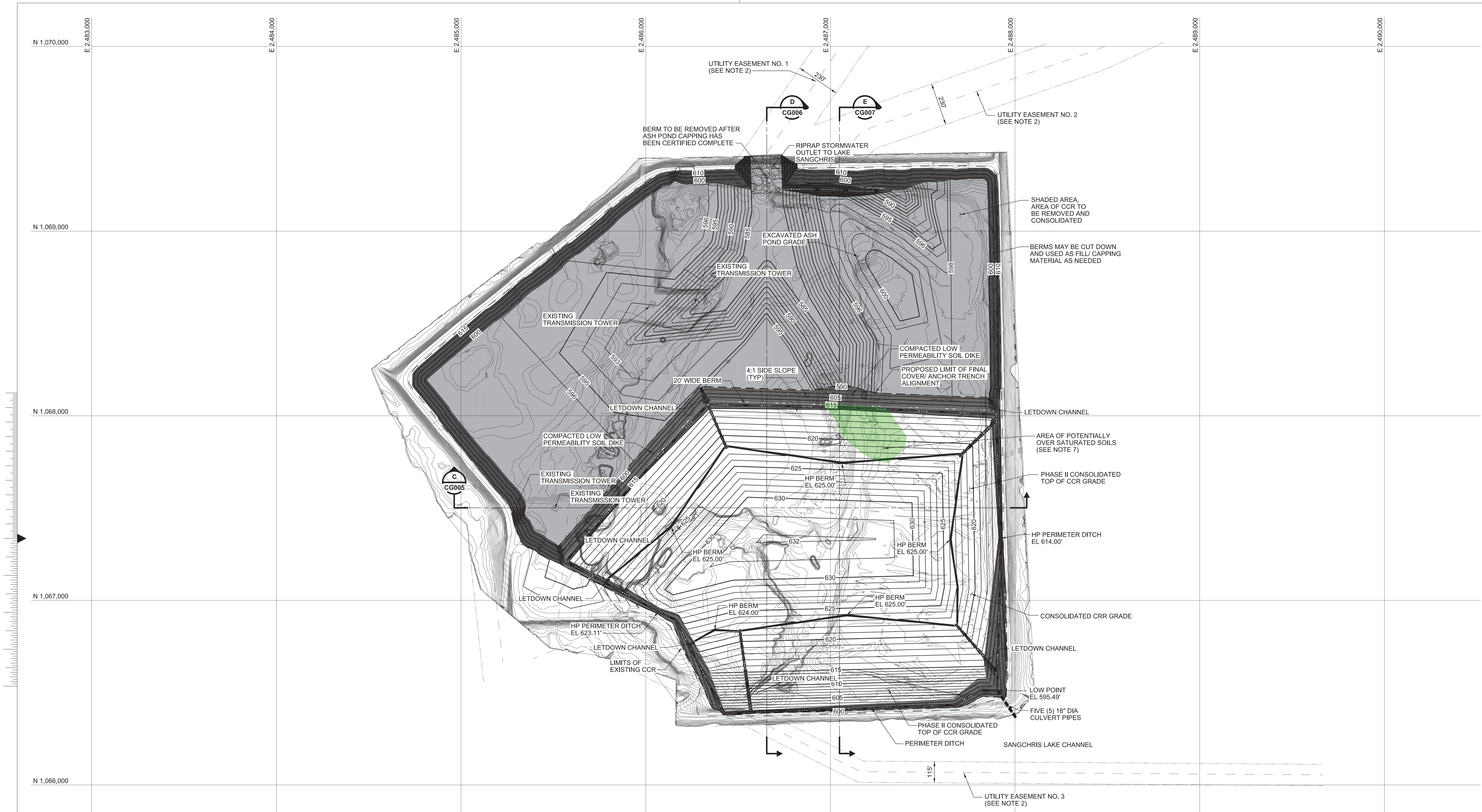
KINCAID ASH POND
CONSOLIDATED GRADING PLAN
PHASE 1

project 132803 | contract 8110

drawing CG001 — rev. E

sheet 1 of 1 sheets

file 135946CG001.DGN



NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPOGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. UTILITY EASEMENT DELINEATION DESCRIPTION CAN BE FOUND ON DOCUMENT NO. 1998R1245.
3. EXISTING CONTOURS SHOWN ARE FROM TOPOGRAPHY AND BATHYMETRY SURVEY PROVIDED BY INGENAE DATED 2/26/2021.
4. EXISTING PIPES THROUGH DIKES TO BE ABANDONED IN PLACE AND FILLED WITH NON-SHRINK GROUT.
5. SHEET PILING INSTALLED IN INITIAL PHASE TO REMAIN IN PLACE.
6. EXISTING TRANSMISSION LINES WILL BE RELOCATED, RAISED, OR MODIFIED TO ALLOW FOR CONSTRUCTION ACCESS.
7. AREA OF POTENTIALLY SATURATED CCR. SATURATED CCR UNDER COMPACTED LOW PERMEABLE SOIL DIKE WILL BE REMOVED AND REPLACED WITH LOW PERMEABLE SOIL.

NORTH

0 200' 400' SCALE IN FEET

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT REVIEW
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184,001310-0006

designed R. OWENS | detailed S. NICHOLS

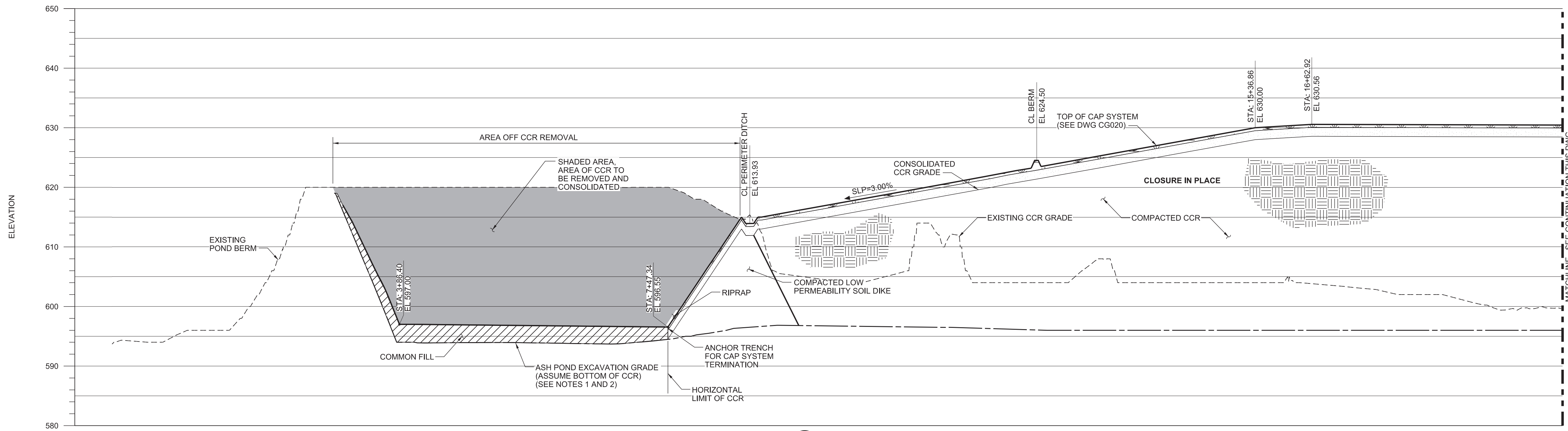
Luminant
SOUTH FORK TOWNSHIP, ILLINOIS

KINCAID ASH POND
CONSOLIDATED GRADING PLAN
PHASE 2

project 132803 | contract 8110
drawing CG002 — rev. E
sheet 1 of 1 sheets
file 135946CG002.DGN

Z:\Clients\ENS\VistraEnergy\132803_PrtB45CnPermit\Design\CADD\Dwgs\Dwgs\Contracts\132803CG002.dgn

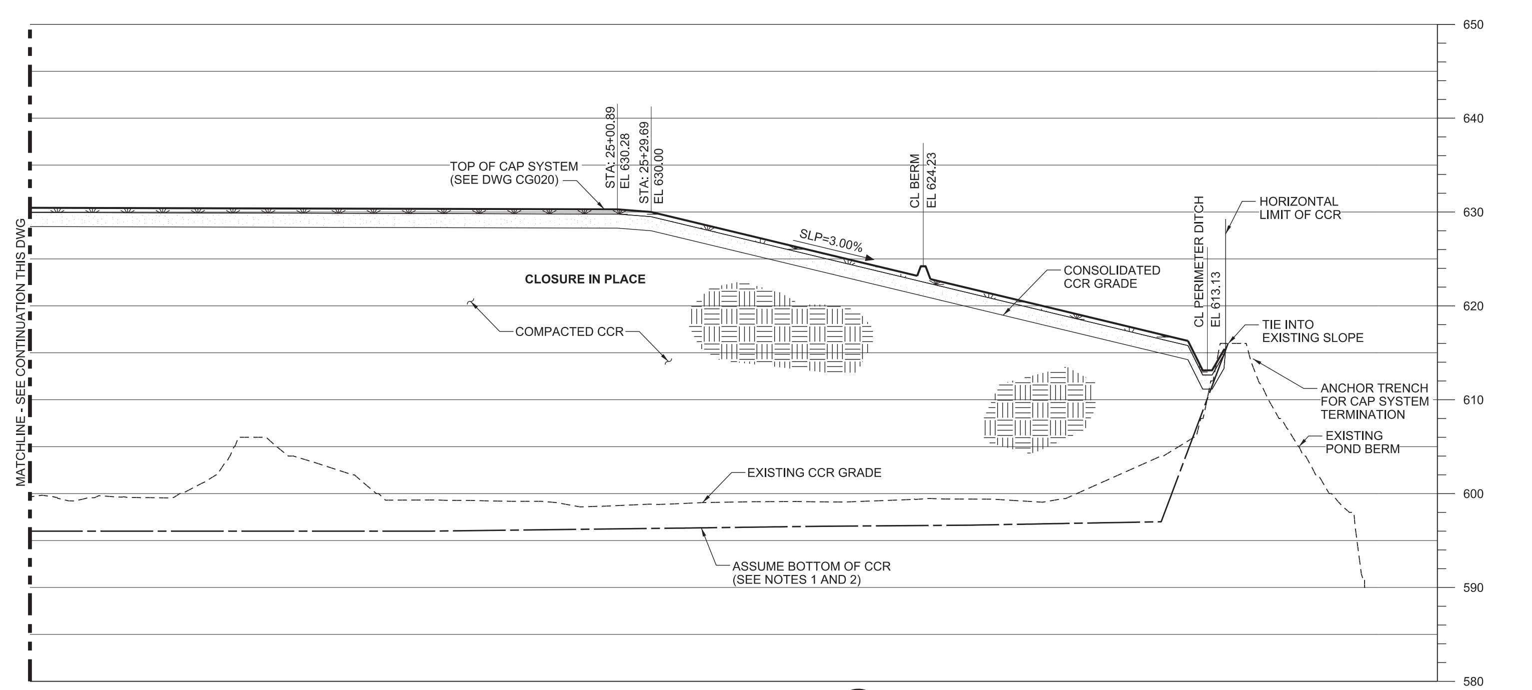
7/27/2022 $USERNAME$TIME$



SECTION A CG001

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET



SECTION A CG001

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET

NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. VERTICAL EXCAVATION LIMITS SHOWN DO NOT ACCOUNT FOR OVER-EXCAVATION OF SUBSOILS.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS & McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184.001310-0006

designed: R. OWENS | detailed: S. NICHOLS

Luminant

SOUTH FORK TOWNSHIP, ILLINOIS

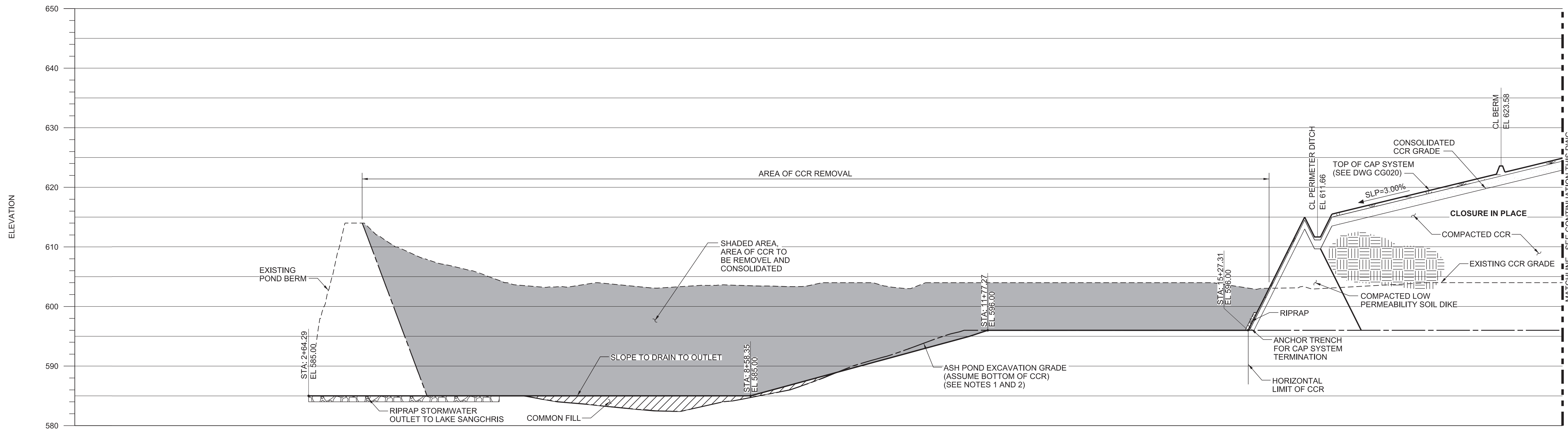
KINCAID ASH POND
CONSOLIDATED GRADING SECTIONS
PHASE 1
SHEET 1

project: 132803 | contract: 8110

drawing: CG003 — rev. E

sheet 1 of 1 sheets

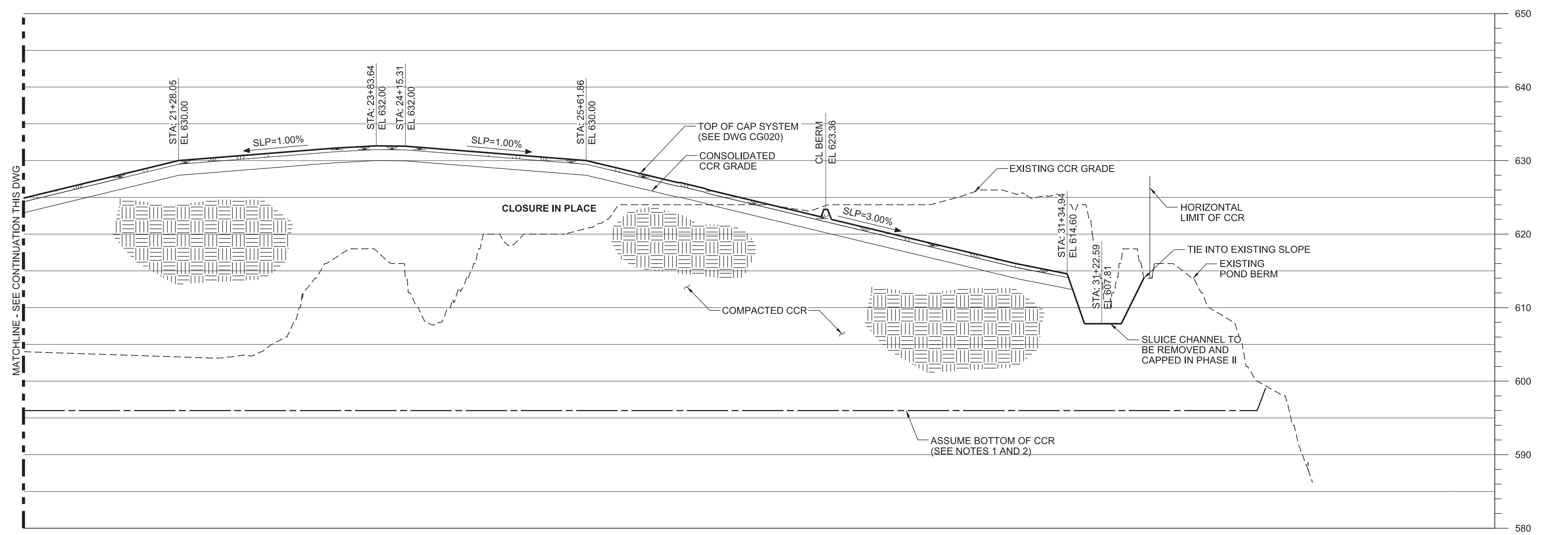
file 135946CG003.DGN



SECTION B CG001

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET



SECTION B CG001

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET

NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPOGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. VERTICAL EXCAVATION LIMITS SHOWN DO NOT ACCOUNT FOR OVER-EXCAVATION OF SUBSOILS.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184.001310-0006

designed R. OWENS | detailed S. NICHOLS

Luminant
SOUTH FORK TOWNSHIP, ILLINOIS

KINCAID ASH POND
CONSOLIDATED GRADING SECTIONS
PHASE 1
SHEET 2

project 132803 | contract 8110

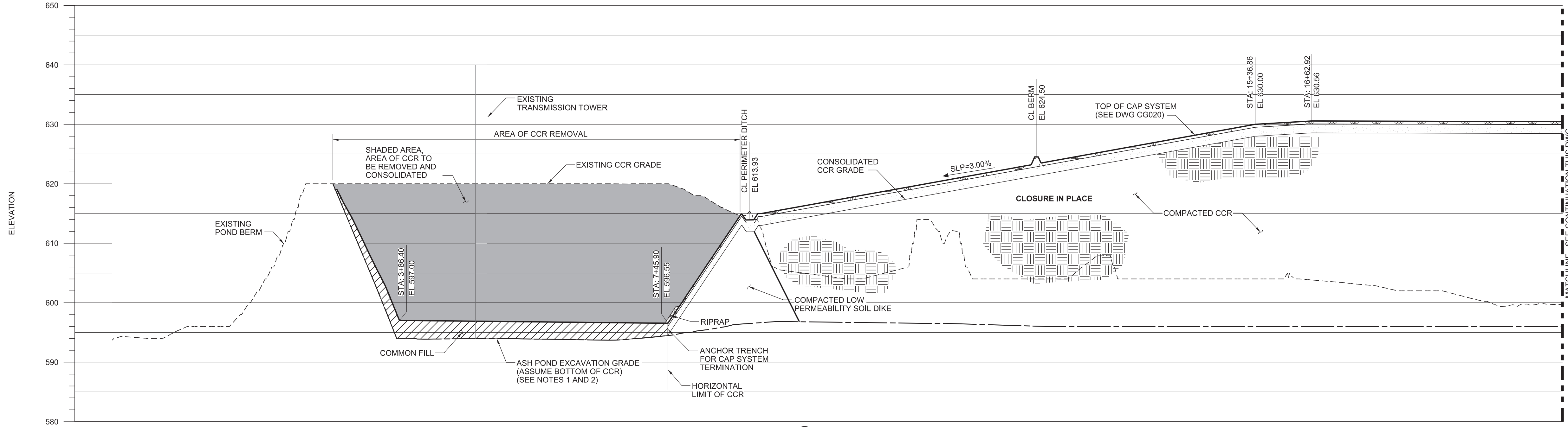
drawing **CG004** rev. **E**

sheet 1 of 1 sheets

file 135946CG004.DGN

Z:\Clients\ENS\VistraEnergy\132803_PrtB45CnPermit\Design\CADD\Dwgs\Dwgs\Contracts\132803CG004.dgn

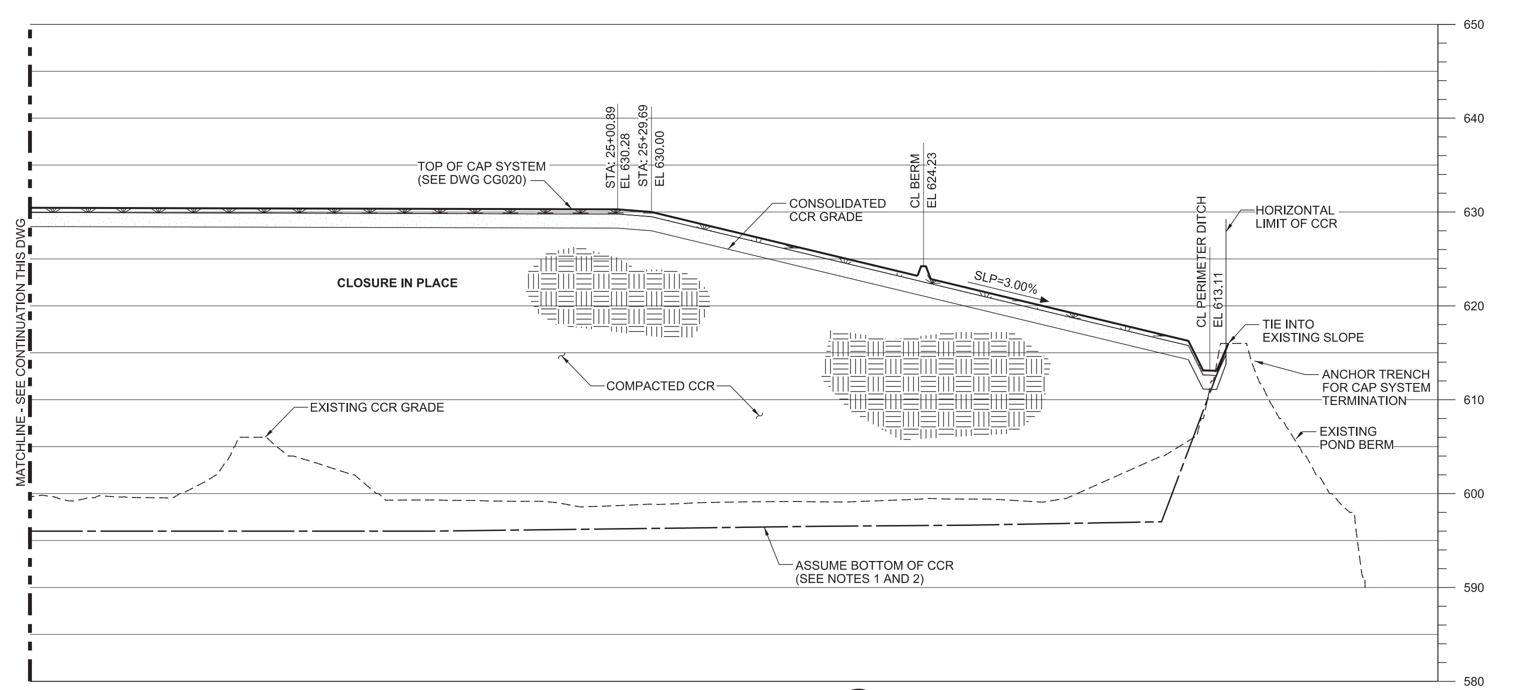
7/26/2022 rowens 4:22:29 PM



SECTION C CG002

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET



SECTION C CG002

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET

NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. VERTICAL EXCAVATION LIMITS SHOWN DO NOT ACCOUNT FOR OVER-EXCAVATION OF SUBSOILS.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184,001310-0006
designed R. OWENS
detailed S. NICHOLS

Luminant

SOUTH FORK TOWNSHIP, ILLINOIS

KINCAID ASH POND
CONSOLIDATED GRADING SECTIONS
PHASE 2
SHEET 1

project 132803 | contract 8110

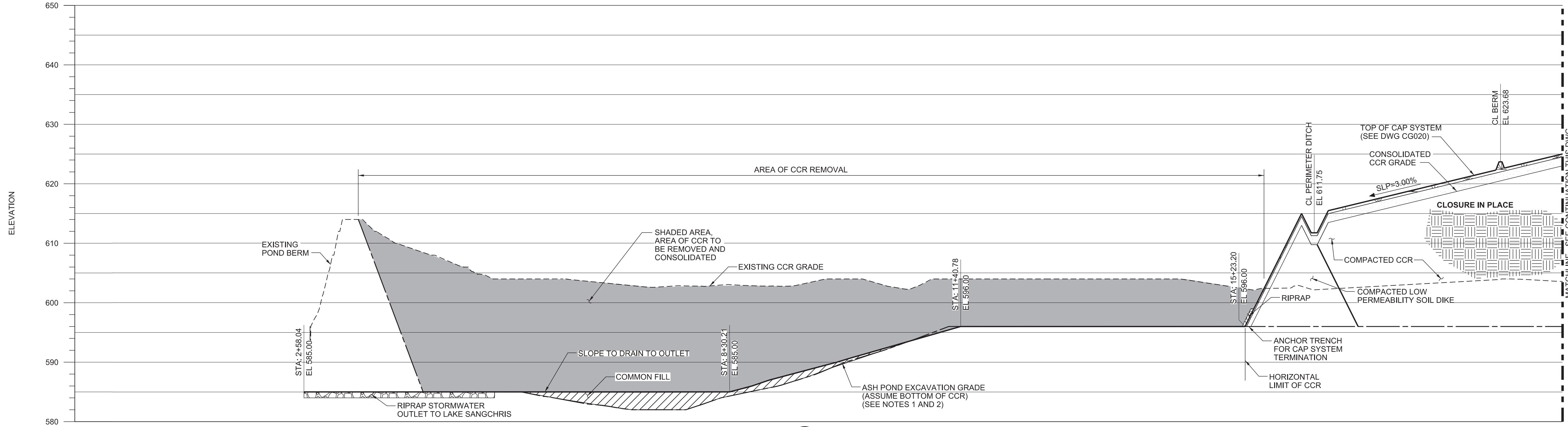
drawing CG005 — rev. E

sheet 1 of 1 sheets

file 135946CG005.DGN

Z:\Clients\ENS\VistraEnergy\132803_Pt845CnPermit\Design\CADD\Dwgs\Dwgs\Contracts\132803CG005.dgn

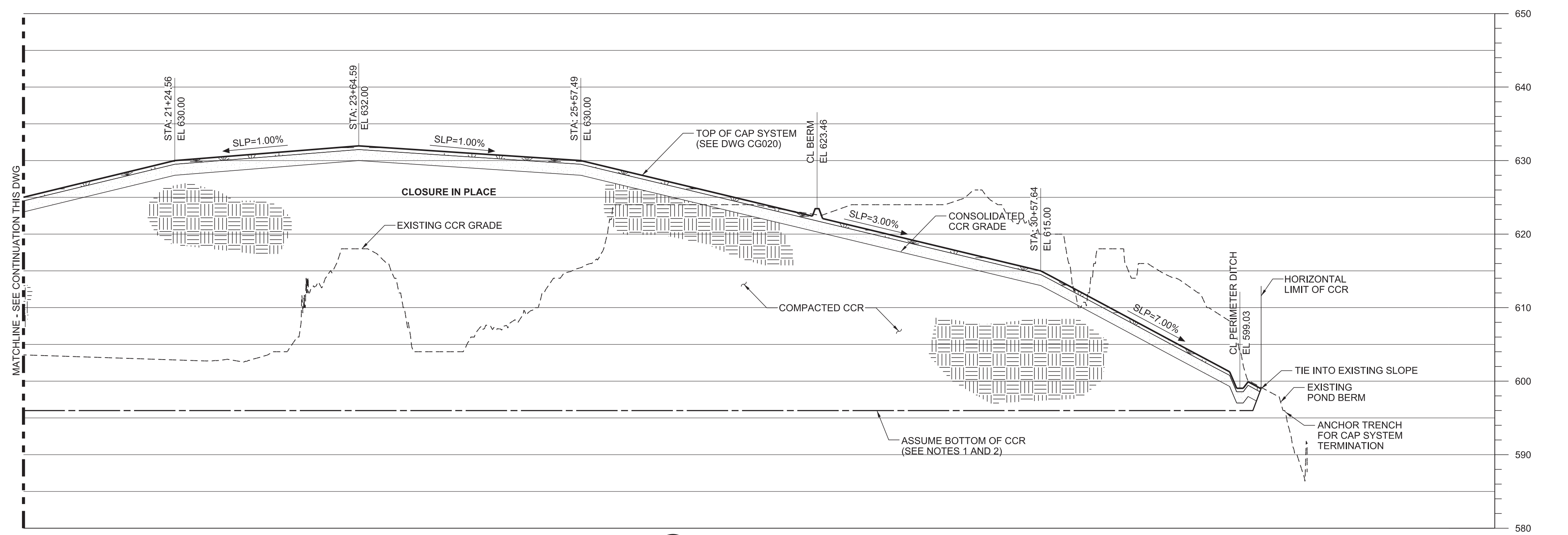
7/26/2022 rowens 4:25:03 PM



SECTION D CG002

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET



SECTION D CG002

HORIZ: 0 60' 120' SCALE IN FEET

VERT: 0 7.5' 15' SCALE IN FEET

NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPOGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. VERTICAL EXCAVATION LIMITS SHOWN DO NOT ACCOUNT FOR OVER-EXCAVATION OF SUBSOILS.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184,001310-0006

designed R. OWENS | detailed S. NICHOLS

Luminant

SOUTH FORK TOWNSHIP, ILLINOIS

KINCAID ASH POND
CONSOLIDATED GRADING SECTIONS
PHASE 2
SHEET 2

project 132803 | contract 8110

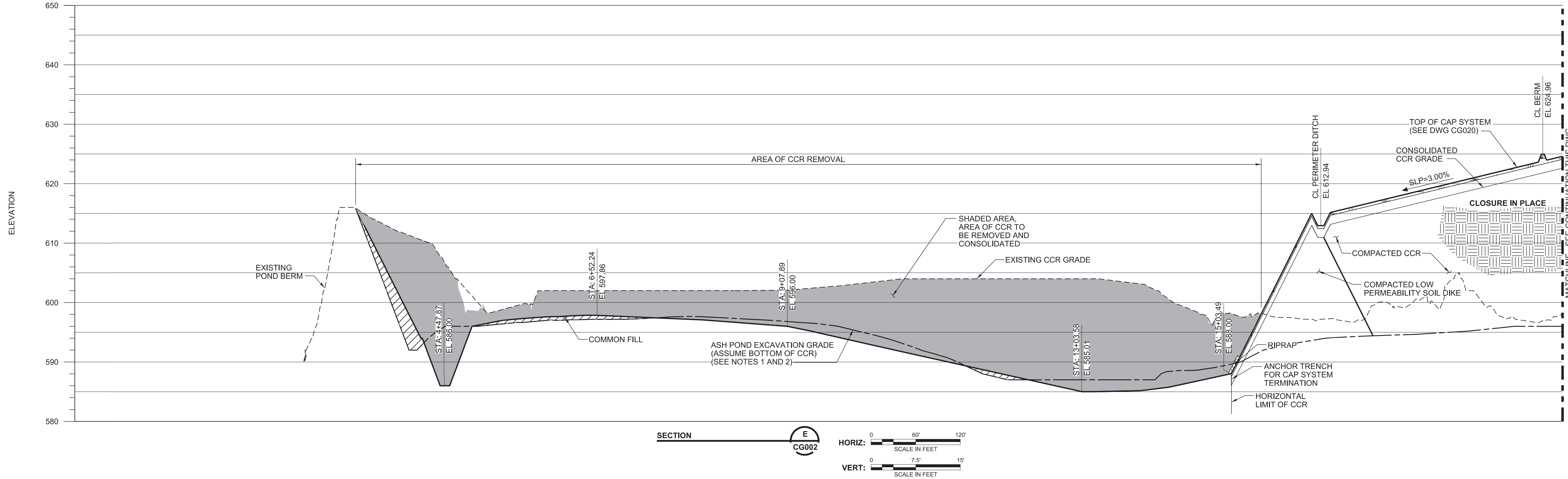
drawing **CG006** — rev. **E**

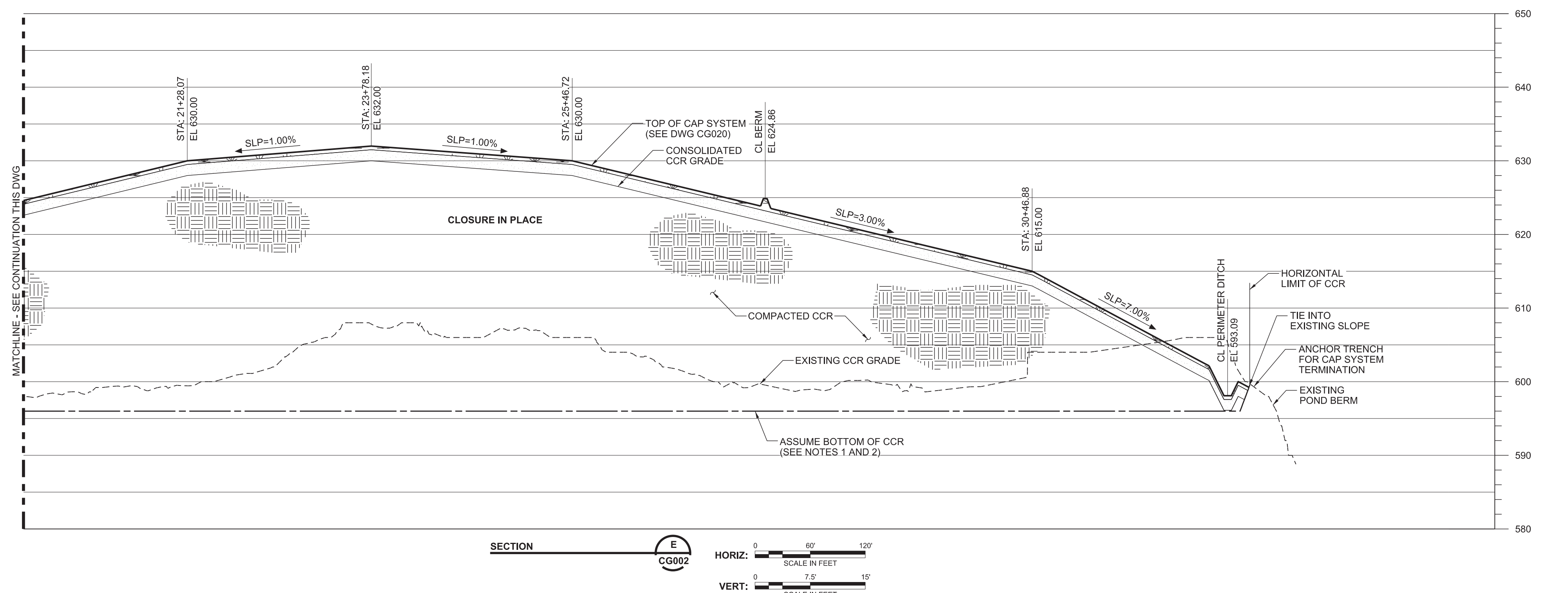
sheet 1 of 1 sheets

file 135946CG006.DGN

Z:\Clients\ENS\VistraEnergy\132803_Pt845CnPermit\Design\CADD\Dwgs\Dwgs\Contracts\132803CG006.dgn

7/26/2022 rowens 4:26:07 PM





NOTES:

1. ASSUMED BOTTOM OF CCR SURFACE BASED ON TOPOGRAPHIC SURFACE FILE BOA_v5A.DWG PROVIDED BY RAMBOLL ON MARCH 14, 2022.
2. VERTICAL EXCAVATION LIMITS SHOWN DO NOT ACCOUNT FOR OVER-EXCAVATION OF SUBSOILS.

FOR PERMITTING PURPOSES ONLY

no.	date	by	ckd	description
E	07/28/22	RNO	MDB	ISSUED FOR PERMIT
D	07/20/22	RNO	MDB	ISSUED FOR OWNER REVIEW
C	07/11/22	RNO	MDB	ISSUED FOR OWNER REVIEW
B	07/06/22	RNO	MDB	ISSUED FOR OWNER REVIEW
A	05/03/22	RNO	MDB	ISSUED FOR OWNER REVIEW

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
Burns & McDonnell Engineering Co, Inc.
Firm Reg. No. 184,001310-0006

designed R. OWENS | detailed S. NICHOLS

Luminant
SOUTH FORK TOWNSHIP, ILLINOIS

KINCAID ASH POND
CONSOLIDATED GRADING SECTIONS
PHASE 2
SHEET 3

project	contract
132803	8110

drawing CG007 — rev. E
sheet 1 of 1 sheets
file 135946CG007.DGN

Z:\Clients\ENS\VistraEnergy\132803_PtII845CnPermit\Design\CADD\Dwgs\Dwgs\Contracts\132803CG007.dgn
7/26/2022 rowens 4:27:11 PM

Appendix D

Nature and Extent Report

NATURE & EXTENT REPORT

Intended for

Kincaid Generation, LLC
199 IL 104
Kincaid, IL 62540

Date

May 12, 2024

Project No.

1940103584-007

NATURE AND EXTENT REPORT

KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

NATURE AND EXTENT REPORT
KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940103584-007**
Recipient	**Kincaid Generation, LLC**
Document type	**Nature and Extent Report**
Revision	**FINAL**
Date	**May 12, 2024**
Prepared by	**Nathaniel Keller and Alison O'Connor**
Checked by	**Melanie Conklin**
Approved by	**Brian G. Hennings, PG**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Alison O'Connor, PhD
Geochemist

Nathaniel R. Keller
Senior Technical Manager, Hydrogeology

Brian G. Hennings, PG
Project Officer, Hydrogeology

CONTENTS

TABLES (ATTACHED)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
BCU	bedrock confining unit
bgs	below ground surface
CCR	coal combustion residuals
CMA	Corrective Measures Assessment
cm/s	centimeters per second
CSM	conceptual site model
E001	Event 1
E002	Event 2
E003	Event 3
GCSM	geochemical conceptual site model
GWPS	groundwater protection standard
ID	Identification
IEPA	Illinois Environmental Protection Agency
HCR	Hydrogeologic Site Characterization Report
KPP	Kincaid Power Plant
LCL	lower confidence limit
LCU	lower confining unit
mg/L	milligrams per liter
ORP	oxidation reduction potential
PMP	potential migration pathway
SEP	sequential extraction process
SI	surface impoundment
TDS	total dissolved solids
UA	uppermost aquifer
USCU	upper semi-confining unit
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

Groundwater samples collected at the Kincaid Power Plant (KPP) Ash Pond (AP) during June 2023 for the Quarter 2, 2023 compliance sampling event (Event 1 [E001]) were evaluated for exceedances of the groundwater protection standards (GWPS) described in Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600. Exceedances were identified in the following hydrostratigraphic units and wells:

- Detected Uppermost Aquifer (UA) Exceedances:
  - Boron at MW-12 and MW-28
  - Sulfate at MW-28 and MW-32
  - Total dissolved solids (TDS) at MW-28
- Upper Semi-Confining Unit (USCU) (potential migration pathway [PMP]) Exceedances:
  - Sulfate at MW-20S

As a result of the identified E001 exceedances a Corrective Measures Assessment (CMA) was initiated on December 14, 2023 and submitted on May 12, 2024 in accordance with 35 I.A.C. § 845.660 [1]. The subsequent compliance sampling events for the Quarter 3 and Quarter 4, 2023 sampling events (Event 2 [E002] and Event 3 [E003]) were completed in September and November 2023 and groundwater samples were evaluated for exceedances of the GWPS as described in 35 I.A.C. § 845.600. Additional exceedances were identified in the following hydrostratigraphic units and wells during the E003 event:

- USCU (PMP) Exceedances:
  - Boron at MW-7S
  - Sulfate at MW-7S

The additional boron and sulfate exceedances at well MW-7S were evaluated with respect to the groundwater model, feasible alternatives, and remedy extents and were determined not to substantially affect the findings and conclusions of the previously initiated CMA evaluation and have been incorporated into the CMA and this report.

As required by 35 I.A.C. § 845.650(d)(1), this report characterizes the nature and extent of boron, sulfate, and TDS, and relevant site conditions to determine how they may affect the corrective measures ultimately selected for the AP and documents the additional measures taken in accordance with 35 I.A.C. § 845.650(d).

Sulfate and boron were detected above the GWPS within two hydrostratigraphic units: the shallow USCU and associated PMP, and in the UA. In addition, TDS was detected above the GWPS within the UA. The extent of boron and sulfate in both units and TDS in the UA above the GWPS is defined laterally by existing wells and Sangchris Lake, with the exception of the extent of sulfate exceedances at MW-20S to the north and east, which is currently being investigated. Vertically, exceedances are defined by the presence of low permeability tills and/or deeper wells that do not have GWPS exceedances. The boron, sulfate, and TDS concentrations are attenuated physically through dilution and dispersion. Besides physical attenuation by dilution and dispersion, SEP results indicate boron and sulfate have been attenuated via adsorption onto iron and manganese hydroxides. Ion exchange is also a potential attenuation mechanism for sulfate as SEP results indicate a substantial proportion of sulfur was associated with the exchangeable fraction. Concentrations of exceedance parameters in Sangchris Lake were evaluated and they do not exceed their respective GPWS.

1. INTRODUCTION

35 I.A.C. § 845.650(d)(1) requires the owner or operator of a coal combustion residuals (CCR) surface impoundment (SI) to characterize the nature and extent of a release and relevant site conditions that may affect the remedy ultimately selected for a CCR SI if any constituent regulated under 35 I.A.C. § 845 is found to exceed the GWPS. This report documents the nature and extent of constituents detected above the GWPS that are attributable to the KPP AP.

The groundwater data and analysis in this report includes results from historical sampling (initiated in 2015) through the E003 sampling event, which was completed on November 29, 2023. Results for events E001 through E003 were submitted and placed in the facility's operating record within 60 days of receiving final laboratory analytical data as required by 35 I.A.C. § 845.800(d)(15) [2, 3, 4]. The statistical determination presented in these reports identified the following exceedances of the GWPS at compliance groundwater wells in the following hydrostratigraphic units:

- Detected UA Exceedances:
  - Boron at MW-12 and MW-28
  - Sulfate at MW-28 and MW-32
  - TDS at MW-28
- Detected USCU (PMP) Exceedances:
  - Boron at MW-7S
  - Sulfate at MW-7S and MW-20S

This Nature and Extent Report discusses in detail the extent of the boron, sulfate, and TDS exceedances as well as a geochemical conceptual site model (GCSM) describing the nature of these exceedances.

2. UNIT BACKGROUND

2.1 Site Location and Description

The KPP is located in the southwest quarter of Section 1, and the northeast quarter of Section 12, Township 13 North, Range 4 West, along West Route 104, Christian County, Illinois and approximately four miles west of the Village of Kincaid (**Figure 2-1**). The AP is located between two lobes of Sangchris Lake, which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River. Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of the AP and is connected to the eastern lobe of Sangchris Lake. The KPP property is surrounded by the lobes of Sangchris Lake, Sangchris Lake State Park, and agricultural land to the north and east, and a combination of undeveloped land and surface support facilities associated with the former Peabody Coal Company #10 mine to the south and west.

2.2 Description of CCR Unit

The KPP operates as a coal-fired power plant and has a single CCR SI, the AP (Illinois Environmental Protection Agency [IEPA] Unit Identification [ID] W0218140002-01), a 172-acre, unlined surface impoundment used to manage CCR and non-CCR waste streams at the KPP with a total storage capacity of approximately 3,560 acre-feet (**Figure 2-2**). Construction of the AP began in 1964 and it was commissioned for use in 1967. The AP primarily contains bottom ash and boiler slag, and other minor materials, including water and wastewater treatment solids, excavation spoils, and dredge spoils present within the AP at a thickness of up to 30 feet as measured in XPW01.

Characterization of the CCR material was completed in 2021 and included in the Hydrogeologic Site Characterization Report (HCR) [5]. Summary geotechnical and solid analytical data tables from CCR samples are included in **Appendix A**. The AP overlies the Cahokia Formation, and the bottom of ash was observed at a depth of 22 feet below ground surface (bgs) at its lowest elevation of 582.57 feet[1] in the northern portion of the AP at XPW04. The base of CCR elevation is consistent with the historic topography, *i.e.,* the bottom of the AP is the historic ground surface at the time the containment berms were constructed and is lowest in elevation along a historic drainage feature that runs approximately through the north-central portion of the AP (**Figure 2-3**).

Water that may come into contact with CCR within the footprint of the AP becomes CCR source water. CCR source water samples, collected from the porewater monitoring wells (**Figure 2-4**) screened within the CCR materials at the AP are used to provide information for Alternative Source Demonstrations and groundwater transport modeling[2].

[1] All elevations in this report are referenced to North American Vertical Datum of 1988 unless otherwise noted.

[2] Per Federal Register 80 (21302), which promulgated the final C.F.R. 40 § 257 rule, porewater concentrations should be used to characterize potential leaching from impoundments. As discussed further in the United States Environmental Protection Agency's (USEPA) risk assessment of CCR surface impoundments [10], porewater is "collected from the interstitial water between waste particles in surface impoundments as it occurs in the field," and concentrations within the porewater are "the most representative data available for impoundments because these data are field-measured concentrations of leachate." Therefore, CCR source water collected from porewater wells screened near the base of ash within the unit represents the CCR source term.

2.3 Geology and Hydrogeology

Significant site investigation has been completed at the KPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the AP has been well characterized and detailed in the HCR [5].

2.3.1 Hydrostratigraphic Units

In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU) / Potential Migration Pathway (PMP):** Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU are more likely to facilitate contaminant migration and these materials are referred to as the PMPs.
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet (**Figures 2-5** through **2-9**). The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit) identified as the Vandalia Till.
- **Bedrock Confining Unit (BCU)**: This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and is present beneath the entire AP. Using locations where bedrock was encountered, the elevation of the top of bedrock is highest at MW-20 (548.02 feet) beneath the eastern portion of the AP and declines in elevation to the west toward MW-12D (540.68 feet) and to the south toward KIN-B005 (520 feet) (**Figures 2-5** through **2-9**).

2.3.2 Uppermost Aquifer

Underlying the USCU is a sandy unit which is considered the UA in the area. The lithologic description of the UA ranges from well graded sand to sandy clay, but in most locations, it is described as silty or clayey sand. Based on interpreted groundwater elevations, the top of the UA appears to decline in elevation to the northwest toward Sangchris Lake (**Figure 2-10**). Below the AP the UA was encountered at an elevation ranging from 577.1 to 582.2 feet. This unit occurs directly above the Vandalia Till (LCU).

Although there may be other lenses of coarser grained material within the USCU, there is no evidence that they are laterally continuous across the site. The determination that the sand unit is the UA is supported by a well search performed in the vicinity of the site. Many of the nearby potable wells indicate the presence of this aquifer at a similar elevation to what was encountered at the site. Potable well construction logs also identify this unit as the primary source of groundwater, when constructed as bored wells (between 30 and 36 inches in diameter) to account for it being a shallow and low-yielding unit [5].

2.3.3 Potential Migration Pathways

The USCU has been characterized with information collected from monitoring wells screened within both clay and silt and discontinuous sand lenses encountered during geologic investigations. The general discussion for the USCU, included below, includes all monitoring wells in this unit, but further subdivides the discussion to characterize PMPs based on information from wells screened within these materials. PMPs were interpreted using the lithologic composition and hydrogeologic properties (*e.g.,* hydraulic conductivity and hydraulic position with respect to the unit) of the materials. In addition to the physical properties, the analytical results from baseline groundwater monitoring performed in wells screened in the USCU were used to identify PMPs. Monitoring wells are classified as follows:

- USCU monitoring locations: MW-7S[3], MW-8S, MW-11S, MW-12S[3], MW-20S[3], MW-25[3], MW-27[3], and MW-31S.

2.3.4 Regional Bedrock Geology

Underlying the unlithified materials of the Vandalia Till is the Pennsylvanian-age Bond Formation consisting of a sequence of lithified marine sediments comprised mainly of limestone interbedded with lesser amounts of shale and sandstone. The top of bedrock surface in the vicinity of the site is approximately 550 feet [6].

2.3.5 Water Table Elevation and Groundwater Flow Direction

The elevations of water within the AP, as observed in XPW01 through XPW04 and XSG-01 in 2023, averaged 602.64 feet, ranging from 596.34 to 605.65 feet as measured at XSG-01 in the southeast corner of the AP near the outfall. Groundwater elevations supporting the discussion presented in this section are provided in **Table 2-1**.

The groundwater elevation in wells screened in the UA (MW-1 through MW-12, MW-20, MW-23, MW-28, MW-30, MW-31, MW-32, and PZ-4C) averaged 591.05 feet in 2023, with a range from 580.51 feet in background well MW-1 (south of the AP) to 596.76 feet in MW-32 (northeast of the AP). A groundwater elevation contour map (**Figure 2-11**) shows that there is a groundwater divide beneath the AP running from approximately the southwest corner to the northeast corner. Generally, these groundwater elevations result in horizontal groundwater flow in the UA to the northwest and southeast toward the lobes of Sangchris Lake. Localized flow toward historic drainage features that were present prior to construction of the ash pond (*i.e.,* near MW-7/7S and MW-27, MW-28, and MW-31; **Appendix B**) is also observed on the west and north side of the unit (**Figure 2-11**).

The groundwater elevation in wells within the USCU (MW-7S, MW-8S, MW-12S, MW-20S, MW-27, and MW-31S) in 2023 averaged 589.35 feet, with a range from 582.91 feet in MW-27 (west of the AP) to 598.92 feet in MW-31S (north central of the AP). USCU wells MW-7S and MW-8S were dry during compliance sampling events E001 and E002, respectively, completed in June and September 2023. Wells MW-12S, located on the northwest side of the AP, and MW-27, on the

[3] Well in the USCU that has been identified to monitor the PMP.

southwest side near a former drainage feature, consistently recorded the lowest groundwater elevation, and the highest elevations were measured at MW-31S, on the north side of the AP. There also appears to be a component of groundwater flow to the south and east toward the discharge flume that flows to the eastern lobe of Sangchris Lake as evidenced by groundwater elevations from monitoring wells on the southern side of the AP being consistently below the screen interval of MW-11S (591-595 feet); this monitoring well was consistently dry during 2021 groundwater monitoring. These observations also suggest a groundwater divide beneath the AP which appears in both USCU and UA monitoring wells (above).

The groundwater elevation in BCU well MW-12D averaged 587.20 feet in 2023, with a range from 586.40 to 588.14 feet.

2.3.5.1 Vertical Hydraulic Gradients

Vertical hydraulic gradients were calculated using available groundwater elevation data from February to August 2021 at nested well locations within the USCU/PMP, UA, and BCU [5]. Evaluation of recent data collected through 2023 is also consistent with these results (**Appendices C and D**). The results of the vertical gradient calculations for these hydrostratigraphic units are summarized below:

- USCU/PMP to UA:
  - Gradients calculated between MW-12 (UA) and MW-12S (PMP) were downward for all events.
  - Gradients calculated between MW-7 (UA) and MW-7S (PMP) were mostly upward as calculated from available data for January, September, and December 2023, with a slight downward gradient during October 2023.
  - Gradients calculated between MW-20 (UA) and MW-20S (PMP) were mostly upward, with slight downward gradients in October and November 2023.
- USCU to UA:
  - Gradients calculated between MW-31 (UA) and MW-31S (USCU) were consistently downward.
  - Gradients calculated between MW-8 (UA) and MW-8S (USCU) were variable, with a slight upward gradient January 2023 and a flat gradient in December 2023. MW-8S was reported as dry throughout the remaining months of 2023; however, these variable gradient calculations are consistent with previous observations.
- UA to BCU:
  - Gradients calculated between MW-12D (BCU) and MW-12 (UA) were consistently upward.

These results are consistent with previous vertical gradient calculations [7, 5] and are consistent with the hydrogeologic gradients expected with the site located between lobes of Sangchris Lake, as discussed further in the next section.

2.3.5.2 Impact of Surface Water Bodies on Groundwater Flow

The surface water elevation at Sangchris Lake measured in 2023 averaged 584.44 feet, ranging from 583.08 to 586.05 feet at location SG-02, which is near the inlet for the KPP. The surface water elevation within the AP measured in 2023 averaged 602.70 feet, ranging from 596.43 to

605.65 feet at XSG-01. Groundwater elevations are primarily controlled by the level in Sangchris Lake and the water level within the AP. There is an apparent groundwater divide beneath the AP, with groundwater flow in the UA to the northwest and southeast toward the western and eastern lobes of Sangchris Lake, respectively. Generally downward vertical gradients are present between the PMP and UA wells along the north side of the unit (*i.e.,* MW-12S/12 and MW-31S/31) and upward at MW-20S/20 and MW-7S/7 along the east and southwest side of the unit respectively.

2.3.6 Hydraulic Conductivities

2.3.6.1 Field Hydraulic Conductivities

Field hydraulic conductivity tests were conducted by Ramboll Americas Engineering Solutions, Inc. during the 2021 investigation [5]. The results are summarized in **Table 2-2** and discussed below:

- **CCR:** Results of field hydraulic conductivity tests conducted in wells screened in the CCR (XPW01 through XPW04) ranged from 2.09 x 10^{-2} to 2.64 x 10^{-1} centimeters per second (cm/s), with a geometric mean of 8.57 x 10^{-2} cm/s.
- **USCU / PMP:** Results of field hydraulic conductivity tests performed in 2021 in wells screened in the USCU (MW-12S, MW-25, MW-27, and MW-20S) ranged from 1.56 x 10^{-5} to 1.22 x 10^{-4} cm/s, with a geometric mean of 5.04 x 10^{-5} cm/s. Tests were not performed for all wells in the USCU. Of the wells evaluated, two wells were screened in sandier zones of the USCU and therefore the resulting geometric mean hydraulic conductivity for the unit is likely overestimated.
- **UA:** Field hydraulic conductivity tests performed in 2021 in wells screened in the UA (MW-20, MW-22, MW-23, MW-26, MW-28, MW-29, MW-30, MW-31, MW-32, and PZ-4C) ranged from 1.29 x 10^{-6} to 5.35 x 10^{-4} cm/s, with a geometric mean of 4.14 x 10^{-5} cm/s. The geometric mean likely underestimates the hydraulic conductivity of the unit because it includes locations where sandier material was not present (*i.e.,* MW-20, MW-32, and PZ-4C).
- **LCU**: No field hydraulic conductivity tests were performed as there are no wells screened within the LCU.
- **BCU:** Field hydraulic conductivity tests performed in 2021 in a well screened in the BCU (MW-12D) resulted in a hydraulic conductivity of 1.69 x 10^{-3} cm/s. MW-12D was screened within the top 5 feet of the bedrock and the resulting hydraulic conductivity likely represents the weathered bedrock surface.

2.3.6.2 Laboratory Hydraulic Conductivities

Falling head permeability tests (ASTM D5084 Method F) were performed in the laboratory on samples collected during the 2021 investigations [5]. The results are provided in **Appendix A** and discussed below.

- **CCR:** Eight samples were collected from CCR borings XPW01 through XPW04. Laboratory falling head permeability test results from samples collected within the CCR ranged from 3.5 x 10^{-4} to 9.2 x 10^{-3} cm/s, with a geometric mean of 1.4 x 10^{-3} cm/s.
- **USCU:** Three samples were collected from the Upper Cahokia Formation at borings MW-12D and MW-23 within the USCU. Laboratory falling head permeability test results in the USCU ranged from 7.2 x 10^{-8} to 3.2 x 10^{-7} cm/s, with a geometric mean of 1.2 x 10^{-7} cm/s.

Laboratory vertical hydraulic conductivity tests were not performed on samples from within the PMP.

- **UA:** Three samples were collected from the Lower Cahokia Formation at borings MW-12D, MW-20, and MW-23 within the UA. Laboratory falling head permeability test results in the UA ranged from 5.9 x 10^{-8} to 2.0 x 10^{-7} cm/s, with a geometric mean of 1.1 x 10^{-7} cm/s.
- **LCU:** Laboratory hydraulic conductivity tests were not performed in the LCU during the 2021 investigations; however, previously conducted falling head permeability tests performed on samples in the LCU report a laboratory hydraulic conductivity of 4.8 x 10^{-8} cm/s [7].
- **BCU:** Laboratory hydraulic conductivity tests were not performed in the BCU.

2.4 Groundwater Monitoring

The monitoring system for the AP is shown on **Figure 2-4** and consists of two background monitoring wells screened within the UA (MW-1 and MW-2), five compliance monitoring wells screened within the USCU (MW-7S[4], MW-8S, MW-20S[4], MW-27[4], and MW-31S), 14 compliance wells screened with in the UA (MW-3, MW-5, MW-6, MW-7, MW-8, MW-11, MW-12, MW-20, MW-23, MW-27, MW-30, MW-31, MW-32, and PZ-4C), and two water level only surface water staff gages (SG-02 and XSG01) to monitor potential impacts from the AP [8]. Twenty-one wells (two background and 19 compliance) located along the perimeter of the AP are used to monitor groundwater concentrations within the hydrostratigraphic units. CCR source water samples from porewater monitoring wells are collected from location XPW01 on the southern side of the AP, from location XPW02 and XPW03 on the northwestern side of the AP, and from location XPW04 on the northern side of the AP (**Figure 2-4**).

2.5 Hydrogeologic Conceptual Site Model

The HCR [5] and information provided above forms the foundation of the AP hydrogeological setting. The AP overlies a potential recharge area for the underlying transmissive geologic media, which are composed of moderate permeability sand, silty sand, and clayey sand and gravel units, which include the clays and silts of the Upper Cahokia Formation, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till deposits (*i.e.,* the UA).

The geologic conceptual model for the site used for the groundwater modeling [9] consists of the following layers:

- Fill, the constructed AP consists of fill (predominantly coal ash within the AP, but also including constructed berms around the AP).
- Clays and silts of the Cahokia Formation, interbedded with thin sand lenses, most of which are laterally discontinuous, but a thin bed of sand was observed at the bottom of the Cahokia Formation in the majority of soil borings advanced near the AP. This sand unit comprises the UA. The Cahokia materials extend to depths of less than 44 feet.
- Clay and silt with varying amounts of sand and gravel of the Vandalia Till, which extend to depths of up to 52 feet.

[4] Well in the USCU that has been identified to monitor the PMP.

Bedrock beneath the AP consists of the Pennsylvanian-age Bond Formation, comprised mainly of limestone with lesser amounts of shale and sandstone.

The overall groundwater flow system within the unlithified materials is consistent with previous reports [5]. Infiltration of precipitation into the AP recharges groundwater and flows northwest and southeast toward the two lobes of Sangchris Lake. Source water from the AP migrates downward into the silt and clay of the Upper Cahokia and mixes with groundwater. When it encounters sandier portions, the groundwater may migrate horizontally (*i.e.,* as monitored by PMP wells) otherwise it continues to migrate vertically in the low permeability materials until it encounters the sandy portions of the UA above the LCU. In the UA, groundwater migrates preferentially through the sandier zones with higher hydraulic conductivity.

Vertical gradients are generally downward between the USCU and UA in the norther portion of the Unit and upward along the eastern and southwest side, and upward between the BCU and UA. Along the west and south sides of the AP, the UA intersects the intake and discharge flumes based on constructed elevations (**Appendix B**).

3. OCCURRENCE AND DISTRIBUTION OF GROUNDWATER EXCEEDANCES (EXTENT)

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 for sampling events E001, E002, and E003 [2, 3, 4], as described in **Section 1**. Exceedances include the following parameters and wells by hydrostratigraphic unit:

- Detected UA Exceedances (**Figure 3-1**):
  - Boron at MW-12 and MW-28
  - Sulfate at MW-28 and MW-32
  - TDS at MW-28
- Detected USCU (PMP) Exceedances (**Figure 3-2**):
  - Boron at MW-7S
  - Sulfate at MW-7S and MW-20S

The extents of exceedances discussed below were defined using existing monitoring wells, including wells present on-site (**Table 3-1**) that may not be included in the 35 I.A.C. § 845 monitoring program for the AP.

3.1 Additional Investigation to Define Nature and Extent

Solid phase data were collected and evaluated to assess potential geological sources of exceedance parameters and to inform the GCSM (discussed further in **Section 4**). A total of eight borings were advanced at the AP in 2021 and solid samples were collected from the following: from the USCU adjacent to background monitoring well MW-2; from the UA adjacent to compliance monitoring wells MW-3, MW-28, and MW-32; from the USCU and UA adjacent to paired compliance monitoring wells MW-7/MW-7S and MW-8/MW-8S; from the USCU and UA adjacent to compliance monitoring well MW-12; and from the CCR material adjacent to porewater well XPW03. Solids samples were collected and analyzed for the following:

- 6010B for 7-step sequential extraction process (SEP) (iron, aluminum, arsenic, manganese, lead, lithium, molybdenum, cobalt, calcium, beryllium, selenium, and chromium);
- EPA 6010B for Total Metals (iron, aluminum, arsenic, manganese, lead, lithium, molybdenum, cobalt, calcium, beryllium, selenium, and chromium);
- Bulk Mineralogy by Reitveld x-ray diffraction analysis;
- Cation Exchange Capacity Analysis;
- Total Organic Carbon Analysis; and,
- Batch testing using groundwater from MW-02, MW-07/07S, MW-12/12D and MW-28 with background soils to evaluate attenuation mechanisms and sorption capacity.

In addition, 32 surface water samples were collected to characterize the water quality in Sangchris Lake (**Appendix E**). Surface water samples were analyzed for 35 I.A.C. § 845.600 parameters (total and dissolved), ferrous and ferric iron, major ions, and groundwater polishing parameters. Data from this investigation relevant to the extent of exceedances at the AP (*i.e.,* boron, sulfate, and TDS) is presented in **Table 3-2**. Furthermore, sampling was initiated during compliance event E003 at monitoring well location PZ-4A to help define the extent of the sulfate GWPS exceedance at MW-20S.

3.2 Extents in the Uppermost Aquifer

Exceedances are identified quarterly following comparison of lower confidence limits (LCLs) to the GWPSs described in 35 I.A.C. § 845.600. The LCLs vary as the dataset is updated to include additional quarterly events (**Table 3-3**). The discussion below includes ranges of concentrations measured in wells with exceedances, because there is no single value for LCLs. The statistical results from the three compliance monitoring events are presented in **Table 3-3** and all data evaluated has been summarized in **Table 3-4**.

3.2.1 Boron

Boron concentrations in UA monitoring wells MW-12 and MW-28 resulted in exceedances of the GWPS (2 milligrams per liter [mg/L]) during at least one compliance monitoring event between E001 through E003 (**Table 3-3**; **Figure 3-1**). Concentrations and the extent of boron at these locations are summarized as follows:

MW-12 and MW-28 – Concentrations of boron between 2015 and 2023 at MW-12 range from 1.95 to 4.42 mg/L, and concentrations of boron at MW-28 between 2021 and 2023 range from 7.96 to 10.9 mg/L (**Table 3-4**). Both monitoring wells, MW-12 and MW-28, are located northwest of the unit, between the AP and the west lobe of Sangchris Lake. The extents of exceedances above the GWPS are defined laterally in the UA to the northeast by monitoring well MW-30 (**Figure 3-1**), with boron concentrations ranging from 1.06 to 1.60 mg/L, and to the southwest by monitoring well MW-6, with boron concentrations ranging from 0.63 to 1.91 mg/L (**Table 3-4**). Well MW-29, which is located between these two locations, had reported concentrations between 1.57 and 2.01 mg/L in 2021. The west fork of Sangchris Lake is located approximately 30 feet downgradient of MW-12 and 220 feet downgradient of MW-28, and comparison of water elevations indicate that groundwater in the northwest of the AP migrates toward the west lobe of Sangchris Lake. The extent of boron is defined downgradient by surface water samples collected near MW-12 and MW-28, which have total concentrations of boron of 0.051 mg/L and 0.065 mg/L, respectively (**Table 3-2**; **Figure 3-3**). Boron concentrations measured in 32 surface water samples throughout Sangchris Lake in the vicinity of the AP range from 0.025 to 0.065 mg/L, with the most distal samples relative to the AP (northernmost and southwestern most) ranging from 0.045 to 0.051 mg/L (**Appendix E**).

Downward migration of boron in the UA is inhibited by the underlying the LCU, which includes the lithologic layers of the Vandalia Till and has a thickness of approximately 7.5 feet at MW-12D, which is a paired BCU monitoring well adjacent to MW-12. Downward migration of boron is also limited by the upward gradients observed between BCU monitoring well MW-12D and UA monitoring well MW-12. The thickness of the Vandalia Till observed in the soil borings throughout the site was between 7.5 and 37.5 feet. Vertical permeability tests completed on samples of the LCU beneath the UA indicate an average vertical hydraulic conductivity of 4.8×10^{-8} cm/s [7]. This is far lower than the geometric mean horizontal hydraulic conductivity calculated in UA monitoring wells (4.14×10^{-5} cm/s) [5]. The significant contrast in permeability (nearly three orders of magnitude) indicates that groundwater will preferentially migrate horizontally, and the elevated boron concentrations will not extend into the underlying bedrock. In addition, lack of vertical migration is also supported by the absence of concentrations above the GWPS in historical boron samples at MW-12D, ranging from 0.71 to 1.08 mg/L (**Table 3-4**).

3.2.2 Sulfate

Concentrations of sulfate at UA monitoring wells MW-28 and MW-32 resulted in exceedances of the GWPS (400 mg/L) during at least one compliance monitoring event between E001 through E003 (**Table 3-3**; **Figure 3-1**). Concentrations and the extent of sulfate at these locations are summarized as follows:

- MW-28 - Concentrations of sulfate between 2021 and 2023 at MW-28 range from 774 to 951 mg/L (**Table 3-4**). Monitoring well MW-28 is located northwest of the unit, between the AP and the west lobe of Sangchris Lake. The extent of sulfate is defined laterally in the UA to the northeast by monitoring well MW-12, which did not have any identified sulfate exceedances, and sulfate concentrations range from 295 to 426 mg/L between 2021 and 2023. Extents are defined to the southwest by monitoring well MW-6, with sulfate concentrations ranging from 97.0 to 335 mg/L between 2015 and 2023 (**Table 3-4**). The west fork of Sangchris Lake is located approximately 220 feet downgradient of MW-28 and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of sulfate is defined downgradient by surface water samples collected near MW-28, which indicate concentrations of sulfate are 32 mg/L (**Table 3-2**; **Figure 3-3**). Sulfate concentrations measured in 32 surface water samples throughout Sangchris Lake in the vicinity of the AP range from 30 to 32 mg/L, with the most distal samples relative to the AP (northernmost and southwestern most) ranging from 30 to 31 mg/L (**Appendix E**).

  Downward migration of sulfate in the UA at MW-28 is inhibited by the underlying the LCU, as discussed above. In addition, lack of vertical migration is also supported by historical sulfate concentrations at nearby MW-12D, which have been below the laboratory reporting limit of 10 mg/L (method detection limit of 6 mg/L; **Table 3-4**), and consistent upward gradients observed between BCU monitoring well MW-12D and UA monitoring well MW-12D.

- MW-32 - Concentrations of sulfate at MW-32 between 2021 and 2023 range from 340 to 477 mg/L (**Table 3-4**). Monitoring well MW-32 is located northeast of the unit. The extents of exceedances above the GWPS are defined laterally in the UA to the west by monitoring well MW-5, with sulfate concentrations ranging from non-detect (at a laboratory reporting limit of 10 mg/L and method detection limit of 5 mg/L) to 14.0 mg/L, and to the southeast by monitoring well MW-4, with sulfate concentrations ranging from 11.0 to 74.0 mg/L (**Table 3-4**). The extent of sulfate is ultimately defined by surface water samples collected downgradient of MW-32 at K-D-1, which indicate concentrations of sulfate are 32 mg/L (**Table 3-2**; **Figure 3-3**). In addition, it should be noted that the groundwater sampling data from Quarter 4, 2023 indicate that the LCL of sulfate at MW-32 dropped below the GWPS (**Table 3-3**) and was no longer a detected exceedance.

  Downward migration of sulfate in the UA at MW-32 is inhibited by the underlying the LCU, which includes the lithologic layers of the Vandalia Till. The thickness of the Vandalia Till observed in the soil borings throughout the site was between 7.5 and 37.5 feet. Vertical permeability tests completed on samples of the LCU beneath the UA indicate an average vertical hydraulic conductivity of 4.3×10^{-8} cm/s. This is far lower than the geometric mean horizontal hydraulic conductivity calculated in UA monitoring wells (4.14×10^{-5} cm/s) [5]. The significant contrast in permeability (nearly three orders of magnitude) indicates that groundwater will preferentially migrate horizontally and the elevated sulfate concentrations will not extend into the underlying bedrock.

3.2.3 Total Dissolved Solids

TDS results indicate the mass of dissolved material in the groundwater and is a representation of multiple constituents present in the groundwater. Typically, major ions (such as sulfate) represent the primary contributors to TDS. TDS concentrations in UA monitoring well MW-28 resulted in exceedances of the GWPS (1,200 mg/L; **Table 3-3**). Between 2021 and 2023, TDS concentrations at monitoring well MW-28 ranged from 1,570 to 1,860 mg/L (**Table 3-4**). Monitoring well MW-28 is located northwest of the unit, between the AP and the west fork of Sangchris Lake. The extents of concentrations above the GWPS are defined laterally in the UA to the northeast by monitoring well MW-12 which had no reported exceedances, with concentrations ranging from 908 to 1,230 mg/L, and to the southwest by MW-6, with TDS concentrations ranging from 358 to 780 mg/L (**Table 3-4**). The west fork of Sangchris Lake is located approximately 220 feet downgradient of MW-28, and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of TDS is defined downgradient by surface water samples collected from K-B-1 near MW-28, which indicate concentrations of TDS are 198 mg/L (**Table 3-2**; **Figure 3-3**).

Downward migration of sulfate in the UA at MW-28 is inhibited by the underlying LCU, as discussed above. In addition, lack of vertical migration is also supported by historical sulfate concentrations at nearby MW-12D which range between 602 and 634 mg/L (**Table 3-4**).

3.3 Extent in the Upper Semi-Confining Unit / Potential Migration Pathway

Exceedances are identified quarterly following comparison of LCLs to the GWPSs described in 35 I.A.C. § 845.600. The LCLs vary as the dataset is updated to include additional quarterly events (**Table 3-3**). The discussion below includes ranges of concentrations measured in wells with exceedances, because there is no single value for LCLs.

3.3.1 Boron

Boron concentrations in USCU/PMP monitoring well MW-7S resulted in exceedance of the GWPS (2 mg/L; **Table 3-3**; **Figure 3-2**) during the E003 (Quarter 4, 2023) monitoring event. The previous two monitoring events this well did not have enough water to collect samples. Concentrations of boron at MW-7S between 2021 and 2023 range from 3.56 to 5.51 mg/L (**Table 3-4**). Monitoring well MW-7S is located west of the unit, between the AP and the west fork of Sangchris Lake. The west fork of Sangchris Lake is located approximately 200 feet downgradient of MW-7S and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extents of boron exceedances are defined laterally in the USCU to the southeast by monitoring well MW-27 with boron concentrations ranging from 0.77 to 1.50 mg/L and to the northeast by monitoring well MW-12S which had no reported exceedances of boron with concentrations ranging from 0.86 to 2.64 mg/L (**Table 3-4**; **Figure 3-2**). The extent of boron is defined downgradient by surface water samples collected from K-F-1 near MW-7S, which indicate concentrations of boron are less than 0.05 mg/L (**Table 3-2**; **Figure 3-3**).

Vertically, the extent of boron is defined by monitoring well MW-7, which is nested with MW-7S and screened in the underlying UA, with boron concentrations ranging from 0.10 to 0.65 mg/L between 2015 and 2023 (**Table 3-4**). Additionally, as described in **Section 2.3.5.1**, calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-7 and MW-7S are predominantly upward.

3.3.2 Sulfate

Concentrations of sulfate at USCU/PMP wells MW-7S and MW-20S resulted in exceedances of the GWPS (400 mg/L; **Table 3-3**; **Figure 3-2**). Concentrations and the extent of sulfate at these locations are summarized as follows:

- MW-7S - Concentrations of sulfate at MW-7S range from 343 to 577 mg/L (**Table 3-4**). Monitoring well MW-7S is located west of the unit, between the AP and the west fork of Sangchris Lake. The west fork of Sangchris Lake is located approximately 200 feet downgradient of MW-7S and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of sulfate exceedances is defined laterally in the USCU by wells without reported exceedances to the southeast by monitoring well MW-27, with sulfate concentrations ranging from 232 to 346 mg/L, and to the northeast by monitoring well MW-12S, with sulfate concentrations ranging from 118 to 243 mg/L (**Table 3-4**; **Figure 3-2**). The extent of sulfate is defined downgradient by surface water samples collected from K-F-1 near MW-7S, which indicate concentrations of sulfate are 31 mg/L (**Table 3-2**; **Figure 3-3**).

  Vertically, the extent of sulfate is defined by monitoring well MW-7, which is nested with MW-7S, screened in the underlying UA, and did not have any identified exceedances. Sulfate concentrations in MW-7, between 2015 and 2023, range from 132 to 439 mg/L (**Table 3-4**). Additionally, as described in **Section 2.3.5.1**, calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-7 and MW-7S are predominantly upward.

- MW-20S - Concentrations of sulfate at MW-20S range from 243 to 519 mg/L (**Table 3-4**). Monitoring well MW-20S is located east of the unit. The extent of sulfate exceedances is defined laterally in the USCU to the south by monitoring well PZ-4A, which had a sulfate concentration of 102 mg/L reported from the Quarter 4, 2023 compliance monitoring event (**Table 3-4**). The lateral and downgradient extent of sulfate concentrations near MW-20S to the north and west is currently being investigated through installation of monitoring wells along the east property line but is expected to ultimately be defined by the east lobe of Sangchris Lake.

  Vertically, the extent of sulfate is defined by monitoring well MW-20, which is nested with MW-20S, screened in the underlying UA, and did not have any identified exceedances. Sulfate concentrations between 2021 and 2023 range from 127 to 180 mg/L (**Table 3-4**). Additionally, as described in **Section 2.3.5.1**, calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-20 and MW-20S are mostly upward.

4. GEOCHEMICAL CONCEPTUAL SITE MODEL (NATURE)

A GCSM was developed to describe the conditions of the groundwater in the vicinity of the KPP AP and is summarized here (full analysis presented in **Appendix F**). The GCSM describes the geochemical processes that contribute to the mobilization, distribution, and attenuation of chemicals in the environment. Only parameters that have exceeded the GWPS in AP groundwater and will be addressed in the corrective action plan are included in the GCSM. As discussed in previous sections, the exceedances observed at the AP include boron, sulfate, and TDS.

CCR porewater is water "collected from the interstitial water between waste particles in surface impoundments as it occurs in the field" [10] and represents the material potentially leached from impoundments. The CCR materials are the primary source of constituent loading to the CCR porewater (*i.e.*, CCR source water). Over an extended period (*e.g.*, months to years), the CCR porewater (*i.e.*, water contained within the interstitial pore spaces of the CCR that can be sampled by low-flow groundwater sampling methods) reaches equilibrium with the CCR materials. The porewater is therefore representative of the mobile phase constituents capable of migrating into the underlying materials and potentially downgradient in groundwater. The AP CCR source water is therefore the primary indicator of constituents *available* to the groundwater and is considered as the primary source term for environmental investigation and fate and transport modeling.

Boron and sulfate are assessed as indicators of influence from the CCR materials. Sulfate is the major contributor to TDS and is therefore used as a proxy for TDS. Where observed in shallow groundwater at concentrations above the groundwater protection standard, concentrations of boron and sulfate are similar to the concentration measured in CCR porewater. The uneven distribution of sulfate in the shallow UA/PMP groundwater is attributed to the observed chemical heterogeneity in the AP porewater and physical or chemical heterogeneity along the groundwater flow path.

Geochemical attenuation of constituents in groundwater is a function of groundwater pH, redox potential, availability of adsorbent, and presence of competing ions, among other factors. Groundwater pH exerts a major control on constituent mobility and reflects a neutral and generally stable condition in the range of 6 to 7.5 standard units, independent of location, lithology, or exceedance status. The stability of pH in groundwater is an indication that groundwater is well buffered, likely due to the widespread presence of carbonate minerals in the aquifer solids which buffer pH within this range. Neutral groundwater pH is generally favorable to attenuation of constituents in groundwater, such that it promotes the precipitation of the mineral phases that adsorb constituents from the aqueous phase. Groundwater pH additionally controls the tendency of various constituents to adsorb to the mineral surface. CCR porewater pH is generally similar to groundwater pH.

The oxidation and reduction potential (redox potential) of groundwater exerts another major control on constituent mobility in groundwater. Specifically, in the context of CCR, the iron hydroxide minerals that facilitate attenuation of many constituents, including boron and sulfate, tend towards dissolution under anoxic conditions (also known as reducing, or low oxygen). These same iron hydroxide minerals tend towards precipitation under oxic conditions. Porewater oxidation reduction potential (ORP) is generally reducing, while background groundwater ORP is more oxidized. Exceedance wells oscillate between reducing and oxidizing conditions. It appears that the groundwater measured at the exceedance wells is under some influence of the reducing condition from the CCR porewater, which may in turn have implications for the stability of attenuating mineral phases under the pre-closure condition.

Characterization data from the aquifer solids is considered to understand the reactive mineral fractions present in the aquifer solids and the binding mechanisms that control the partitioning of constituents between the solid and aqueous phases. The key finding from the aquifer solids assessment is that adsorptive minerals are present in the aquifer solids and have currently bound both boron and sulfate within the reactive fraction of the solid matrix. The inference follows that some degree of attenuation of the exceedance constituents by the aquifer solids has occurred in the past, most notably through adsorption to both iron and aluminum hydroxide minerals.

5. COMBINED GEOCHEMICAL AND HYDROGEOLOGIC CONCEPTUAL SITE MODELS

5.1 Boron Conceptual Site Model

The conceptual site model (CSM) describing current conditions at the AP combining the hydrogeologic and geochemical CSMs for boron is as follows. Water that may come into contact with CCR in the AP becomes porewater within the unlined CCR unit. Sluicing of CCR elevates heads in the unit and results in radial flow, likely causing porewater impacted with boron to migrate downward and outward into the USCU, PMP, and UA. In the PMP and UA, porewater mixes with groundwater and migrates toward the lobes of Sangchris Lake, primarily in soils where the sandy materials are present and have higher hydraulic conductivity. In addition to physical attenuation mechanisms of dilution and dispersion, SEP results indicate boron has been attenuated via adsorption onto iron and manganese hydroxides.

5.2 Sulfate and TDS Conceptual Site Model

Consistent with the boron CSM, water that may come into contact with CCR in the AP becomes porewater within the unlined CCR unit. Sluicing of CCR elevates heads in the unit and results in radial flow, likely causing porewater impacted with sulfate (and TDS) to migrate downward and outward into the USCU, PMP, and UA. In the PMP and UA, porewater mixes with groundwater and migrates toward lobes of Sangchris Lake, with concentrations attenuating due to physical mechanisms (dilution and dispersion) and adsorption onto iron and manganese oxides as observed in SEP results. Ion exchange is also a potential attenuation mechanism as SEP results indicate a substantial proportion of sulfur was associated with the exchangeable fraction.

6. CONCLUSIONS AND FUTURE ACTIVITIES

In accordance with 35 I.A.C. § 845.650(d)(1), the nature and extent of GWPS exceedances of boron, sulfate, and TDS have been described in sufficient detail to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the AP.

As discussed in **Section 3.3.2**, the horizontal delineation of sulfate at MW-20S is ongoing. Monitoring wells will be installed along the eastern property boundary downgradient of MW-20. Findings from the installation and sampling of these additional wells will be incorporated into the final Corrective Action Plan Permit application, which will be submitted in 2025.

Boron was selected for modeling source control presented in the Final Closure Plan and was identified as a surrogate for the exceedances of sulfate and TDS, as described in the Groundwater Modeling Report [9]. For modeling purposes, it was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil adsorption coefficient was set to 0 milliliters per gram) which is a conservative estimate for predicting contaminant transport times in the model. Additional geochemical modeling will be completed to evaluate how sorption to solid phases may affect boron, sulfate, and TDS mobility and therefore the time to reach the GWPS for these parameters.

7. REFERENCES

[1] Ramboll Americas Engineering Solutions, Inc., "35 I.A.C. § 845 Corrective Measures Assesment, Kincaid Power Plant, Ash Pond, IEPA ID: W021814002-01," May 12, 2024.

[2] Ramboll Americas Engineering Solutions, Inc., "35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2, Ash Pond, Kincaid Power Plant, Kincaid, Illinois.," September 15, 2023.

[3] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 3, Ash Pond, Kincaid Power Plant, Kincaid, Illinois., December 12, 2023.

[4] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 4, Ash Pond, Kincaid Power Plant, Kincaid, Illinois., March 3, 2024.

[5] Ramboll Americas Engineering Solutions, Inc., "Hydrogeologic Site Characterization Report. Kincaid Power Plant, Ash Pond, Kincaid, Illinois. Kincaid Generation, LLC.," October 25, 2021.

[6] Civil & Environmental Consultants, Inc., Hydrogeologic Assessment Report, Kincaid Power Station, Ash Impoundment, June 22, 2010.

[7] Natural Resource Technology, an OBG Company, "Hydrogeologic Monitoring Plan, Kincaid Ash Pond - CCR Unit 141, Kincaid Power Station, Kincaid, Illinois.," October 17, 2017.

[8] Ramboll Americas Engineering Solutions, Inc., "Groundwater Monitoring Plan, Kincaid Power Plant, Ash Pond, Kincaid, Illinois, Kincaid Generation, LLC.," October 25, 2021.

[9] Ramboll Americas Engineering Solutions, Inc., "Groundwater Modeling Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois," July 28, 2022.

[10] United States Environmental Protection Agency, "Human and Ecological Risk Assessment of Coal Combustion Residuals (2050-AE81)," December 2014.

TABLES

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-1	Background	UA	01/30/2023	24.20	580.51
MW-1	Background	UA	11/27/2023	17.14	587.57
MW-1	Background	UA	12/14/2023	16.89	587.82
MW-1	Background	UA	10/23/2023	16.56	588.15
MW-1	Background	UA	09/05/2023	16.39	588.32
MW-1	Background	UA	08/05/2023	16.17	588.54
MW-1	Background	UA	06/12/2023	15.57	589.14
MW-1	Background	UA	07/05/2023	15.52	589.19
MW-1	Background	UA	04/12/2023	15.06	589.65
MW-1	Background	UA	05/12/2023	14.65	590.06
MW-10	Water Level	UA	10/23/2023	14.25	585.86
MW-10	Water Level	UA	11/27/2023	13.24	586.87
MW-10	Water Level	UA	06/12/2023	12.79	587.32
MW-10	Water Level	UA	01/30/2023	11.00	589.11
MW-10	Water Level	UA	09/05/2023	Dry	Dry
MW-10	Water Level	UA	09/06/2023	Dry	Dry
MW-11	Compliance	UA	01/30/2023	16.28	585.53
MW-11	Compliance	UA	04/12/2023	12.04	589.77
MW-11	Compliance	UA	05/12/2023	11.99	589.81
MW-11	Compliance	UA	07/05/2023	11.87	589.93
MW-11	Compliance	UA	09/05/2023	11.79	590.02
MW-11	Compliance	UA	10/23/2023	11.79	590.02
MW-11	Compliance	UA	12/14/2023	11.79	590.02
MW-11	Compliance	UA	11/27/2023	11.74	590.07
MW-11	Compliance	UA	06/12/2023	11.73	590.08
MW-11	Compliance	UA	08/05/2023	11.69	590.11
MW-12	Compliance	UA	12/14/2023	8.18	583.22
MW-12	Compliance	UA	10/23/2023	7.96	583.44
MW-12	Compliance	UA	09/05/2023	7.46	583.94
MW-12	Compliance	UA	11/27/2023	7.22	584.18
MW-12	Compliance	UA	08/05/2023	7.13	584.26
MW-12	Compliance	UA	06/12/2023	6.99	584.41
MW-12	Compliance	UA	01/30/2023	6.12	585.28
MW-12D	Water Level	BCU	01/30/2023	2.90	588.06
MW-12D	Water Level	BCU	04/12/2023	2.96	588
MW-12D	Water Level	BCU	05/12/2023	2.82	588.14
MW-12D	Water Level	BCU	06/12/2023	3.70	587.26
MW-12D	Water Level	BCU	08/05/2023	3.73	587.23

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-12D	Water Level	BCU	09/05/2023	4.16	586.8
MW-12D	Water Level	BCU	10/23/2023	4.54	586.42
MW-12D	Water Level	BCU	11/27/2023	4.56	586.4
MW-12D	Water Level	BCU	12/14/2023	4.48	586.48
MW-12S	Water Level	USCU	01/30/2023	5.75	585.35
MW-12S	Water Level	USCU	04/12/2023	6.05	585.05
MW-12S	Water Level	USCU	05/12/2023	5.29	585.81
MW-12S	Water Level	USCU	06/12/2023	6.50	584.6
MW-12S	Water Level	USCU	07/05/2023	6.25	584.84
MW-12S	Water Level	USCU	08/05/2023	6.83	584.27
MW-12S	Water Level	USCU	09/05/2023	7.17	583.93
MW-12S	Water Level	USCU	10/23/2023	7.84	583.26
MW-12S	Water Level	USCU	11/27/2023	7.89	583.21
MW-12S	Water Level	USCU	12/14/2023	7.82	583.28
MW-2	Background	UA	11/27/2023	8.90	592.2
MW-2	Background	UA	10/23/2023	8.71	592.39
MW-2	Background	UA	08/05/2023	8.69	592.41
MW-2	Background	UA	09/05/2023	8.60	592.5
MW-2	Background	UA	01/30/2023	7.98	593.12
MW-2	Background	UA	12/14/2023	7.69	593.41
MW-2	Background	UA	06/12/2023	7.37	593.73
MW-20	Compliance	UA	09/05/2023	9.72	591.05
MW-20	Compliance	UA	10/23/2023	8.96	591.81
MW-20	Compliance	UA	08/05/2023	8.50	592.26
MW-20	Compliance	UA	11/27/2023	8.20	592.57
MW-20	Compliance	UA	12/14/2023	7.06	593.71
MW-20	Compliance	UA	07/05/2023	6.90	593.86
MW-20	Compliance	UA	06/12/2023	6.40	594.37
MW-20	Compliance	UA	04/12/2023	5.85	594.92
MW-20	Compliance	UA	05/12/2023	5.66	595.1
MW-20	Compliance	UA	01/30/2023	5.63	595.14
MW-20S	Compliance	USCU	01/30/2023	5.72	594.92
MW-20S	Compliance	USCU	04/12/2023	8.68	591.95
MW-20S	Compliance	USCU	05/12/2023	8.33	592.3
MW-20S	Compliance	USCU	06/12/2023	6.38	594.26
MW-20S	Compliance	USCU	07/05/2023	9.13	591.51
MW-20S	Compliance	USCU	08/05/2023	10.67	589.97
MW-20S	Compliance	USCU	09/05/2023	11.64	589

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-20S	Compliance	USCU	10/23/2023	8.80	591.84
MW-20S	Compliance	USCU	11/27/2023	7.92	592.72
MW-20S	Compliance	USCU	12/14/2023	6.97	593.67
MW-23	Compliance	UA	06/12/2023	16.67	593.65
MW-23	Compliance	UA	09/05/2023	16.67	593.65
MW-23	Compliance	UA	11/27/2023	16.61	593.71
MW-23	Compliance	UA	12/14/2023	16.52	593.8
MW-23	Compliance	UA	10/23/2023	16.48	593.84
MW-23	Compliance	UA	07/05/2023	16.37	593.95
MW-23	Compliance	UA	08/05/2023	16.37	593.95
MW-23	Compliance	UA	05/12/2023	16.28	594.04
MW-23	Compliance	UA	01/30/2023	16.27	594.05
MW-23	Compliance	UA	04/12/2023	16.18	594.14
MW-27	Compliance	USCU	01/30/2023	13.31	586.74
MW-27	Compliance	USCU	04/12/2023	10.66	589.39
MW-27	Compliance	USCU	05/12/2023	10.72	589.32
MW-27	Compliance	USCU	06/12/2023	14.45	585.6
MW-27	Compliance	USCU	07/05/2023	15.25	584.8
MW-27	Compliance	USCU	08/05/2023	16.44	583.6
MW-27	Compliance	USCU	09/05/2023	Dry	Dry
MW-27	Compliance	USCU	10/23/2023	17.14	582.91
MW-27	Compliance	USCU	11/27/2023	Dry	Dry
MW-27	Compliance	USCU	12/14/2023	16.54	583.51
MW-28	Compliance	UA	10/23/2023	8.19	593.21
MW-28	Compliance	UA	09/05/2023	8.17	593.23
MW-28	Compliance	UA	11/27/2023	8.15	593.25
MW-28	Compliance	UA	08/05/2023	8.05	593.34
MW-28	Compliance	UA	07/05/2023	7.83	593.57
MW-28	Compliance	UA	12/14/2023	7.82	593.58
MW-28	Compliance	UA	06/12/2023	7.42	593.98
MW-28	Compliance	UA	04/12/2023	6.35	595.05
MW-28	Compliance	UA	05/12/2023	6.14	595.25
MW-28	Compliance	UA	01/30/2023	6.00	595.4
MW-3	Compliance	UA	08/05/2023	9.31	592.15
MW-3	Compliance	UA	09/05/2023	9.05	592.41
MW-3	Compliance	UA	01/30/2023	8.85	592.61
MW-3	Compliance	UA	06/12/2023	8.84	592.62
MW-3	Compliance	UA	07/05/2023	8.78	592.68

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-3	Compliance	UA	12/14/2023	8.65	592.81
MW-3	Compliance	UA	10/23/2023	8.64	592.82
MW-3	Compliance	UA	11/27/2023	8.62	592.84
MW-3	Compliance	UA	04/12/2023	8.60	592.86
MW-3	Compliance	UA	05/12/2023	8.55	592.91
MW-30	Compliance	UA	10/23/2023	25.54	592.93
MW-30	Compliance	UA	11/27/2023	25.50	592.97
MW-30	Compliance	UA	09/05/2023	25.45	593.02
MW-30	Compliance	UA	12/14/2023	25.43	593.04
MW-30	Compliance	UA	06/12/2023	25.20	593.27
MW-30	Compliance	UA	08/05/2023	24.86	593.61
MW-30	Compliance	UA	07/05/2023	24.77	593.7
MW-30	Compliance	UA	04/12/2023	24.13	594.34
MW-30	Compliance	UA	01/30/2023	24.04	594.43
MW-30	Compliance	UA	05/12/2023	23.87	594.6
MW-31	Compliance	UA	11/27/2023	33.20	584.14
MW-31	Compliance	UA	10/23/2023	33.10	584.24
MW-31	Compliance	UA	09/05/2023	32.72	584.62
MW-31	Compliance	UA	12/14/2023	32.60	584.74
MW-31	Compliance	UA	06/12/2023	31.22	586.12
MW-31	Compliance	UA	07/05/2023	30.71	586.63
MW-31	Compliance	UA	04/12/2023	29.65	587.69
MW-31	Compliance	UA	01/30/2023	29.55	587.79
MW-31	Compliance	UA	05/12/2023	29.33	588.01
MW-31S	Compliance	USCU	01/30/2023	18.62	598.92
MW-31S	Compliance	USCU	04/12/2023	29.30	588.23
MW-31S	Compliance	USCU	05/12/2023	25.87	591.67
MW-31S	Compliance	USCU	06/12/2023	23.83	593.71
MW-31S	Compliance	USCU	07/05/2023	26.05	591.48
MW-31S	Compliance	USCU	08/05/2023	23.01	594.53
MW-31S	Compliance	USCU	09/05/2023	21.54	596
MW-31S	Compliance	USCU	10/23/2023	22.19	595.35
MW-31S	Compliance	USCU	11/27/2023	20.31	597.23
MW-31S	Compliance	USCU	12/14/2023	23.88	593.66
MW-32	Compliance	UA	06/12/2023	28.75	590.74
MW-32	Compliance	UA	11/27/2023	25.50	593.99
MW-32	Compliance	UA	09/05/2023	25.44	594.05
MW-32	Compliance	UA	10/23/2023	25.31	594.18

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-32	Compliance	UA	08/05/2023	25.05	594.44
MW-32	Compliance	UA	12/14/2023	24.72	594.77
MW-32	Compliance	UA	01/30/2023	22.73	596.76
MW-4	Water Level	UA	09/05/2023	10.18	590.7
MW-4	Water Level	UA	10/23/2023	9.51	591.37
MW-4	Water Level	UA	11/27/2023	8.91	591.97
MW-4	Water Level	UA	06/12/2023	7.62	593.26
MW-4	Water Level	UA	01/30/2023	7.50	593.38
MW-5	Compliance	UA	10/23/2023	28.98	590.46
MW-5	Compliance	UA	09/05/2023	28.70	590.74
MW-5	Compliance	UA	11/27/2023	28.57	590.87
MW-5	Compliance	UA	12/14/2023	28.19	591.25
MW-5	Compliance	UA	08/05/2023	28.15	591.29
MW-5	Compliance	UA	06/12/2023	26.82	592.62
MW-5	Compliance	UA	01/30/2023	25.50	593.94
MW-6	Compliance	UA	11/27/2023	12.27	588.19
MW-6	Compliance	UA	12/14/2023	12.16	588.3
MW-6	Compliance	UA	10/23/2023	12.15	588.31
MW-6	Compliance	UA	09/05/2023	11.96	588.5
MW-6	Compliance	UA	08/05/2023	11.49	588.97
MW-6	Compliance	UA	06/12/2023	10.19	590.27
MW-6	Compliance	UA	01/30/2023	8.13	592.33
MW-7	Compliance	UA	09/05/2023	10.31	587.44
MW-7	Compliance	UA	08/05/2023	10.02	587.73
MW-7	Compliance	UA	07/05/2023	9.76	587.98
MW-7	Compliance	UA	10/23/2023	9.64	588.11
MW-7	Compliance	UA	12/14/2023	9.56	588.19
MW-7	Compliance	UA	11/27/2023	9.53	588.22
MW-7	Compliance	UA	06/12/2023	9.45	588.3
MW-7	Compliance	UA	04/12/2023	8.76	588.98
MW-7	Compliance	UA	05/12/2023	8.53	589.21
MW-7	Compliance	UA	01/30/2023	8.31	589.44
MW-7S	Compliance	USCU	01/30/2023	10.22	587.42
MW-7S	Compliance	USCU	06/12/2023	Dry	Dry
MW-7S	Compliance	USCU	09/05/2023	10.36	587.28
MW-7S	Compliance	USCU	10/23/2023	9.20	588.44
MW-7S	Compliance	USCU	12/14/2023	10.45	587.19
MW-8	Compliance	UA	09/05/2023	9.78	593.36

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
MW-8	Compliance	UA	08/05/2023	9.75	593.38
MW-8	Compliance	UA	06/12/2023	9.75	593.39
MW-8	Compliance	UA	10/23/2023	9.70	593.44
MW-8	Compliance	UA	11/27/2023	9.67	593.47
MW-8	Compliance	UA	12/14/2023	9.30	593.84
MW-8	Compliance	UA	07/05/2023	9.11	594.03
MW-8	Compliance	UA	04/12/2023	8.92	594.21
MW-8	Compliance	UA	05/12/2023	8.39	594.74
MW-8	Compliance	UA	01/30/2023	8.00	595.14
MW-8S	Compliance	USCU	01/30/2023	8.50	594.8
MW-8S	Compliance	USCU	06/12/2023	Dry	Dry
MW-8S	Compliance	USCU	09/05/2023	Dry	Dry
MW-8S	Compliance	USCU	11/27/2023	Dry	Dry
MW-8S	Compliance	USCU	12/14/2023	9.46	593.84
MW-9	Water Level	UA	10/23/2023	16.61	582.78
MW-9	Water Level	UA	09/05/2023	15.58	583.81
MW-9	Water Level	UA	01/30/2023	10.95	588.44
MW-9	Water Level	UA	06/12/2023	10.14	589.25
PZ-4C	Compliance	UA	09/05/2023	8.79	591.78
PZ-4C	Compliance	UA	08/05/2023	8.24	592.33
PZ-4C	Compliance	UA	10/23/2023	8.03	592.54
PZ-4C	Compliance	UA	11/27/2023	7.56	593.01
PZ-4C	Compliance	UA	12/14/2023	7.40	593.17
PZ-4C	Compliance	UA	07/05/2023	7.21	593.36
PZ-4C	Compliance	UA	06/12/2023	7.15	593.42
PZ-4C	Compliance	UA	04/12/2023	7.02	593.55
PZ-4C	Compliance	UA	05/12/2023	6.86	593.71
PZ-4C	Compliance	UA	01/30/2023	6.60	593.97
SG-02	Water Level	SW	11/27/2023	-18.28	583.08
SG-02	Water Level	SW	12/14/2023	-18.33	583.13
SG-02	Water Level	SW	10/23/2023	-18.48	583.28
SG-02	Water Level	SW	09/05/2023	-19.25	584.05
SG-02	Water Level	SW	08/05/2023	-19.57	584.37
SG-02	Water Level	SW	06/12/2023	-20.21	585.01
SG-02	Water Level	SW	07/05/2023	-20.25	585.05
SG-02	Water Level	SW	01/30/2023	-20.38	585.18
SG-02	Water Level	SW	04/12/2023	-20.39	585.19
SG-02	Water Level	SW	05/12/2023	-21.25	586.05

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
XPW01	Water Level	CCR	01/30/2023	24.20	603.64
XPW01	Water Level	CCR	04/12/2023	24.82	603.02
XPW01	Water Level	CCR	05/12/2023	24.68	603.16
XPW01	Water Level	CCR	06/12/2023	24.99	602.85
XPW01	Water Level	CCR	07/05/2023	24.45	603.39
XPW01	Water Level	CCR	08/05/2023	24.11	603.73
XPW01	Water Level	CCR	09/05/2023	24.43	603.41
XPW01	Water Level	CCR	10/23/2023	24.61	603.23
XPW01	Water Level	CCR	11/27/2023	24.79	603.05
XPW01	Water Level	CCR	12/14/2023	24.61	603.23
XPW02	Water Level	CCR	01/30/2023	16.21	603.98
XPW02	Water Level	CCR	04/12/2023	16.70	603.49
XPW02	Water Level	CCR	05/12/2023	16.66	603.53
XPW02	Water Level	CCR	06/12/2023	16.97	603.22
XPW02	Water Level	CCR	07/05/2023	16.59	603.60
XPW02	Water Level	CCR	08/05/2023	16.01	604.18
XPW02	Water Level	CCR	09/05/2023	16.51	603.68
XPW02	Water Level	CCR	10/23/2023	16.73	603.46
XPW02	Water Level	CCR	11/27/2023	17.12	603.07
XPW02	Water Level	CCR	12/14/2023	16.82	603.37
XPW03	Water Level	CCR	01/30/2023	14.90	601.18
XPW03	Water Level	CCR	04/12/2023	15.35	600.73
XPW03	Water Level	CCR	05/12/2023	15.42	600.66
XPW03	Water Level	CCR	06/12/2023	15.54	600.54
XPW03	Water Level	CCR	07/05/2023	15.45	600.63
XPW03	Water Level	CCR	08/05/2023	14.85	601.23
XPW03	Water Level	CCR	09/05/2023	15.18	600.90
XPW03	Water Level	CCR	10/23/2023	15.42	600.66
XPW03	Water Level	CCR	11/27/2023	15.65	600.43
XPW03	Water Level	CCR	12/14/2023	15.54	600.54
XPW04	Water Level	CCR	01/30/2023	3.15	603.38
XPW04	Water Level	CCR	06/12/2023	3.94	602.59
XPW04	Water Level	CCR	08/05/2023	3.12	603.41
XPW04	Water Level	CCR	09/05/2023	3.33	603.20
XPW04	Water Level	CCR	10/23/2023	3.54	602.99
XPW04	Water Level	CCR	11/27/2023	3.63	602.90

Table 2-1. Summary of Groundwater Elevation Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Well Type	Monitored Unit	Date	Depth to Groundwater (feet BMP)	Groundwater Elevation (feet NAVD88)
XPW04	Water Level	CCR	12/14/2023	3.46	603.07
XSG-01	Water Level	CCR	01/30/2023	12.00	596.43
XSG-01	Water Level	CCR	10/23/2023	5.56	602.87
XSG-01	Water Level	CCR	11/27/2023	5.52	602.91
XSG-01	Water Level	CCR	12/14/2023	5.22	603.21
XSG-01	Water Level	CCR	06/12/2023	3.33	605.1
XSG-01	Water Level	CCR	09/05/2023	2.78	605.65

Notes:
BMP = below measuring point
CCR = coal combustion residuals
NAVD 88 = North American Vertical Datum of 1988
SW = surface water (Sangchris Lake)
UA = uppermost aquifer
USCU = Upper Semi-Confining Unit

Table 2-2. Field Horizontal Hydraulic Conductivities
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Well ID	Gradient Position	Bottom of Screen Elevation (ft NAVD88)	Screen Length [1] (ft)	Field Identified Screened Material (USCS)	Slug Type	Analysis Method	Number of Field Tests	Test Analyzed [2]	Hydraulic Conductivity (cm/s)	Minimum Hydraulic Conductivity (cm/s)	Maximum Hydraulic Conductivity (cm/s)	Hydraulic Conductivity Geometric Mean (cm/s)
USCU												
MW-12S*	D	579.62	5	CL	Solid	Kansas Geological Survey	4	FH-1	3.30E-05	1.56E-05	1.22E-04	5.04E-05
MW-25*	D	590.60	5	SW-SM/CL	Solid	Kansas Geological Survey	4	FH-1	1.03E-04			
MW-27*	D	582.35	5	CL/SC/ML	Solid	Bouwer-Rice	1	FH-1	1.56E-05			
MW-20S*	U	588.43	6	ML/CL	Solid	Bouwer-Rice	4	FH-1	1.22E-04			
UA												
MW-20	U	574.52	10	ML/CL	Solid	Bouwer-Rice	1	FH-1	6.77E-06	1.29E-06	5.35E-04	4.14E-05
MW-22	D	580.51	4	SC/SP-SC	Solid	Bouwer-Rice	2	RH-1	3.80E-05			
MW-23	D	580.05	5	CL	Solid	Kansas Geological Survey	4	FH-1	5.35E-04			
MW-26	D	581.33	5	SC/ML	Solid	Bouwer-Rice	1	FH-1	1.29E-06			
MW-28	D	576.33	10	ML/SM	Solid	Bouwer-Rice	4	FH-1	1.34E-04			
MW-29	D	577.86	5	SW-SM	Solid	Cooper-Bredehoeft-Papadopulos	4	FH-1	1.18E-04			
MW-30	D	576.00	5	CL/ML/SM	Solid	Kansas Geological Survey	1	FH-1	7.07E-06			
MW-31	D	575.02	5	CL/ML/SC	Solid	Cooper-Bredehoeft-Papadopulos	2	FH-1	3.30E-05			
MW-32	D	580.20	5	CL/ML	Solid	Kansas Geological Survey	4	RH-1	4.61E-04			
PZ-4C	D	577.39	5	CL	Solid	Bouwer-Rice	2	FH-1	4.95E-05			
BCU												
MW-12D	D	534.08	5	BR	Solid	Kansas Geological Survey	4	FH-1	1.69E-03	1.69E-03	1.69E-03	1.69E-03
CCR												
XPW-01	NA	593.48	10	SW-SM	Solid	Springer-Gelhar	6	FH-1	2.64E-01	2.09E-02	2.64E-01	8.57E-02
XPW-02	NA	594.91	10	SW/SP	Solid	Springer-Gelhar	4	RH-1	2.09E-02			
XPW-03	NA	596.08	10	SW	Solid	Springer-Gelhar	4	RH-2	9.48E-02			
XPW-04	NA	581.57	10	SW	Solid	Springer-Gelhar	6	FH-1	1.03E-01			

[O: SSW 06/09/21; U:CJC 08/17/21; C: LDC 08/17/21; U: LDC 09/13/21; C: EJT 09/19/21]

Notes:
[1] All wells are constructed from 2 inch polyvinyl chloride (PVC) with 0.01 inch slotted screens.
[2] Test response data (elapsed time and corresponding changes in water levels) were plotted as normalized displacement to evaluate similarity among repeat test data within each well. A single test was selected for analysis at each well based on the quality of the test data (*i.e.*, smooth recovery curve) and coincidence of repeat test data.
* Well in the upper semi-confining unit that has been identified to monitor the potential migration pathway.
BCU = bedrock confining unit
CCR = coal combustion residuals
cm/s = centimeters per second
D = Downgradient
FH-1 = Falling Head 1 Test
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988
RH-1 = Rising Head 1 Test
RH-2 = Rising Head 2 Test
U = Upgradient
UA = uppermost aquifer
USCU = upper semi-confining unit

USCS = Unified Soil Classification System
BR = Bedrock
CL = Lean Clay
ML = Silt
SC = Clayey Sand
SM = Silty Sand
SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand with Clay
SW = Well Graded Sand with Gravel
SW-SM = Well Graded Sand with Silt

Table 3-1. Monitoring Well Construction Details
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Location	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft bgs)	Screen Bottom Depth (ft bgs)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft bgs)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
MW-1	UA	04/20/2010	604.7	604.9	Top of PVC	602.6	15	25	587.6	577.6	25	568.1	10	2	39.592051	-89.490283
MW-2	UA	04/21/2010	601.1	601.3	Top of PVC	598.9	10	20	588.9	578.9	20	541.4	10	2	39.590698	-89.488916
MW-3	UA	04/15/2010	601.5	601.6	Top of PVC	599.2	14	24	585.2	575.2	24	552.7	10	2	39.594458	-89.487173
MW-4	UA	04/14/2010	600.9	600.9	Top of PVC	598.5	12	22	586.5	576.5	22	560.5	10	2	39.600751	-89.487354
MW-5	UA	04/22/2010	619.4	619.6	Top of PVC	617.8	30	40	587.8	577.8	40	541.8	10	2	39.601296	-89.490402
MW-6	UA	04/16/2010	600.5	600.6	Top of PVC	598.4	10	20	588.4	578.4	20	572.9	10	2	39.598638	-89.498944
MW-7	UA	04/16/2010	597.8	597.9	Top of PVC	596.0	10	20	586.0	576.0	20	569.5	10	2	39.597637	-89.498959
MW-7S	USCU	02/02/2021	597.6	597.8	Top of PVC	595.6	6	11	589.6	584.6	11	580.6	5	2	39.59766	-89.498978
MW-8	UA	04/13/2010	603.1	603.3	Top of PVC	601.1	12	22	589.1	579.1	22	563.1	10	2	39.594399	-89.496829
MW-8S	USCU	02/02/2021	603.3	603.5	Top of PVC	600.6	4	7	596.6	593.6	7	580.6	3	2	39.594381	-89.496822
MW-9	UA	04/19/2010	599.4	599.4	Top of PVC	597.6	10	20	587.6	577.6	20	573.1	10	2	39.595204	-89.500968
MW-10	UA	04/19/2010	600.1	600.1	Top of PVC	598.2	10	20	588.2	578.2	20	575.2	10	2	39.590652	-89.503745
MW-11	UA	06/17/2015	601.8	602.0	Top of PVC	599.3	11	21	588.3	578.3	21	578.3	10	2	39.593104	-89.491115
MW-12	UA	07/23/2015	591.4	591.6	Top of PVC	589.0	15	25	573.9	563.9	25	563.9	10	2	39.600208	-89.496381
MW-12S	USCU	01/27/2021	591.1	591.0	Top of PVC	588.6	5	9	583.6	579.6	9	579.1	4	2	39.600208	-89.496412
MW-12D	BCU	01/26/2021	591.0	591.1	Top of PVC	589.1	50	55	539.1	534.1	55	489.1	5	2	39.600194	-89.496418
MW-20	UA	01/26/2021	600.8	600.9	Top of PVC	598.5	14	24	584.5	574.5	24	547.5	10	2	39.598653	-89.48728
MW-20S	USCU	01/26/2021	600.6	600.8	Top of PVC	598.4	4	10	594.4	588.4	10	588.4	6	2	39.598665	-89.487279
MW-22	UA	02/03/2021	601.8	601.8	Top of PVC	599.5	15	19	584.5	580.5	19	579.5	4	2	39.593235	-89.487638
MW-23	UA	02/02/2021	610.3	610.5	Top of PVC	608.0	23	28	585.0	580.0	28	558.0	5	2	39.593293	-89.489352
MW-24	UA	02/02/2021	615.5	615.5	Top of PVC	613.0	27	32	586.0	581.0	32	581.0	5	2	39.593271	-89.493267
MW-25	USCU	02/02/2021	607.2	607.2	Top of PVC	604.6	9	14	595.6	590.6	14	579.6	5	2	39.594397	-89.495062
MW-26	UA	02/02/2021	596.2	596.2	Top of PVC	593.3	7	12	586.3	581.3	12	573.3	5	2	39.595584	-89.497582
MW-27	USCU	02/02/2021	600.0	600.2	Top of PVC	597.4	10	15	587.4	582.4	15	577.4	5	2	39.596694	-89.497927
MW-28	UA	02/02/2021	601.4	601.6	Top of PVC	598.3	12	22	586.3	576.3	22	573.3	10	2	39.599258	-89.497962
MW-29	UA	02/01/2021	599.9	599.9	Top of PVC	596.9	14	19	582.9	577.9	19	576.9	5	2	39.599691	-89.497249
MW-30	UA	02/03/2021	618.5	618.6	Top of PVC	616.0	35	40	581.0	576.0	40	571.0	5	2	39.601262	-89.493996
MW-31	UA	02/03/2021	617.3	617.5	Top of PVC	615.0	35	40	580.0	575.0	40	565.0	5	2	39.601301	-89.491702
MW-31S	USCU	02/03/2021	617.5	617.7	Top of PVC	615.1	25	30	590.1	585.1	30	585.1	5	2	39.601303	-89.491681
MW-32	UA	02/03/2021	619.5	619.7	Top of PVC	617.2	32	37	585.2	580.2	37	577.2	5	2	39.601279	-89.488643
PZ-4C	UA	03/30/2016	600.6	600.7	Top of PVC	597.9	15.5	20.5	582.4	577.4	20.5	577.4	5	2	39.596398	-89.487207
PZ-4A	USCU	03/30/2016	600.8	600.8	Top of PVC	597.9	5	10	592.9	587.9	10	587.9	5	2	39.596415	-89.487208

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
bgs = below ground surface
ft = foot or feet
HSU = Hydrostratigraphic Unit
UA = Uppermost Aquifer
BCU = Bedrock Confining Unit
USCU = Upper Semi-Confining Unit
PVC = polyvinyl chloride

Table 3-2. Surface Water Sampling Data

Nature and Extent Report

Kincaid Power Plant

Ash Pond

Kincaid, Illinois

Sample Location	Sample Date	Fraction	Analyte	Unit	Result
K-B-1	10/06/2021	T	Boron	mg/L	0.0649
K-C-1	10/06/2021	T	Boron	mg/L	0.0505
K-D-1	10/06/2021	T	Boron	mg/L	0.0481
K-F-1	10/06/2021	T	Boron	mg/L	0.0463
K-B-1	10/06/2021	D	Boron	mg/L	0.0558
K-C-1	10/06/2021	D	Boron	mg/L	0.0429
K-D-1	10/06/2021	D	Boron	mg/L	0.0459
K-F-1	10/06/2021	D	Boron	mg/L	0.0421
K-B-1	10/06/2021	T	Sulfate	mg/L	32
K-C-1	10/06/2021	T	Sulfate	mg/L	32
K-D-1	10/06/2021	T	Sulfate	mg/L	32
K-F-1	10/06/2021	T	Sulfate	mg/L	31
K-B-1	10/06/2021	T	TDS	mg/L	198
K-C-1	10/06/2021	T	TDS	mg/L	216
K-D-1	10/06/2021	T	TDS	mg/L	210
K-F-1	10/06/2021	T	TDS	mg/L	188

Notes:

D = dissolved

T = total

mg/L = milligrams per liter

TDS = total dissolved solids

Table 3-3. Exceedance Parameter Statistical Results
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Location	Parameter	Unit	Groundwater Protection Standard	2023 Q2 LCL	2023 Q3 LCL	2023 Q4 LCL
MW-12	Boron, total	mg/L	2	2.64	2.68	2.68
MW-28	Boron, total	mg/L	2	8.58	8.71	8.62
MW-20S	Sulfate, total	mg/L	400	404	330	313
MW-28	Sulfate, total	mg/L	400	808	817	824
MW-32	Sulfate, total	mg/L	400	429	407	397
MW-28	Total Dissolved Solids	mg/L	1,200	1,610	1,620	1,640
MW-7S	Boron, total	mg/L	2	--	--	3.73
MW-7S	Sulfate, total	mg/L	400	--	--	408

Notes:
-- = data not available (well reported as dry during compliance sampling event)
LCL = Lower Confidence Level
mg/L = milligrams per liter

Table 3-4. Summary of Groundwater Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

HSU	Location	Parameter	Unit	Sample Count	Non-Detect Results	Percent Non-Detect Results	First Sample	Last Sample	Minimum	Median	Mean	Maximum
BCU	MW-12D	Boron, total	mg/L	8	0	0	02/25/2021	08/11/2021	0.709	0.836	0.857	1.08
BCU	MW-12D	Sulfate, total	mg/L	8	8	100	02/25/2021	08/11/2021	<6	<6	<6	<6
BCU	MW-12D	Total Dissolved Solids	mg/L	7	0	0	02/25/2021	08/11/2021	602	614	617	634
CCR	XPW01	Boron, total	mg/L	11	0	0	03/01/2021	06/13/2023	0.527	1.30	1.22	1.58
CCR	XPW01	Sulfate, total	mg/L	11	0	0	03/01/2021	06/13/2023	125	237	247	353
CCR	XPW01	Total Dissolved Solids	mg/L	10	0	0	03/01/2021	06/13/2023	340	529	546	696
CCR	XPW02	Boron, total	mg/L	11	0	0	03/01/2021	06/13/2023	2.39	3.52	3.53	4.23
CCR	XPW02	Sulfate, total	mg/L	11	0	0	03/01/2021	06/13/2023	201	353	345	465
CCR	XPW02	Total Dissolved Solids	mg/L	10	0	0	03/01/2021	06/13/2023	262	819	758	1,010
CCR	XPW03	Boron, total	mg/L	11	0	0	03/02/2021	06/13/2023	2.54	2.92	3.02	4.21
CCR	XPW03	Sulfate, total	mg/L	11	0	0	03/02/2021	06/13/2023	537	715	769	1,110
CCR	XPW03	Total Dissolved Solids	mg/L	10	0	0	03/02/2021	06/13/2023	290	1,335	1,317	1,880
CCR	XPW04	Boron, total	mg/L	11	0	0	03/02/2021	06/13/2023	0.902	1.54	1.57	2.28
CCR	XPW04	Sulfate, total	mg/L	11	0	0	03/02/2021	06/13/2023	29.0	75.0	66.0	104
CCR	XPW04	Total Dissolved Solids	mg/L	10	0	0	03/02/2021	06/13/2023	325	385	383	450
USCU	PZ-4A	Boron, total	mg/L	1	0	0	11/29/2023	11/29/2023	0.963	0.963	0.963	0.963
USCU	PZ-4A	Sulfate, total	mg/L	1	0	0	11/29/2023	11/29/2023	102	102	102	102
USCU	PZ-4A	Total Dissolved Solids	mg/L	1	0	0	11/29/2023	11/29/2023	655	655	655	655
UA	MW-1	Boron, total	mg/L	38	0	0	06/16/2015	11/27/2023	0.192	0.247	0.248	0.352
UA	MW-1	Sulfate, total	mg/L	38	0	0	06/16/2015	11/27/2023	80.0	92.5	94.8	117
UA	MW-1	Total Dissolved Solids	mg/L	38	0	0	06/16/2015	11/27/2023	292	327	330	400
UA	MW-2	Boron, total	mg/L	38	0	0	06/16/2015	11/27/2023	0.0474	0.0713	0.0768	0.152
UA	MW-2	Sulfate, total	mg/L	38	0	0	06/16/2015	11/27/2023	119	146	147	178
UA	MW-2	Total Dissolved Solids	mg/L	38	0	0	06/16/2015	11/27/2023	416	492	500	596
UA	MW-3	Boron, total	mg/L	27	0	0	06/16/2015	11/28/2023	1.02	1.67	1.68	2.40
UA	MW-3	Sulfate, total	mg/L	27	0	0	06/16/2015	11/28/2023	117	143	151	209
UA	MW-3	Total Dissolved Solids	mg/L	27	0	0	06/16/2015	11/28/2023	558	596	613	708
UA	MW-5	Boron, total	mg/L	31	0	0	06/16/2015	11/27/2023	0.464	0.544	0.548	0.657
UA	MW-5	Sulfate, total	mg/L	31	11	35	06/16/2015	11/27/2023	<5	<5	11	14.0
UA	MW-5	Total Dissolved Solids	mg/L	31	0	0	06/16/2015	11/27/2023	564	666	674	760
UA	MW-6	Boron, total	mg/L	31	0	0	06/16/2015	11/28/2023	0.632	1.07	1.12	1.91
UA	MW-6	Sulfate, total	mg/L	31	0	0	06/16/2015	11/28/2023	97.0	157	169	335
UA	MW-6	Total Dissolved Solids	mg/L	31	0	0	06/16/2015	11/28/2023	358	532	540	780
UA	MW-7	Boron, total	mg/L	31	0	0	06/17/2015	11/27/2023	0.0987	0.263	0.290	0.648
UA	MW-7	Sulfate, total	mg/L	31	0	0	06/17/2015	11/27/2023	132	185	211	439
UA	MW-7	Total Dissolved Solids	mg/L	31	0	0	06/17/2015	11/27/2023	430	604	630	1,000
UA	MW-8	Boron, total	mg/L	31	0	0	06/17/2015	11/28/2023	0.858	0.997	1.01	1.51
UA	MW-8	Sulfate, total	mg/L	31	0	0	06/17/2015	11/28/2023	214	281	288	348
UA	MW-8	Total Dissolved Solids	mg/L	31	0	0	06/17/2015	11/28/2023	794	872	878	1,000

Table 3-4. Summary of Groundwater Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

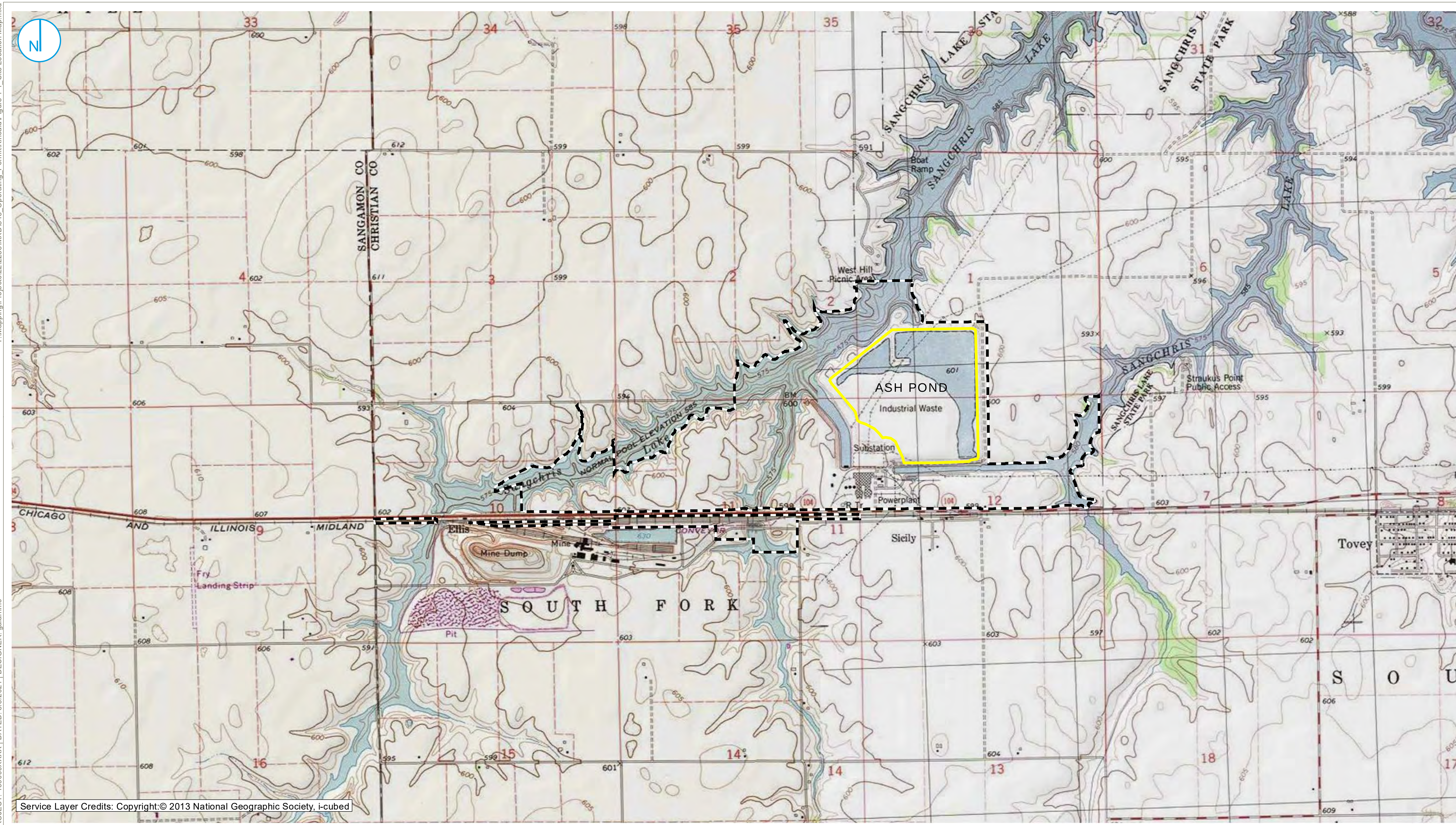
HSU	Location	Parameter	Unit	Sample Count	Non-Detect Results	Percent Non-Detect Results	First Sample	Last Sample	Minimum	Median	Mean	Maximum
UA	MW-11	Boron, total	mg/L	30	0	0	12/15/2015	11/28/2023	1.34	1.67	1.66	2.28
UA	MW-11	Sulfate, total	mg/L	30	0	0	12/15/2015	11/28/2023	88.0	113	113	135
UA	MW-11	Total Dissolved Solids	mg/L	30	0	0	12/15/2015	11/28/2023	554	646	639	678
UA	MW-12	Boron, total	mg/L	30	0	0	12/15/2015	11/28/2023	1.95	3.0	2.98	4.42
UA	MW-12	Sulfate, total	mg/L	30	0	0	12/15/2015	11/28/2023	295	382	377	426
UA	MW-12	Total Dissolved Solids	mg/L	30	0	0	12/15/2015	11/28/2023	908	1,110	1,111	1,230
UA	MW-20	Boron, total	mg/L	12	0	0	02/26/2021	11/28/2023	0.340	0.501	0.502	0.642
UA	MW-20	Sulfate, total	mg/L	12	0	0	02/26/2021	11/28/2023	127	140	145	180
UA	MW-20	Total Dissolved Solids	mg/L	11	0	0	02/26/2021	11/28/2023	572	628	626	666
UA	MW-23	Boron, total	mg/L	12	0	0	02/26/2021	11/28/2023	0.932	2.05	2.03	2.67
UA	MW-23	Sulfate, total	mg/L	12	0	0	02/26/2021	11/28/2023	33.0	45.0	44.8	55.0
UA	MW-23	Total Dissolved Solids	mg/L	11	0	0	02/26/2021	11/28/2023	566	594	598	634
UA	MW-28	Boron, total	mg/L	12	0	0	02/24/2021	11/28/2023	7.96	9.36	9.35	10.9
UA	MW-28	Sulfate, total	mg/L	12	0	0	02/24/2021	11/28/2023	774	886	870	951
UA	MW-28	Total Dissolved Solids	mg/L	11	0	0	02/24/2021	11/28/2023	1,570	1,720	1,717	1,860
UA	MW-30	Boron, total	mg/L	12	0	0	02/25/2021	11/28/2023	1.06	1.16	1.19	1.60
UA	MW-30	Sulfate, total	mg/L	12	2	17	02/25/2021	11/28/2023	<6	16.0	24.3	85.0
UA	MW-30	Total Dissolved Solids	mg/L	11	0	0	02/25/2021	11/28/2023	565	678	657	690
UA	MW-31	Boron, total	mg/L	12	0	0	02/24/2021	11/27/2023	0.210	0.272	0.275	0.369
UA	MW-31	Sulfate, total	mg/L	12	12	100	02/24/2021	11/27/2023	<6	<6	<6	<6
UA	MW-31	Total Dissolved Solids	mg/L	11	0	0	02/24/2021	11/27/2023	530	614	603	658
UA	MW-32	Boron, total	mg/L	12	0	0	02/25/2021	11/27/2023	1.38	1.64	1.65	1.88
UA	MW-32	Sulfate, total	mg/L	12	0	0	02/25/2021	11/27/2023	340	448	433	477
UA	MW-32	Total Dissolved Solids	mg/L	11	0	0	02/25/2021	11/27/2023	1,050	1,180	1,139	1,190
UA	PZ-4C	Boron, total	mg/L	11	0	0	02/25/2021	11/28/2023	1.15	1.57	1.53	1.93
UA	PZ-4C	Sulfate, total	mg/L	11	0	0	02/25/2021	11/28/2023	38.0	71.0	70.5	82.0
UA	PZ-4C	Total Dissolved Solids	mg/L	10	0	0	02/25/2021	11/28/2023	500	566	557	582
UA	MW-4	Boron, total	mg/L	22	0	0	06/16/2015	09/05/2023	0.339	0.564	0.561	0.843
UA	MW-4	Sulfate, total	mg/L	22	0	0	06/16/2015	09/05/2023	11.0	36.5	41.0	74.0
UA	MW-4	Total Dissolved Solids	mg/L	22	0	0	06/16/2015	09/05/2023	432	482	491	552
UA	MW-9	Boron, total	mg/L	18	0	0	06/17/2015	09/07/2023	0.0605	0.101	0.108	0.182
UA	MW-9	Sulfate, total	mg/L	18	0	0	06/17/2015	09/07/2023	33.0	85.0	88.2	152
UA	MW-9	Total Dissolved Solids	mg/L	18	0	0	06/17/2015	09/07/2023	230	358	358	494
UA	MW-10	Boron, total	mg/L	17	0	0	06/17/2015	02/01/2023	0.685	1.43	1.33	1.69
UA	MW-10	Sulfate, total	mg/L	17	0	0	06/17/2015	02/01/2023	310	428	424	535
UA	MW-10	Total Dissolved Solids	mg/L	17	0	0	06/17/2015	02/01/2023	728	1,100	1,044	1,490
UA	MW-22	Boron, total	mg/L	4	0	0	02/26/2021	05/18/2021	1.44	1.46	1.48	1.55
UA	MW-22	Sulfate, total	mg/L	4	0	0	02/26/2021	05/18/2021	104	118	116	123
UA	MW-22	Total Dissolved Solids	mg/L	4	0	0	02/26/2021	05/18/2021	494	503	502	510

Table 3-4. Summary of Groundwater Data
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

HSU	Location	Parameter	Unit	Sample Count	Non-Detect Results	Percent Non-Detect Results	First Sample	Last Sample	Minimum	Median	Mean	Maximum
UA	MW-24	Boron, total	mg/L	4	0	0	03/01/2021	05/19/2021	0.124	0.209	0.196	0.242
UA	MW-24	Sulfate, total	mg/L	4	0	0	03/01/2021	05/19/2021	59.0	69.0	68.2	76.0
UA	MW-24	Total Dissolved Solids	mg/L	4	0	0	03/01/2021	05/19/2021	608	664	652	670
UA	MW-26	Boron, total	mg/L	4	0	0	02/25/2021	05/21/2021	1.07	1.10	1.14	1.32
UA	MW-26	Sulfate, total	mg/L	4	0	0	02/25/2021	05/21/2021	175	180	183	196
UA	MW-26	Total Dissolved Solids	mg/L	4	0	0	02/25/2021	05/21/2021	660	710	701	724
UA	MW-29	Boron, total	mg/L	8	0	0	02/25/2021	08/11/2021	1.57	1.66	1.72	2.01
UA	MW-29	Sulfate, total	mg/L	8	0	0	02/25/2021	08/11/2021	148	152	153	163
UA	MW-29	Total Dissolved Solids	mg/L	7	0	0	02/25/2021	08/11/2021	756	774	774	790
USCU	MW-7S	Boron, total	mg/L	10	0	0	02/24/2021	11/27/2023	3.56	4.25	4.37	5.51
USCU	MW-7S	Sulfate, total	mg/L	10	0	0	02/24/2021	11/27/2023	343	476	480	577
USCU	MW-7S	Total Dissolved Solids	mg/L	9	0	0	02/24/2021	11/27/2023	414	1,130	1,070	1,300
USCU	MW-8S	Boron, total	mg/L	4	0	0	02/24/2021	05/21/2021	0.742	1.04	0.979	1.10
USCU	MW-8S	Sulfate, total	mg/L	4	0	0	02/24/2021	05/21/2021	427	576	547	609
USCU	MW-8S	Total Dissolved Solids	mg/L	4	0	0	02/24/2021	05/21/2021	1,150	1,200	1,218	1,320
USCU	MW-20S	Boron, total	mg/L	12	0	0	02/26/2021	11/28/2023	0.0611	1.51	1.48	2.19
USCU	MW-20S	Sulfate, total	mg/L	12	0	0	02/26/2021	11/28/2023	243	349	346	519
USCU	MW-20S	Total Dissolved Solids	mg/L	11	0	0	02/26/2021	11/28/2023	842	936	982	1,250
USCU	MW-27	Boron, total	mg/L	9	0	0	02/24/2021	02/01/2023	0.774	1.27	1.20	1.50
USCU	MW-27	Sulfate, total	mg/L	9	0	0	02/24/2021	02/01/2023	232	308	295	346
USCU	MW-27	Total Dissolved Solids	mg/L	8	0	0	02/24/2021	02/01/2023	344	976	928	1,100
USCU	MW-31S	Boron, total	mg/L	11	0	0	02/24/2021	11/27/2023	0.0340	0.0539	0.0507	0.0606
USCU	MW-31S	Sulfate, total	mg/L	10	1	10	02/24/2021	11/27/2023	<6	90.0	102	216
USCU	MW-31S	Total Dissolved Solids	mg/L	9	0	0	02/24/2021	11/27/2023	635	820	803	900
USCU	MW-12S	Boron, total	mg/L	8	0	0	02/25/2021	08/11/2021	0.856	1.50	1.60	2.63
USCU	MW-12S	Sulfate, total	mg/L	8	0	0	02/25/2021	08/11/2021	118	194	185	243
USCU	MW-12S	Total Dissolved Solids	mg/L	7	0	0	02/25/2021	08/11/2021	598	730	735	884
USCU	MW-25	Boron, total	mg/L	5	0	0	02/25/2021	08/11/2021	1.04	1.08	1.09	1.14
USCU	MW-25	Sulfate, total	mg/L	5	0	0	02/25/2021	08/11/2021	174	177	182	205
USCU	MW-25	Total Dissolved Solids	mg/L	5	0	0	02/25/2021	08/11/2021	436	448	446	454

Notes:
< = less than the method detection limit
HSU = Hydrostratigraphic Unit
BCU = Bedrock Confining Unit
CCR = Coal Combustion Residuals
UA = Uppermost Aquifer
USCU = Upper Semi-Confining Unit
mg/L = milligrams per liter

FIGURES



REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 2-1

NATURE AND EXTENT REPORT
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 8/5/2021 | DESIGNER: galarnmc

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\Figure 1-2_Site_Map.mxd

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 250 500 Feet

SITE MAP

NATURE AND EXTENT REPORT
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES: CONTOUR LINES ARE FROM HISTORIC SURVEY (SARGENT & LUNDY ENGINEERS, 1964) INCLUDED IN HISTORY OF CONSTRUCTION (AECOM, 2016)
Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

5 FOOT HISTORIC ELEVATION CONTOUR
4 FOOT HISTORIC ELEVATION CONTOUR
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

BASE OF CCR

K - AK 8A - REPORTA
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-3

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\Figure 2-6_Bottom of Ash.mxd

PROJECT: 169000XXXX | DATED: 9/30/2021 | DESIGNER: STOLZSD

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
PORE WATER WELL
STAFF GAGE, LAKE
STAFF GAGE, CCR UNIT
35 I.A.C. § 845 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

MONITORING WELL LOCATION MAP

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-4

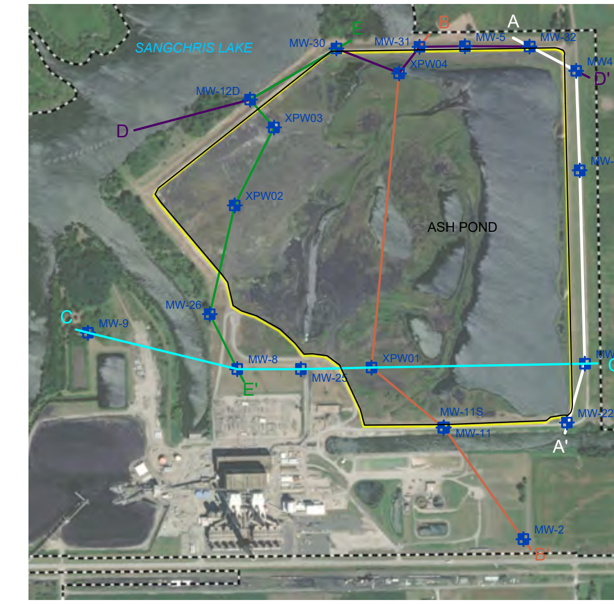
RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

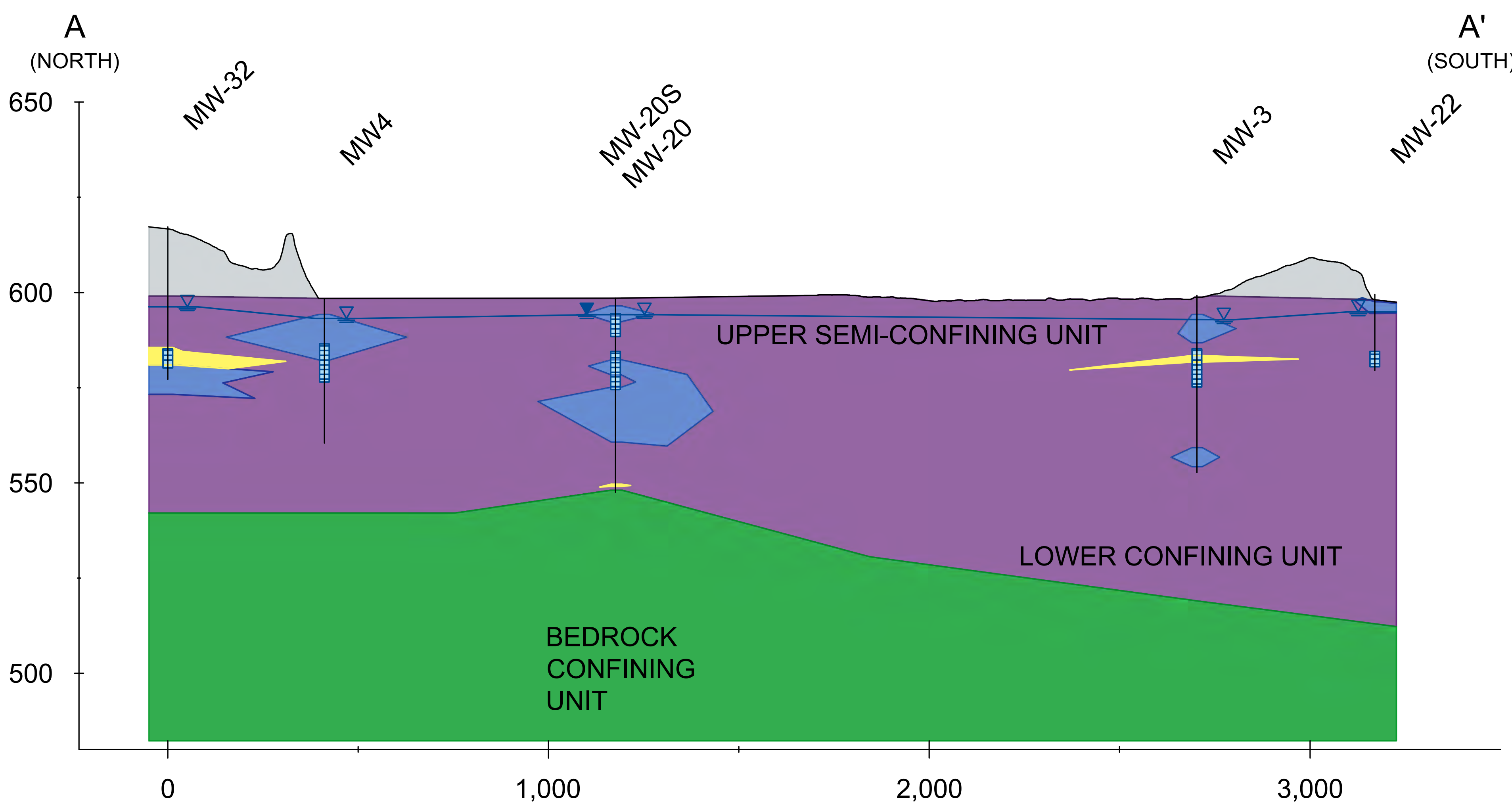
RAMBOLL

Documents\-CCR GW\Deliverables\Part 845 Operating Permits\Sites\Kincaid\Hydrogeo\Figures\EVS\working files\CAD\Cross Sections\Kincaid Cross Sections.dwg

NOTES

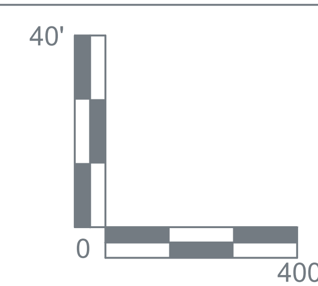
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Vertical Datum: NAVD88
5. Groundwater elevations measured on July 22-23, 2021.





LEGEND

- COAL COMBUSTION RESIDUALS, CCRs
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPER AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)



GEOLOGIC CROSS SECTION A-A'

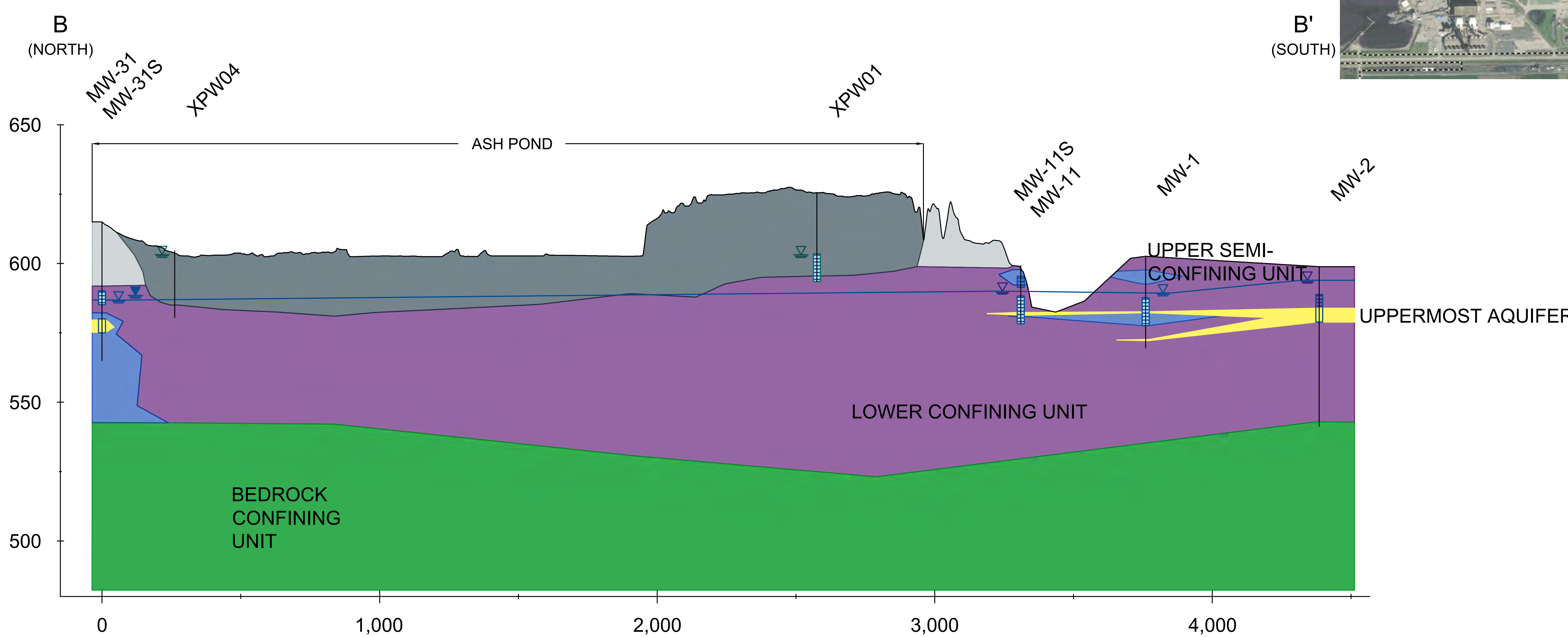
NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-5

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Vertical Datum: NAVD88
5. Groundwater elevations measured on July 22-23, 2021.



LEGEND

- COAL COMBUSTION RESIDUALS, CCRs
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPER AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

40'
0
400'

GEOLOGIC CROSS SECTION B-B'

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

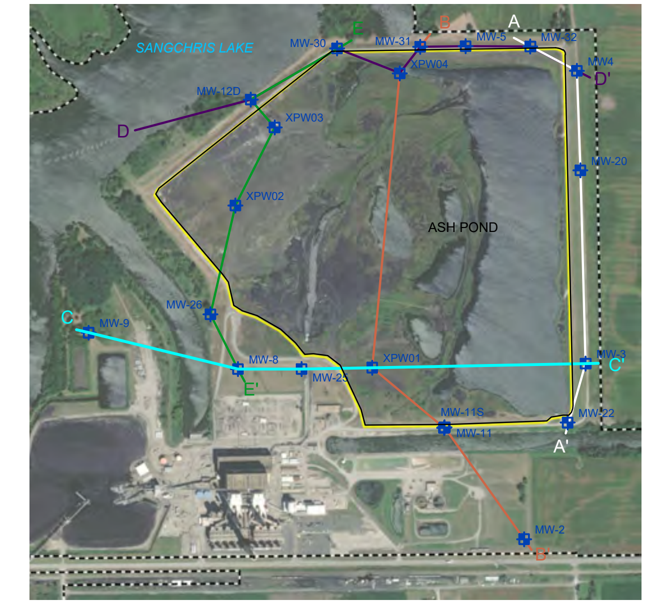
FIGURE 2-6

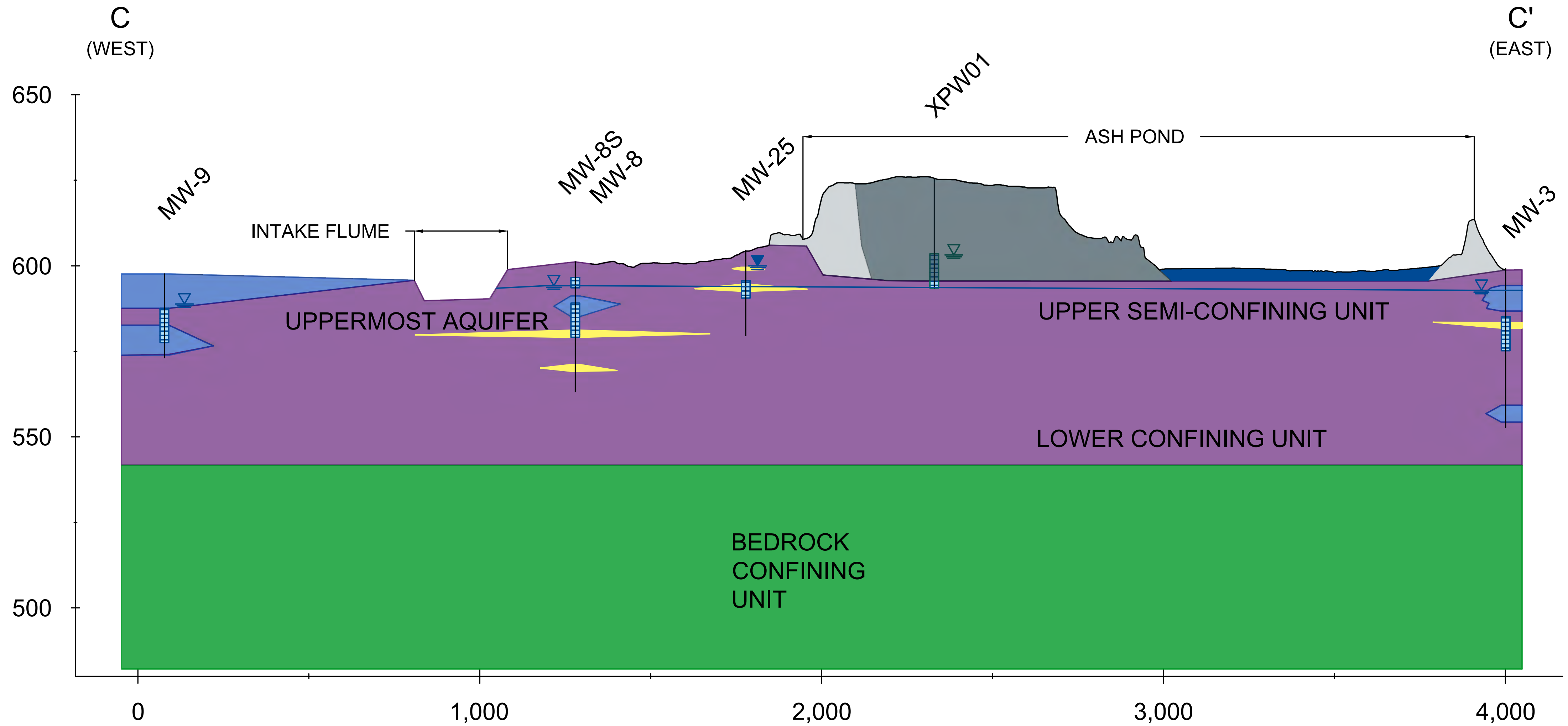
RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES

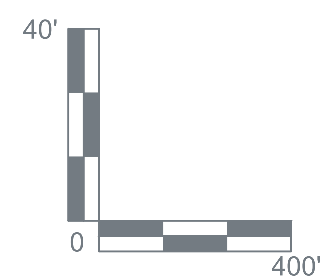
1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Vertical Datum: NAVD88
5. Groundwater elevations measured on July 22-23, 2021.





LEGEND

- SURFACE WATER
- COAL COMBUSTION RESIDUALS, CCRs
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPER AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)



GEOLOGIC CROSS SECTION C-C'

NATURE AND EXTENT REPORT ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

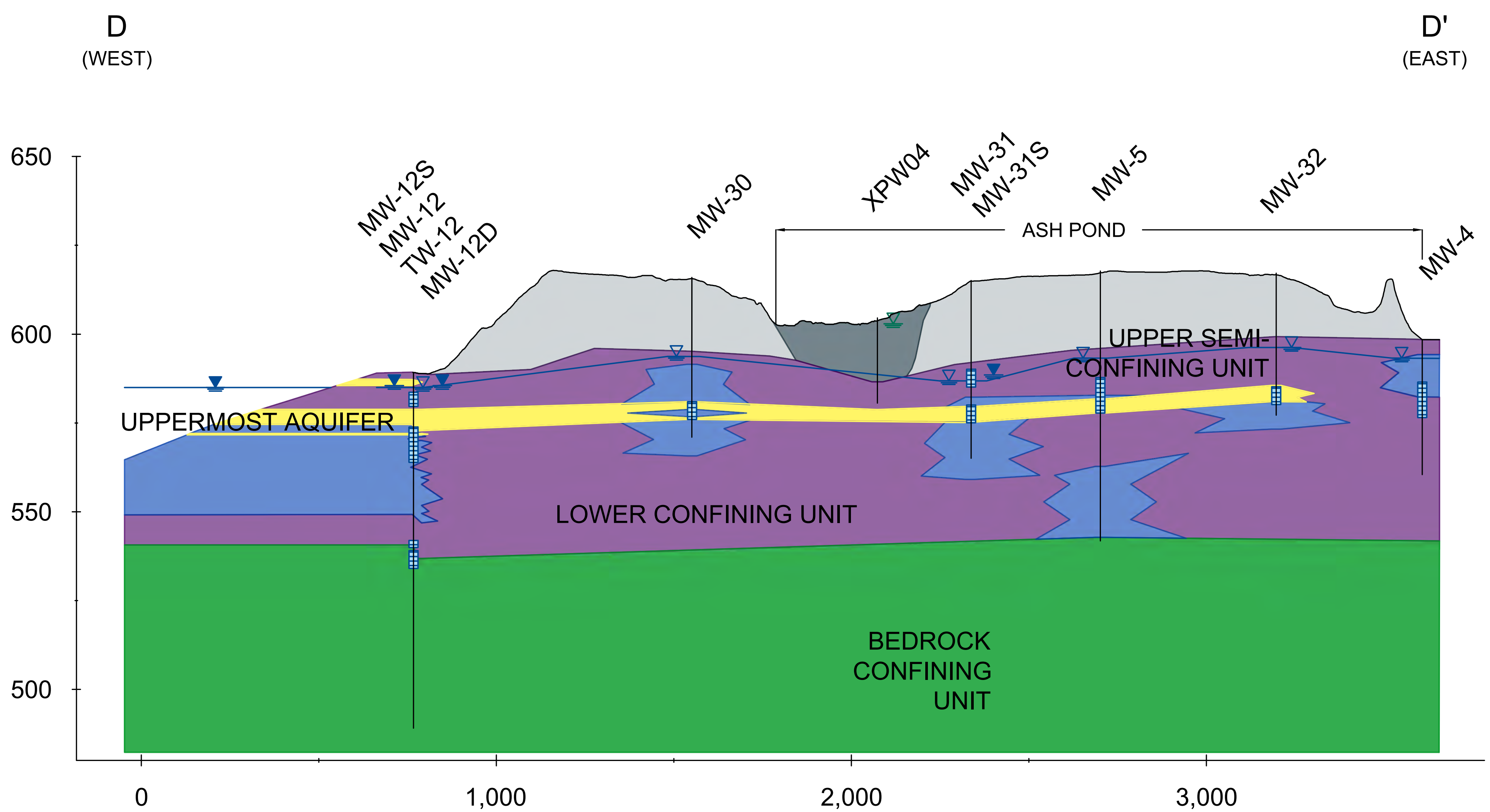
FIGURE 2-7

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

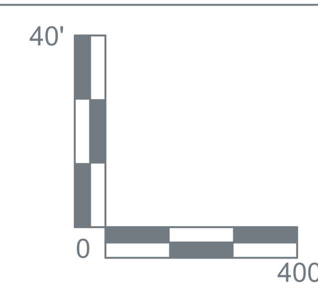
NOTES

1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Vertical Datum: NAVD88
5. Groundwater elevations measured on July 22-23, 2021.



LEGEND

- COAL COMBUSTION RESIDUALS, CCRs
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPER AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)
- SURFACE WATER



GEOLOGIC CROSS SECTION D-D'

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

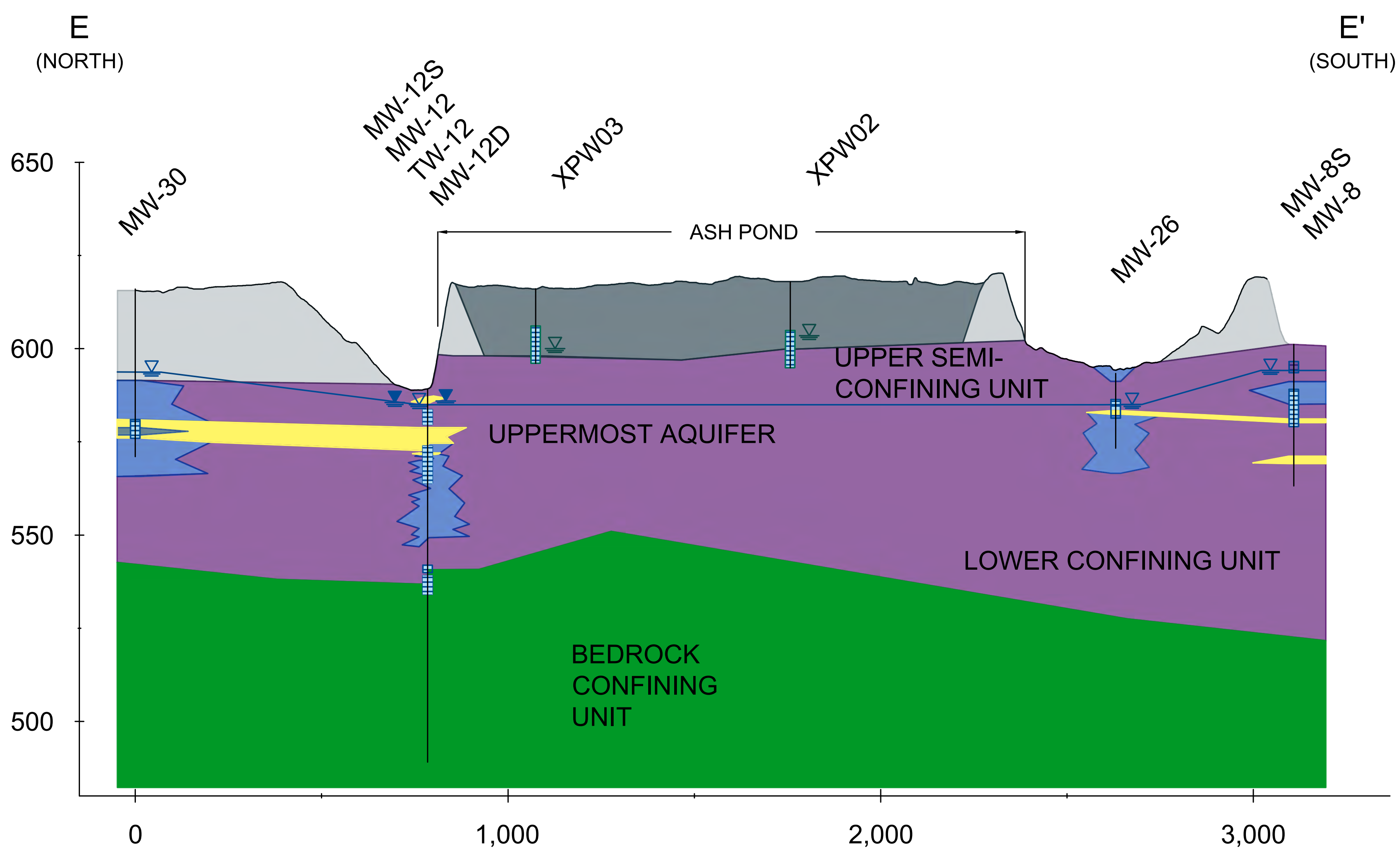
FIGURE 2-8

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES

1. This profile was developed by interpolation between widely spaced boreholes. Only at the borehole location should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.
2. Scale is approximate.
3. Vertical scale is exaggerated 10X.
4. Vertical Datum: NAVD88
5. Groundwater elevations measured on July 22-23, 2021.



LEGEND

- COAL COMBUSTION RESIDUALS, CCRs
- FILL
- CLAY (CL/CH)
- SILT (ML)
- SAND (SP/SM/SW)
- BEDROCK / WEATHERED BEDROCK (INTERBEDDED SHALE, LIMESTONE, SANDSTONE, V. LITTLE SS)
- WELL SCREEN INTERVAL
- UPPERMOST AQUIFER POTENTIOMETRIC SURFACE
- UPPER AQUIFER GROUNDWATER ELEVATION
- POREWATER ELEVATION
- BEDROCK GROUNDWATER / OTHER GROUNDWATER / SURFACE WATER ELEVATION(S)

40'
0
400'

GEOLOGIC CROSS SECTION E-E'

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-9

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\Figure 3-2_Top of Uppermost Aquifer.mxd

PROJECT: 169000XXXX | DATED: 8/18/2021 | DESIGNER: STOLZSD

INTERPRETED TOP OF UPPERMOST AQUIFER (95TH PERCENTILE GROUNDWATER ELEVATION CONTOURS)

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 250 500 Feet

NOTE

TOP OF AQUIFER CONTOURS GENERATED IN 2018 (HALEY & ALDRICH, INC., 2018) FOR 40 C.F.R. § 257; CONTOURS HAVE NOT BEEN MODIFIED USING BORING DATA COLLECTED IN 2021, ALTHOUGH THE SEPARATION DISTANCE BETWEEN TOP OF UPPERMOST AQUIFER AND BASE OF ASH IS CONSISTENT.

TOP OF UPPERMOST AQUIFER

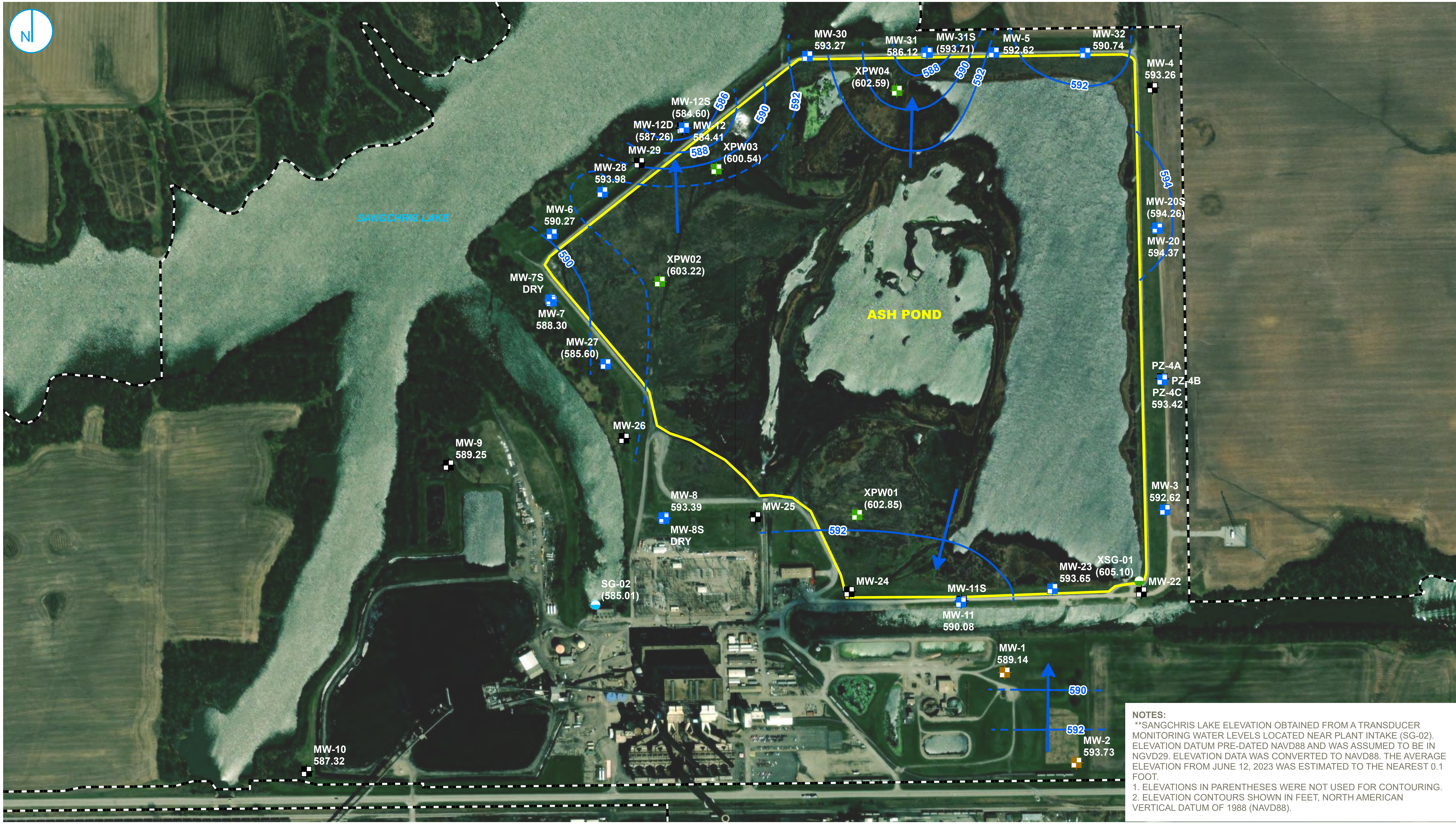
NATURE AND EXTENT REPORT
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-10

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE (SG-02). ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. THE AVERAGE ELEVATION FROM JUNE 12, 2023 WAS ESTIMATED TO THE NEAREST 0.1 FOOT.
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Kincaid\2023_04_Kincaid_Pot_Map.aprx

PROJECT: 169000XXXX | DATED: 10/27/2023 | DESIGNER: egreaves

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- STAFF GAGE, LAKE
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 250 500
Feet

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP
JUNE 12, 2023 (E001)

NATURE AND EXTENT REPORT
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-11

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\Nature_and_Extent\KIN\Nature_and_Extent_Report\Figure 3-1. KIN GWPS UA.mxd

PROJECT: 169000XXXX | DATED: 4/22/2024 | DESIGNER: galarnmc

TOTAL BORON EXCEEDANCE

TOTAL SULFATE EXCEEDANCE

TOTAL DISSOLVED SOLIDS EXCEEDANCE

COMPLIANCE WELL WITHOUT EXCEEDANCE

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 250 500 Feet

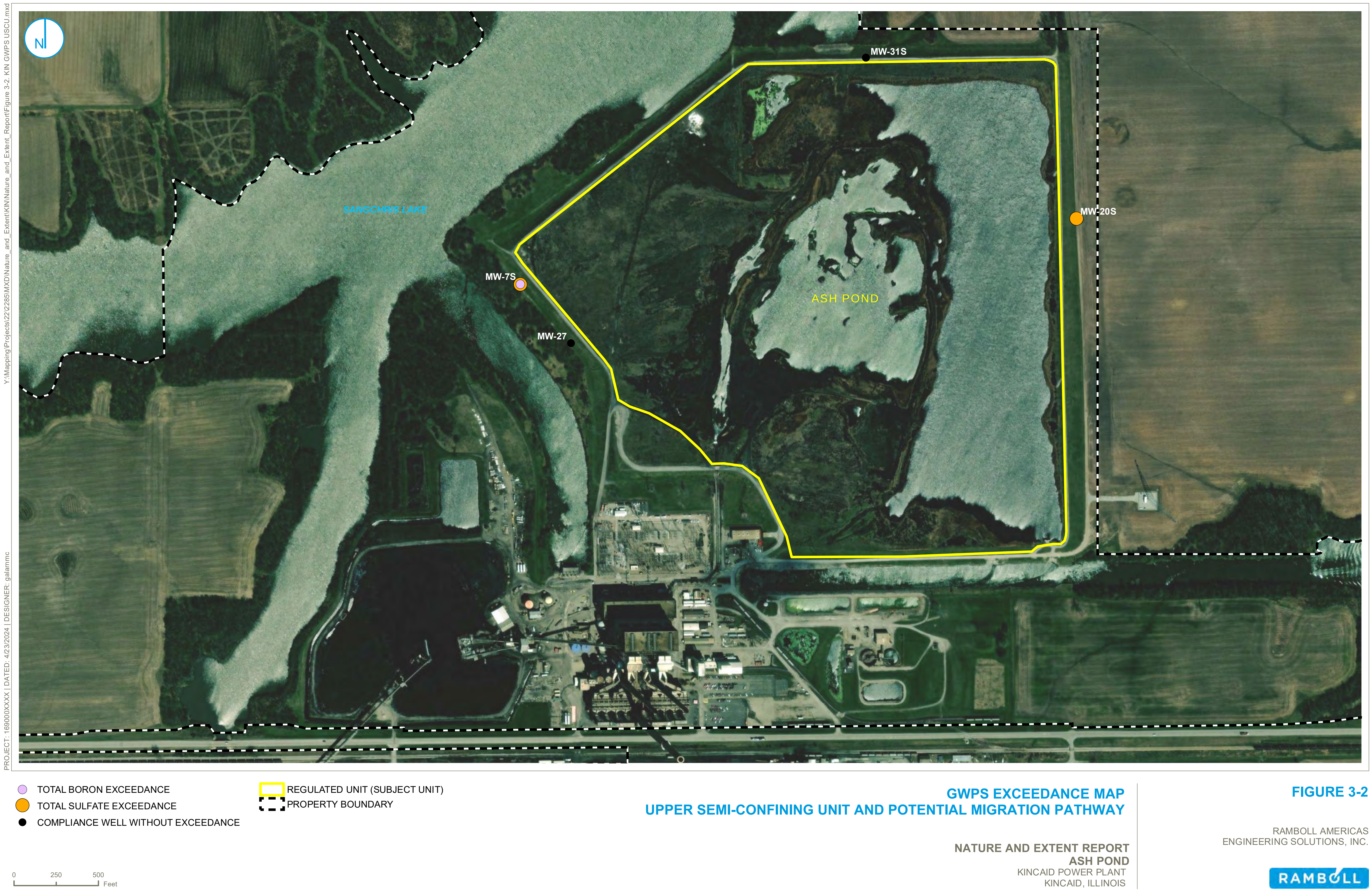
GWPS EXCEEDANCE MAP
UPPERMOST AQUIFER

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 3-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



GWPS EXCEEDANCE MAP
UPPER SEMI-CONFINING UNIT AND POTENTIAL MIGRATION PATHWAY

FIGURE 3-2

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

SURFACE WATER SAMPLE
COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, RIVER
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

SURFACE WATER SAMPLING LOCATIONS

FIGURE 3-3

NATURE AND EXTENT REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

APPENDICES

APPENDIX A
CCR Geotechnical and Analytical Results

TABLE 2-1. GEOTECHNICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Sample ID	Field Location ID	Top of Sample (ft bgs)	Bottom of Sample (ft bgs)	Moisture Content (%)	Dry Density (pcf)	Specific Gravity	Calculated Porosity [1] (%)	Vertical Hydraulic Conductivity (cm/s)	LL	PL	PI	Laboratory USCS	Gravel (%)	Sand (%)	Fines (%)
CCR															
XPW01 (8.5-9)	XPW01	8.5	9	19.4	74.8	2.790	57%	7.2E-04	12	14	NP	SP	0	97.4	2.6
XPW01 (20.5-21)	XPW01	20.5	21	26.8	79.2	2.838	55%	3.5E-04	17	15	2	SP	0	96.3	3.7
XPW02 (8.5-9)	XPW02	8.5	9	11.8	62.7	2.787	64%	4.0E-03	4	9	NP	SP-SM	0	94.1	5.9
XPW02 (21-21.5)	XPW02	21	21.5	13.9	93.9	2.799	46%	1.9E-03	8	11	NP	SP-SM	0	94.5	5.5
XPW03 (8-8.5)	XPW03	8	8.5	27.4	86.9	2.805	50%	4.3E-03	14	13	1	SW-SM	0.2	91.4	8.4
XPW03 (18-18.5)	XPW03	18	18.5	36.4	89.3	2.770	48%	3.5E-03	5	10	NP	SP	1.6	97.1	1.3
XPW04 (10.5-11)	XPW04	10.5	11	18.3	77.4	2.786	55%	9.2E-04	3	6	NP	SP	0.2	98.4	1.4
XPW04 (21-21.5)	XPW04	21	21.5	32.3	81.3	2.795	53%	5.5E-04	15	16	NP	SP	0	97.3	2.7
Upper Cahokia Formation															
MW-12D (5-7)	MW-12D	5	7	18.6	97.8	2.682	42%	3.2E-07	22	13	9	SC	4.9	49.8	45.3
MW-12D (11.5-12)	MW-12D	11.5	12	18.2	94.5	2.704	44%	7.2E-08	22	12	10	CL	1.1	34.7	64.2
MW-23 (15-17)	MW-23	15	17	28.4	92.7	2.705	45%	7.4E-08	43	17	26	CL	0	2.5	97.5
Lower Cahokia Formation															
MW-12D (20.5-22.5)	MW-12D	20.5	22.5	14.0	106.9	2.672	36%	2.0E-07	22	13	9	SC	6	46.4	47.6
MW-20 (15-17)	MW-20	15	17	18.9	107.7	2.701	36%	1.2E-07	32	14	18	CL	0.6	29.9	69.5
MW-23 (25-27)	MW-23	25	27	15.6	112.3	2.731	34%	5.9E-08	32	14	18	CL	0	41.6	58.4

[O: SSW 04/30/21; U: CJC 08/11/21; C: LDC 08/17/21; U: LDC 09/13/21; C: EJT 09/19/21]

Notes:
[1] Porosity calculated as relationship of bulk density (p_b) to particle density (p_d) ($n = 100[1- (p_b/p_d)]$)
bgs = below ground surface
CCR = coal combustion residuals
cm/s = centimeters per second
ft = foot/feet
LL = Liquid limit
NP = Non-Plastic
pcf = pounds per cubic foot
PI = Plasticity Index
PL = Plastic Limit
% = percent

USCS = Unified Soil Classification System
CL = Lean Clay
SC = Clayey Sand
SP = Poorly Graded Sand
SP-SM = Poorly Graded Sand with Silt
SW-SM = Well Graded Sand with Silt

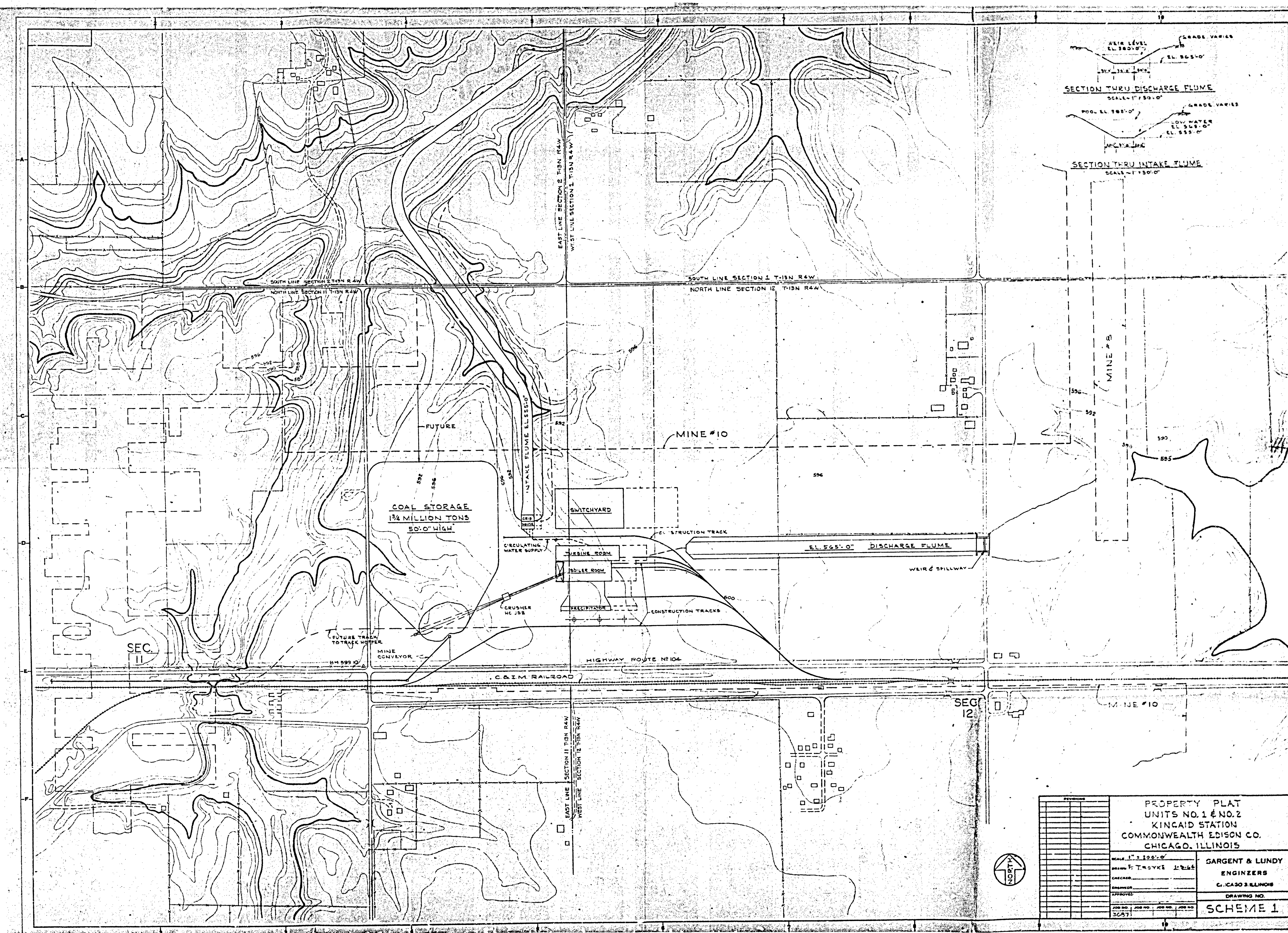
TABLE 2-2. ASH ANALYTICAL RESULTS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Sample Location	Sample Depth (ft BGS)	Sample Date	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Boron (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Lead (mg/kg)	Lithium (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)
XPW01	6-8	02/01/2021	1.12	1.84	83.8	2.31	107	<0.19	37.7	5.18	3.99	10.7	<0.011	3.35	<0.96	0.19
XPW01	16-18	02/01/2021	<0.73	0.63	34.4	0.74	30.1	<0.19	11.5	2.16	0.68	4.43	<0.012	1.55	<0.93	0.28
XPW01	26-28	02/01/2021	<0.77	1.4	22.7	0.53	21.7	<0.19	7.79	1.4	1.09	2.57	<0.012	1.52	<0.96	<0.19
XPW02	6-8	01/26/2021	0.84	1.36	60.6	1.49	77	0.19	23.4	3.9	5.84	6.75	<0.01	2.08	<0.93	<0.19
XPW02	16-18	01/26/2021	<0.8	2.26	57.7	1.39	69.1	0.26	21.3	4.54	5.68	6.02	<0.012	3.03	<0.96	0.31
XPW03	6-8	01/26/2021	<0.77	1.48	1580	1.23	82.4	0.25	20.6	6.39	4.32	11.1	<0.01	2.09	<0.93	<0.19
XPW03	16-18	01/26/2021	<0.75	1.31	470	2.59	106	<0.19	56.7	7.33	4.32	13.4	<0.01	3.07	<0.94	<0.19
XPW04	5-7	01/26/2021	<1.92	0.45	164	2.09	84.9	<0.2	48.8	5.44	1.93	10.3	<0.011	2.2	<0.98	<0.2
XPW04	20-20.5	01/26/2021	1.05	0.5	112	1.48	60.2	<0.19	23.9	3.81	1.54	7.28	<0.011	1.46	<0.93	<0.19

Notes:
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method.
BGS = below ground surface
ft = feet
mg/kg = milligrams per kilogram

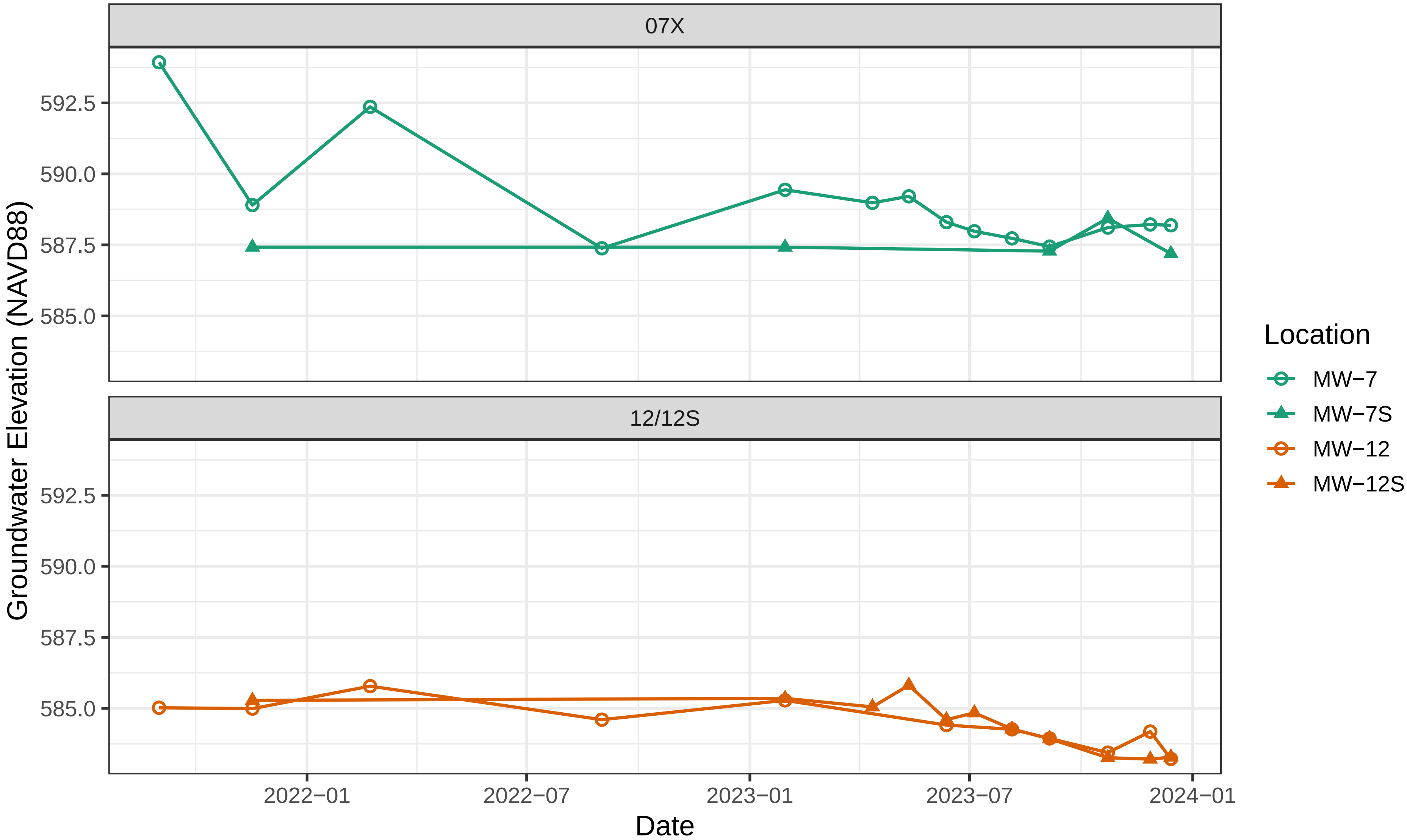
generated 10/05/2021, 4:11:38 PM CDT

APPENDIX B
Historic Plat of Survey Map (1966)


SECTION THRU DISCHARGE FLUME
GRADE VARIES
SECTION THRU INTAKE FLUME
GRADE VARIES
LOW WATER
MINE #8
MINE #10
FUTURE
INTAKE FLUME
COAL STORAGE
1¾ MILLION TONS
50'-0" HIGH
SWITCHYARD
CIRCULATING WATER SUPPLY
TURBINE ROOM
BOILER ROOM
PRECIPITATOR
CRUSHER
CONSTRUCTION TRACKS
DISCHARGE FLUME
WEIR & SPILLWAY
FUTURE TRACK TO TRACK HOPPER
MINE CONVEYOR
HIGHWAY ROUTE No 104
C.&I.M. RAILROAD
SEC. 11
SEC 12
PROPERTY PLAT
UNITS NO. 1 & NO. 2
KINCAID STATION
COMMONWEALTH EDISON CO.
CHICAGO, ILLINOIS
SCALE 1" = 100'-0"
DRAWN F. TROYKE
CHECKED
ENGINEER
APPROVED
JOB NO.
3057
SARGENT & LUNDY
ENGINEERS
CHICAGO 3, ILLINOIS
DRAWING NO.
SCHEME 1
NORTH

APPENDIX C
Hydrographs Showing Vertical Gradients

Path: dara/Vistra − 845/Corrective Action Assessment/Nature and Extent/Hydrographs

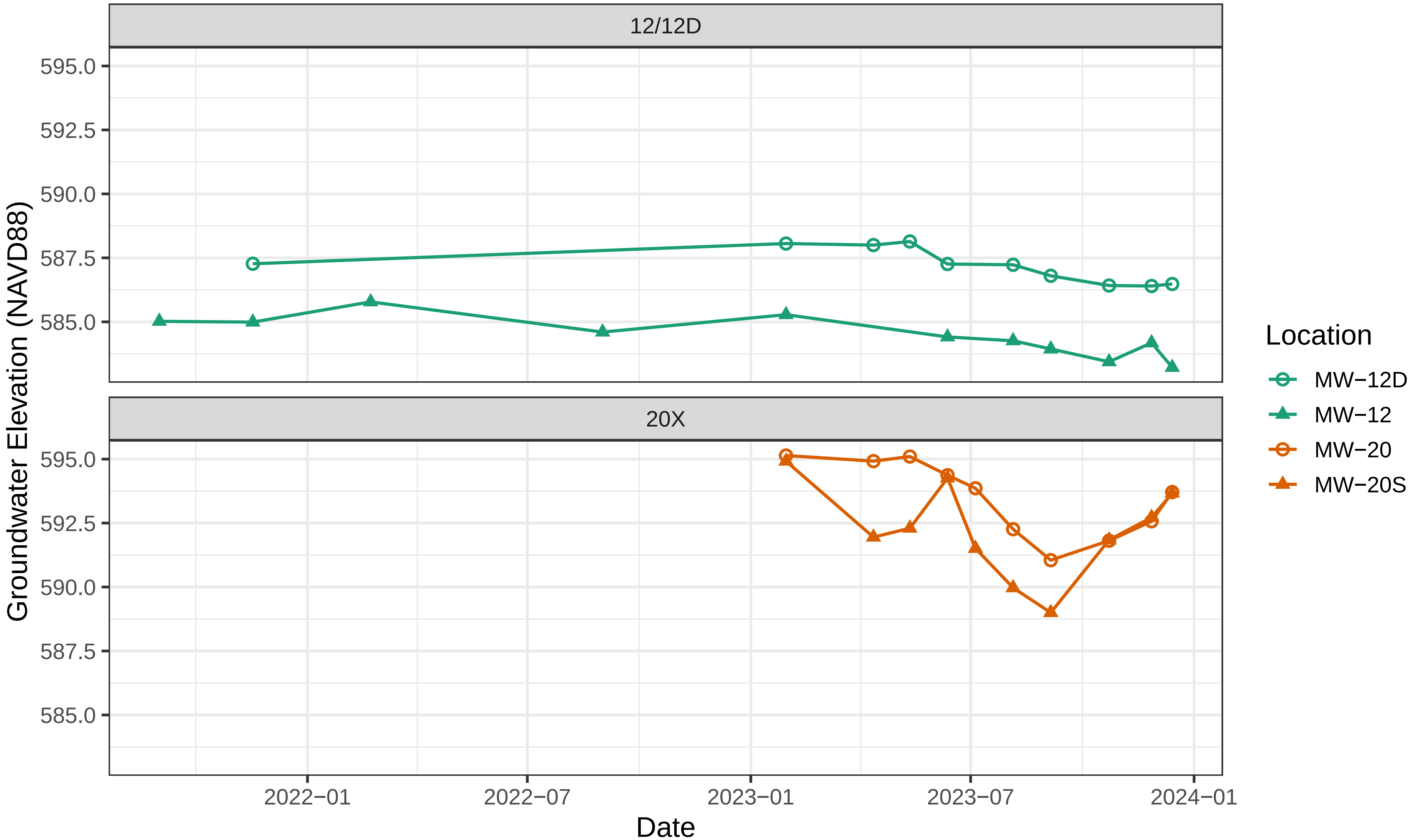


Hydrographs
Nature and Extent Report
Kincaid Ash Pond
Kincaid, IL

Figure
1

Drafter: AOC Date: 2024−04−29 Contract Number: 1940103584

Path: dara/Vistra − 845/Corrective Action Assessment/Nature and Extent/Hydrographs

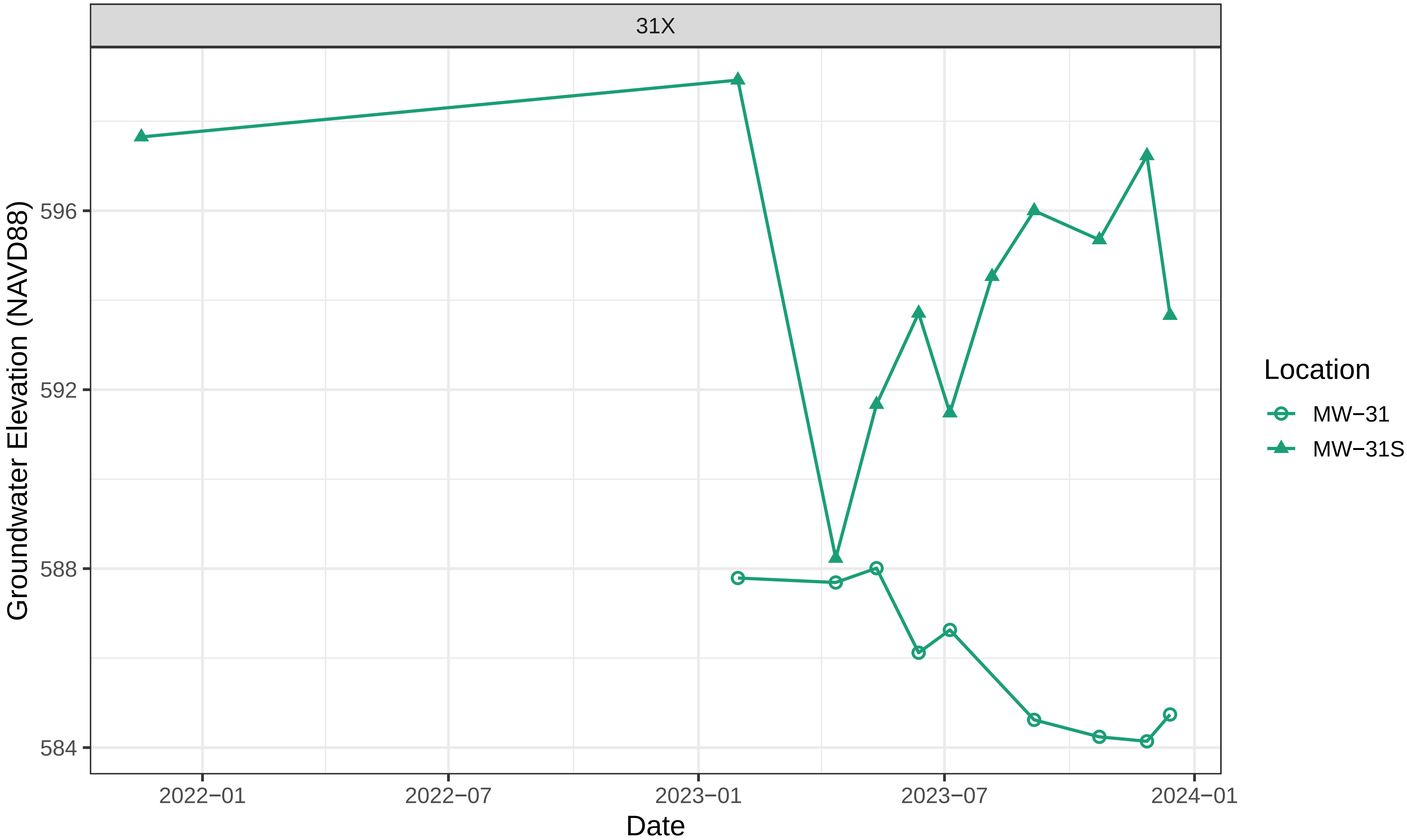


Hydrographs
Nature and Extent Report
Kincaid Ash Pond
Kincaid, IL

Figure
2

Drafter: AOC Date: 2024−04−29 Contract Number: 1940103584

Path: dara/Vistra − 845/Corrective Action Assessment/Nature and Extent/Hydrographs



RAMBOLL

Hydrographs
Nature and Extent Report
Kincaid Ash Pond
Kincaid, IL

Figure
3

Drafter: AOC Date: 2024−04−29 Contract Number: 1940103584

APPENDIX D
Vertical Hydraulic Gradients

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-12 Groundwater Elevation (ft NAVD88)	MW-12D Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	UA	BCU				
02/23/2021	584.12	584.55	-0.43	32.46	-0.013	up
03/15/2021	584.70	585.36	-0.66	32.46	-0.020	up
04/05/2021	585.10	586.23	-1.13	32.46	-0.035	up
05/20/2021	586.59	587.18	-0.59	32.46	-0.018	up
06/10/2021	585.02	586.55	-1.53	32.46	-0.047	up
7/01/2021-7/02/2021	585.41	586.71	-1.30	32.46	-0.040	up
7/22/2021-7/23/2021	584.98	586.58	-1.60	32.46	-0.049	up
8/10/2021-8/11/2021	585.05	586.71	-1.66	32.46	-0.051	up
01/30/2023	585.28	588.06	-2.78	32.46	-0.086	up
04/12/2023	--	588.00	--	--	--	--
05/12/2023	--	588.14	--	--	--	--
06/12/2023	584.41	587.26	-2.85	32.46	-0.088	up
07/05/2023	584.41	587.26	-2.85	32.46	-0.088	up
08/05/2023	584.26	587.23	-2.97	32.46	-0.091	up
09/05/2023	583.94	586.80	-2.86	32.46	-0.088	up
10/23/2023	583.44	586.42	-2.98	32.46	-0.092	up
11/27/2023	584.18	586.40	-2.22	32.46	-0.068	up
12/13/2023	583.22	586.48	-3.26	32.46	-0.100	up
			Middle of screen elevation MW-12			569.0
			Middle of screen elevation MW-12D			536.6

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-12S Groundwater Elevation (ft NAVD88)	MW-12 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	PMP	UA				
02/23/2021	584.81	584.12	0.69	12.58	0.055	down
03/15/2021	585.43	584.70	0.73	12.58	0.058	down
04/05/2021	585.53	585.10	0.43	12.58	0.034	down
05/20/2021	587.19	586.59	0.60	12.58	0.048	down
06/10/2021	585.27	585.02	0.25	12.58	0.020	down
7/01/2021-7/02/2021	585.60	585.41	0.19	12.58	0.015	down
7/22/2021-7/23/2021	585.12	584.98	0.14	12.58	0.011	down
8/10/2021-8/11/2021	585.31	585.05	0.26	12.58	0.021	down
01/30/2023	588.06	585.35	2.71	12.58	0.216	down
04/12/2023	585.05	--	--	--	--	--
05/12/2023	585.81	--	--	--	--	--
06/12/2023	587.26	584.60	2.66	12.58	0.212	down
08/05/2023	587.23	584.27	2.96	12.58	0.235	down
09/05/2023	586.80	583.93	2.87	12.58	0.228	down
10/23/2023	586.42	583.26	3.16	12.58	0.251	down
11/27/2023	586.40	583.21	3.19	12.58	0.254	down
12/13/2023	586.48	583.28	3.20	12.58	0.254	down
			Middle of screen elevation MW-12S			581.6
			Middle of screen elevation MW-12			569.0

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-31S Groundwater Elevation (ft NAVD88)	MW-31 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	USCU	UA				
02/23/2021	591.18	587.68	3.50	10.11	0.346	down
03/15/2021	591.83	587.96	3.87	10.11	0.383	down
04/05/2021	590.92	587.86	3.06	10.11	0.303	down
05/20/2021	592.83	588.63	4.20	10.11	0.415	down
6/09/2021-6/10/2021	588.77	586.66	2.11	11.25	0.188	down
07/01/2021	588.55	594.19	-5.64	11.03	-0.511	up
7/22/2021-7/23/2021	588.55	586.69	1.86	11.03	0.169	down
01/30/2023	598.92	587.79	11.13	10.11	1.101	down
04/12/2023	588.23	587.69	0.54	10.71	0.050	down
05/12/2023	591.67	588.01	3.66	10.11	0.362	down
06/12/2023	593.71	586.12	7.59	10.11	0.751	down
07/05/2023	591.48	586.63	4.85	10.11	0.480	down
08/05/2023	594.53	--	--	--	--	--
09/05/2023	596.00	584.62	11.38	10.11	1.125	down
10/23/2023	595.35	584.24	11.11	10.11	1.099	down
11/27/2023	597.23	584.14	13.09	10.11	1.295	down
12/14/2023	593.66	584.74	8.92	10.11	0.882	down
			Middle of screen elevation MW-31S			587.6
			Middle of screen elevation MW-31			577.5

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-8S Groundwater Elevation (ft NAVD88)	MW-8 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	USCU	UA				
02/23/2021	594.97	595.54	-0.57	10.83	-0.053	up
03/15/2021	594.85	595.97	-1.12	10.71	-0.105	up
04/05/2021	594.45	594.70	-0.25	10.31	-0.024	up
05/21/2021	597.46	597.33	0.13	10.93	0.012	down
06/10/2021	593.90	593.85	0.05	9.76	0.005	down
07/01/2021	--	598.50	--	--	--	--
07/22/2021	--	594.15	--	--	--	--
08/10/2021	--	596.10	--	--	--	--
01/30/2023	594.80	595.14	-0.34	10.66	-0.032	up
04/12/2023	--	594.21	--	--	--	--
05/12/2023	--	594.74	--	--	--	--
06/12/2023	--	593.39	--	--	--	--
07/05/2023	--	594.03	--	--	--	--
08/05/2023	--	593.38	--	--	--	--
09/05/2023	--	593.36	--	--	--	--
10/23/2023	--	593.44	--	--	--	--
11/27/2023	--	593.47	--	--	--	--
12/14/2023	593.84	593.84	0.00	9.70	0.000	flat
			Middle of screen elevation MW-8S			595.1
			Middle of screen elevation MW-8			584.1

RAMBOLL

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-7S Groundwater Elevation (ft NAVD88)	MW-7 Groundwater Elevation (ft NAVD88)	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
	USCU	UA				
02/23/2021	587.18	589.45	-2.27	6.18	-0.367	up
03/15/2021	587.26	594.86	-7.60	6.26	-1.214	up
04/05/2021	587.12	588.64	-1.52	6.12	-0.248	up
05/21/2021	587.86	591.55	-3.69	6.86	-0.538	up
06/10/2021	587.44	586.86	0.58	6.44	0.090	down
7/01/2021-7/02/2021	587.34	592.54	-5.20	6.34	-0.820	up
7/22/2021-7/23/2021	587.33	587.73	-0.40	6.33	-0.063	up
8/10/2021-8/11/2021	587.73	595.40	-7.67	6.73	-1.140	up
01/30/2023	587.42	589.44	-2.02	6.42	-0.315	up
04/12/2023	--	588.98	--	--	--	--
05/12/2023	--	589.21	--	--	--	--
06/12/2023	--	588.30	--	--	--	--
07/05/2023	--	587.98	--	--	--	--
08/05/2023	--	587.73	--	--	--	--
09/05/2023	587.28	587.44	-0.16	6.28	-0.025	up
10/23/2023	588.44	588.11	0.33	7.44	0.044	down
11/27/2023	--		--	--	--	--
12/14/2023	587.19	588.19	-1.00	6.19	-0.162	up
			Middle of screen elevation MW-7S			587.1
			Middle of screen elevation MW-7			581.0

Appendix D. Vertical Hydraulic Gradients
Nature and Extent Report
Kincaid Power Plant
Ash Pond
Kincaid, Illinois

Date	MW-20S Groundwater Elevation (ft NAVD88) USCU	MW-20 Groundwater Elevation (ft NAVD88) LCU	Head Change (ft)	Distance Change [1] (ft)	Vertical Hydraulic Gradient [2] (dh/dl)	
02/23/2021	594.83	594.82	0.01	11.91	0.001	flat
03/15/2021	595.19	595.12	0.07	11.91	0.006	down
04/05/2021	595.05	595.05	0.00	11.91	0.000	flat
05/18/2021-05/19/2021	599.06	598.93	0.13	11.91	0.011	down
06/09/2021	594.64	594.68	-0.04	11.91	-0.003	up
07/01/2021	595.04	595.07	-0.03	11.91	-0.003	up
08/10/2021	594.95	594.91	0.04	11.91	0.003	down
01/30/2023	594.92	595.14	-0.22	11.91	-0.018	up
04/12/2023	591.95	594.92	-2.97	12.43	-0.239	up
05/12/2023	592.30	595.10	-2.80	12.78	-0.219	up
06/12/2023	594.26	594.37	-0.11	14.74	-0.007	up
07/05/2023	591.51	593.86	-2.35	11.99	-0.196	up
08/05/2023	589.97	592.26	-2.29	10.45	-0.219	up
09/05/2023	589.00	591.05	-2.05	9.48	-0.216	up
10/23/2023	591.84	591.81	0.03	12.32	0.002	down
11/27/2023	592.72	592.57	0.15	13.20	0.011	down
12/14/2023	593.67	593.71	-0.04	14.15	-0.003	up
			Middle of screen elevation MW-20S			591.4
			Middle of screen elevation MW-20			579.5

[O:SSW 06/09/21; U:CJC 04/26/24; C: SSW 04/26/24]

Notes:
[1] Distance change was calculated using the midpoint of the piezometer screen and water table surface. If the water table surface was above the top of the monitoring well screen, then distance change was calculated using the midpoint of both screens.
[2] Vertical gradients between ±0.0015 are considered flat, and typically have less than 0.02 foot difference in groundwater elevation between wells.
-- = data not available
BCU = bedrock confining unit
dh = head change
dl = distance change
ft = foot/feet
LCU = lower confining unit
NAVD88 = North American Vertical Datum of 1988
PMP = potential migration pathway
UA = uppermost aquifer
USCU = upper semi-confining unit

RAMBOLL

APPENDIX E
Technical Memorandum, Surface Water Sampling Summary, Kincaid Power Plant

TECHNICAL MEMORANDUM

DATE December 16, 2021 **Project No.** 21454831

TO David Mitchell, Stu Cravens, Vic Modeer
Kincaid Generation, LLC

CC Brian Hennings - Ramboll

FROM Pat Behling, Jeffrey Ingram - Golder **EMAIL** JIngram@golder.com

SURFACE WATER SAMPLING SUMMARY, KINCAID POWER PLANT, CHRISTIAN COUNTY, ILLINOIS

1.0 INTRODUCTION AND BACKGROUND

Golder Associates USA Inc. (Golder) is pleased to submit this Technical Memorandum summarizing recent surface water sampling activities at the Kincaid Power Plant (KPP or Site) operated by Kincaid Generation, LLC (KG) in Christian County, Illinois. During the field investigation, 32 samples were collected and sent for laboratory analysis from Sangchris Lake, which is adjacent to the Site, in the vicinity of the Primary Ash Pond (PAP, CCR Unit ID 141). A sample location map is provided in **Figure 1**.

2.0 PROJECT SCOPE OF WORK

The scope of work for this project consisted of the following:

- Preparation of a Site-specific Health, Safety, and Environment Plan (HASEP).
- Review of baseline data to determine sample locations and constituents for analysis.
- Collection of 32 surface water samples from Sangchris Lake.
- Preparation of a Technical Memorandum to summarize the sampling and the results.

3.0 FIELD INVESTIGATION

3.1 Health, Safety, and Environment Plan

This work was performed under a Site-Specific HASEP that was approved by KG. The HASEP was prepared in accordance with KG sub-contractor requirements and includes identification of occupation and health and safety hazards (risks) related to the field team, site conditions, specific risk controls, training requirements, personal protective equipment (PPE) requirements, and information on potential emergencies.

3.2 Surface Water Sampling Locations

Surface water sampling on Sangchris Lake was completed on October 6th and October 7th, 2021. To access the sample locations, Golder subcontracted with Environmental Restoration, LLC. (ER) to provide and operate an open boat with a low horsepower outboard motor. Thirty-two (32) surface water samples were collected from

Sangchris Lake at locations agreed upon prior to sampling between Golder and IPGC. Sample locations were confirmed in the field using a Trimble Geo7X handheld GPS unit as displayed in **Figure 1**.

3.3 Surface Water Sample Collection and Results

At each sampling location, the field methods described in section 3.2.1.3 of the *Surface Water Sampling Work Plan – Kincaid Power Plant, Christian County, Illinois* were completed as applicable. Field parameters including turbidity, pH, specific conductivity, dissolved oxygen, redox potential, and temperature were recorded prior to collecting each sample as shown on the field forms provided in **Appendix A**.

Surface water samples were placed in clean laboratory-supplied containers and properly labeled with well ID, project name, sampler initials, analyses to be performed, date, and time of collection. Sample information was logged on a chain of custody (COC) and the samples and COC were shipped to Teklab, Inc. (Teklab) for analysis. Sampling data validation was completed by Golder following receipt of the analytical data from Teklab. A summary of the results is displayed in **Table 1** and the laboratory data packet from Teklab as well as the data validation is provided in **Appendix B**.

No exceedances of the Site Groundwater Protection Standards (GWPS) used for Part 845 groundwater monitoring were noted based on our initial evaluation of the surface water sampling results. Further evaluation of the surface water data will be completed as part of the MNA evaluation for the site.

4.0 CLOSING

Golder appreciates the opportunity to continue to work on this project. Should you require any additional information about this technical memo, please feel free to contact the undersigned.

Sincerely,

Golder Associates Inc.

Jeffrey Ingram
Senior Project Geologist

Patrick J. Behling
Principal and Practice Leader

JSI/PJB

Attachments: Table 1 – Sangchris Lake Surface Water Sampling Results
Figure 1 – Sangchris Lake Surface Water Sample Locations
Appendix A – Surface Water Sampling Field Forms
Appendix B – Laboratory Analytical Data

Tables

Table 1
Sangchris Lake Sampling Results
Kincaid Power Plant
Christian County, Illinois

Analyte	Units	Site GWPS	K-A-1	K-A-2M	K-A-2D	K-A-3M	K-A-3D	K-B-1	K-B-2M	K-B-2D	K-B-3M
Field Parameters											
Dissolved Oxygen	mg/L	NA	6.98	7.74	7.65	6.27	7.53	7.27	6.85	6.39	6.78
Redox Potential	mV	NA	94.5	93.0	94.3	97.5	97.9	93.0	81.4	88.2	89.3
Specific Conductance	µS/cm	NA	293.2	287.2	288.8	291.2	295.0	298.6	296.7	291.6	293.2
Temperature	°C	NA	23.8	23.8	23.6	23.8	22.8	24.1	23.9	23.9	24.1
Turbidity	NTU	NA	12.6	10.1	14.1	11.3	23.2	13.5	10.7	11.6	10.9
Sample Depth	FT BLE	NA	2.5	5.4	10.3	7.5	15.0	1.0	4.8	9.7	8.6
Part 845 Constituents											
Antimony, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Total	mg/L	0.01	0.0025	0.0026	0.0027	0.0026	0.0029	0.0025	0.0026	0.0027	0.0027
Barium, Total	mg/L	2	0.0694	0.0673	0.0701	0.0704	0.0706	0.0702	0.0716	0.0712	0.0732
Beryllium, Total	mg/L	0.004	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Total	mg/L	2	0.0504	0.0469	0.0564	0.0483	0.0486	0.0649	0.0517	0.0472	0.0471
Cadmium, Total	mg/L	0.005	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Total	mg/L	NA	31.2	31.0	31.6	31.5	32.6	32.0	31.5	30.4	31.6
Chloride, Total	mg/L	200	21	21	20	20	21	20	20	20	21
Chromium, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Fluoride, Total	mg/L	4	0.36	0.36	0.36	0.36	0.35	0.36	0.36	0.36	0.36
Lead, Total	mg/L	0.0075	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Total	mg/L	0.04	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Total	mg/L	0.002	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020
Molybdenum, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
pH	SU	5.6 - 9.0	8.79	8.72	8.69	8.61	8.73	8.52	8.48	8.40	8.45
Radium (226+228)	pCi/L	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total	mg/L	0.05	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Sulfate, Total	mg/L	300	30	31	31	31	30	32	31	31	31
Thalium, Total	mg/L	0.002	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Total Dissolved Solids	mg/L	1,200	194 J	190	182	196	188	198	198	190	202
Dissolved Metals											
Antimony, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Dissolved	mg/L	NA	0.0021	0.0021	0.0022	0.0022	0.0023	0.0020	0.0021	0.0021	0.0021
Barium, Dissolved	mg/L	NA	0.0553	0.0549	0.0555	0.0551	0.0520	0.0573	0.0537	0.0551	0.0547
Beryllium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Dissolved	mg/L	NA	0.0411	0.0454	0.0459	0.0452	0.0470	0.0558	0.0404	0.0403	0.0466
Cadmium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Dissolved	mg/L	NA	29.1	29.2	29.2	28.7	29.5	29.8	29.0	28.9	28.8
Chromium, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	0.0024
Cobalt, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lead, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Dissolved	mg/L	NA	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Dissolved	mg/L	NA	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002
Molybdenum, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Selenium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Thalium, Dissolved	mg/L	NA	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Iron Speciation											
Ferric Iron	mg/L	NA	0.250	0.220	0.390	0.210	0.900	0.210	0.220	0.300	0.230
Ferrous Iron	mg/L	NA	ND < 0.020	0.021	0.025	0.021	0.028	0.032	0.032	0.032	0.028
Additional Major Cations/Anions											
Alkalinity, Bicarbonate	mg/L	NA	105	106	106	107	106	112	107	119	113
Alkalinity, Carbonate	mg/L	NA	11	11	11	9	14	6	0	0	4
Sodium, Dissolved	mg/L	NA	11.6	11.5	11.5	11.4	11.6	11.7	11.6	11.4	11.5
Sodium, Total	mg/L	NA	12.2	12.1	12.3	12.3	12.3	12.5	12.3	11.9	12.2
Magnesium, Dissolved	mg/L	NA	18.1	18.1	18.1	17.7	18.3	18.3	18.0	17.9	17.8
Magnesium, Total	mg/L	NA	19.3	19.2	19.6	19.5	20.1	19.7	19.5	18.8	19.5
Potassium, Dissolved	mg/L	NA	2.81	2.83	2.82	2.79	2.84	2.85	2.82	2.80	2.81
Potassium, Total	mg/L	NA	3.03	2.99	3.06	3.06	3.15	3.07	3.04	2.96	3.04
Manganese, Dissolved	mg/L	NA	ND < 0.0020	ND < 0.0020	0.0032	ND < 0.0020	ND < 0.0020	0.0023	ND < 0.0020	ND < 0.0020	ND < 0.0020
Manganese, Total	mg/L	NA	0.0808	0.0787	0.0929	0.0845	0.1170	0.0948	0.0946	0.0989	0.1040
Iron, Dissolved	mg/L	NA	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	0.0371
Iron, Total	mg/L	NA	0.263	0.238	0.416	0.230	0.929	0.240	0.254	0.330	0.261
Additoinal MNA Parameters											
Sulfide, Total	mg/L	NA	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05
Total Organic Carbon	mg/L	NA	4.2	4.3	4.3	4.2	4.3	4.5	4.2	4.2	4.3
Nitrate, Total	mg/L	NA	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	0.094
Phosphorus, Total	mg/L	NA	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100

Notes:
1. Unit Abbreviations: °C - degrees celcius, mg/L - milligrams per liter, SU - standard units, mV - millivolts, µS/cm - microsiemens per centimeter, NTU - nephelometric turbidity unit, pCi/L - picocuries per liter, FT BLE - feet below lake elevation.
2. ND - Non Detects. NDs reported as less than the Method Detection Limit (MDL) or adjusted Practical Quanitation Limit (PQL) basd on data validation.
3. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
4. J - Flags are estimated values based on data validation.
5. Site Groundwater Protection Standards (GWPS) from Table 3-1, Background Groundwater Quality Standards from the Newton Groundwater Monitoring Plan.
6. For pH, the values represent the upper / lower limits. Values outside of these values represents a statistical exceedance.
7. No values are present above the Site GWPS, therefore, no highlighting is used in the table.

Prepared by: GTM
Checked by: RP
Reviewed by: PJB

GOLDER
MEMBER OF WSP

Table 1
Sangchris Lake Sampling Results
Kincaid Power Plant
Christian County, Illinois

Analyte	Units	Site GWPS	K-B-3D	K-C-1	K-C-2M	K-C-2D	K-C-3M	K-C-3D	K-D-1	K-D-2M
Field Parameters										
Dissolved Oxygen	mg/L	NA	7.02	6.43	4.92	5.90	6.23	4.55	5.33	5.55
Redox Potential	mV	NA	92.2	79.0	86.0	86.7	86.7	91.6	77.7	79.8
Specific Conductance	µS/cm	NA	294.0	298.1	301.2	301.4	297.5	296.4	351.4	301.1
Temperature	°C	NA	23.5	24.1	23.9	23.9	24.0	23.9	23.5	23.6
Turbidity	NTU	NA	19.8	10.1	9.7	11.6	11.2	25.4	9.1	7.7
Sample Depth	FT BLE	NA	17.2	2.7	4.2	8.3	9.9	19.8	2.1	6.6
Part 845 Constituents										
Antimony, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Total	mg/L	0.01	0.0028	0.0026	0.0026	0.0026	0.0026	0.0028	0.0027	0.0026
Barium, Total	mg/L	2	0.0738	0.0706	0.0708	0.0741	0.0720	0.0786	0.0736	0.0703
Beryllium, Total	mg/L	0.004	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Total	mg/L	2	0.0518	0.0505	0.0491	0.0517	0.0452	0.0498	0.0481	0.0484
Cadmium, Total	mg/L	0.005	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Total	mg/L	NA	31.9	30.8	31.1	31.5	30.9	31.8	28.9	30.8
Chloride, Total	mg/L	200	21	20	20	20	21	21	20	20
Chromium, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Fluoride, Total	mg/L	4	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Lead, Total	mg/L	0.0075	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Total	mg/L	0.04	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Total	mg/L	0.002	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020
Molybdenum, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
pH	SU	5.6 - 9.0	8.53	8.51	8.40	8.35	8.35	8.29	8.49	8.43
Radium (226+228)	pCi/L	5	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total	mg/L	0.05	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Sulfate, Total	mg/L	300	30	32	32	31	31	31	32	31
Thalium, Total	mg/L	0.002	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Total Dissolved Solids	mg/L	1,200	194	216	200	202	192	190	210	200
Dissolved Metals										
Antimony, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	0.0012	0.0039	ND < 0.0010	ND < 0.0010	ND < 0.0010	0.0012
Arsenic, Dissolved	mg/L	NA	0.0021	0.0023	0.0021	0.0022	0.0022	0.0022	0.0023	0.0021
Barium, Dissolved	mg/L	NA	0.0553	0.0561	0.0559	0.0565	0.0552	0.0543	0.0533	0.0560
Beryllium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Dissolved	mg/L	NA	0.0437	0.0429	0.0429	0.0421	0.0407	0.0463	0.0459	0.0408
Cadmium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Dissolved	mg/L	NA	28.9	29.1	29.2	29.0	29.0	29.1	28.7	28.8
Chromium, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lead, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Dissolved	mg/L	NA	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Dissolved	mg/L	NA	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002
Molybdenum, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Selenium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Thalium, Dissolved	mg/L	NA	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Iron Speciation										
Ferric Iron	mg/L	NA	0.550	0.190	0.230	0.340	0.250	0.630	0.510	0.180
Ferrous Iron	mg/L	NA	0.054	0.021	0.021	0.036	0.021 J	0.068	0.025	0.036
Additional Major Cations/Anions										
Alkalinity, Bicarbonate	mg/L	NA	109	112	117	118	116	119	115	119
Alkalinity, Carbonate	mg/L	NA	7	6	0	0	0	0	5	0
Sodium, Dissolved	mg/L	NA	11.5	11.6	11.6	11.4	11.4	11.4	11.4	11.4
Sodium, Total	mg/L	NA	12.2	12.1	12.3	12.3	12.1	12.2	11.9	12.1
Magnesium, Dissolved	mg/L	NA	17.9	18.1	18.1	18.0	18.0	18.1	17.7	17.9
Magnesium, Total	mg/L	NA	19.6	19.1	19.3	19.5	19.1	19.6	17.7	19.1
Potassium, Dissolved	mg/L	NA	2.82	2.86	2.82	2.80	2.79	2.81	2.79	2.79
Potassium, Total	mg/L	NA	3.09	3.02	3.06	3.10	3.02	3.09	2.78	3.02
Manganese, Dissolved	mg/L	NA	0.0087	ND < 0.0020	ND < 0.0020	ND < 0.0020	ND < 0.0020	0.0044	ND < 0.0020	ND < 0.0020
Manganese, Total	mg/L	NA	0.1250	0.0869	0.0908	0.0992	0.1010	0.1680	0.1250	0.0833
Iron, Dissolved	mg/L	NA	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250
Iron, Total	mg/L	NA	0.604	0.210	0.254	0.378	0.298	0.693	0.533	0.213
Additoinal MNA Parameters										
Sulfide, Total	mg/L	NA	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05
Total Organic Carbon	mg/L	NA	4.2	4.2	4.1	4.0	4.1	4.4	4.1	4.4
Nitrate, Total	mg/L	NA	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050
Phosphorus, Total	mg/L	NA	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100

Notes:
1. Unit Abbreviations: °C - degrees celcius, mg/L - milligrams per liter, SU - standard units, mV - millivolts, µS/cm - microsiemens per centimeter, NTU - nephelometric turbidity unit, pCi/L - picocuries per liter, FT BLE - feet below lake elevation.
2. ND - Non Detects. NDs reported as less than the Method Detection Limit (MDL) or adjusted Practical Quanitation Limit (PQL) basd on data validation.
3. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
4. J - Flags are estimated values based on data validation.
5. Site Groundwater Protection Standards (GWPS) from Table 3-1, Background Groundwater Quality Standards from the Newton Groundwater Monitoring Plan.
6. For pH, the values represent the upper / lower limits. Values outside of these values represents a statistical exceedance.
7. No values are present above the Site GWPS, therefore, no highlighting is used in the table.

Prepared by: GTM
Checked by: RP
Reviewed by: PJB

Table 1
Sangchris Lake Sampling Results
Kincaid Power Plant
Christian County, Illinois

Analyte	Units	Site GWPS	K-D-2D	K-E-1	K-E-2M	K-E-2D	K-F-1	K-F-2M	K-F-2D	K-G-1
Field Parameters										
Dissolved Oxygen	mg/L	NA	5.85	5.90	69.70	5.95	6.60	7.45	7.64	5.62
Redox Potential	mV	NA	80.9	80.7	79.1	78.3	98.5	98.2	99.6	166.4
Specific Conductance	µS/cm	NA	298.7	354.0	355.0	354.7	293.6	291.2	291.5	329.6
Temperature	°C	NA	23.7	23.6	23.8	23.7	24.0	23.7	23.4	23.0
Turbidity	NTU	NA	13.5	8.9	10.0	16.2	12.3	11.5	19.7	11.9
Sample Depth	FT BLE	NA	13.2	3.3	9.9	19.8	1.1	11.2	22.4	1.7
Part 845 Constituents										
Antimony, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Total	mg/L	0.01	0.0025	0.0025	0.0025	0.0026	0.0026	0.0025	0.0025	0.0025
Barium, Total	mg/L	2	0.0737	0.0671	0.0633	0.0703	0.0711	0.0703	0.0723	0.0683
Beryllium, Total	mg/L	0.004	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Total	mg/L	2	0.0513	0.0474	0.0455	0.0496	0.0463	0.0471	0.0447	0.0472
Cadmium, Total	mg/L	0.005	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Total	mg/L	NA	31.1	29.6	30.2	30.9	31.4	30.8	31.8	33.0
Chloride, Total	mg/L	200	20	20	20	20	21	21	21	20
Chromium, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Fluoride, Total	mg/L	4	0.36	0.36	0.36	0.36	0.35	0.35	0.36	0.36
Lead, Total	mg/L	0.0075	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Total	mg/L	0.04	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Total	mg/L	0.002	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020
Molybdenum, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
pH	SU	5.6 - 9.0	8.37	8.35	8.37	8.36	8.64	8.64	8.58	8.28
Radium (226+228)	pCi/L	5	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total	mg/L	0.05	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Sulfate, Total	mg/L	300	32	31	31	31	31	31	31	31
Thalium, Total	mg/L	0.002	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Total Dissolved Solids	mg/L	1,200	214	214	216	218	188	214	204	172
Dissolved Metals										
Antimony, Dissolved	mg/L	NA	0.0045	ND < 0.0010	ND < 0.0010	ND < 0.0010	0.0012	0.0038	0.0039	ND < 0.0010
Arsenic, Dissolved	mg/L	NA	0.0020	0.0021	0.0021	0.0021	0.0022	0.0022	0.0022	0.0021
Barium, Dissolved	mg/L	NA	0.0570	0.0530	0.0523	0.0522	0.0562	0.0558	0.0550	0.0538
Beryllium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Dissolved	mg/L	NA	0.0421	0.0446	0.0441	0.0435	0.0421	0.0451	0.0407	0.0482
Cadmium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Dissolved	mg/L	NA	28.7	29.0 J	28.8	28.5	28.7	28.6	29.2	30.9 J
Chromium, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lead, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Dissolved	mg/L	NA	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Dissolved	mg/L	NA	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002
Molybdenum, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Selenium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Thalium, Dissolved	mg/L	NA	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Iron Speciation										
Ferric Iron	mg/L	NA	0.450	0.170	0.140	0.260	0.300	0.260	0.490	0.170
Ferrous Iron	mg/L	NA	0.061	0.036	0.036	0.028	0.021	0.021	0.032	0.043
Additional Major Cations/Anions										
Alkalinity, Bicarbonate	mg/L	NA	117	119	118	120	107	108	112	121
Alkalinity, Carbonate	mg/L	NA	0	0	0	0	10	9	8	0
Sodium, Dissolved	mg/L	NA	11.4	11.4	11.5	11.3	11.5	11.5	11.4	11.7
Sodium, Total	mg/L	NA	12.2	12.0	12.2	12.3	12.2	12.1	12.0	12.7
Magnesium, Dissolved	mg/L	NA	17.8	17.9	17.8	17.6	17.7	17.7	18.0	18.4 J
Magnesium, Total	mg/L	NA	19.1	18.1	18.3	18.7	19.4	19.1	19.6	19.6
Potassium, Dissolved	mg/L	NA	2.78	2.79	2.81	2.78	2.82	2.81	2.77	2.66
Potassium, Total	mg/L	NA	3.06	2.78	2.88	2.93	3.05	3.03	3.04	2.86
Manganese, Dissolved	mg/L	NA	0.0032	0.0032	0.0061	0.0121	ND < 0.0020	ND < 0.0020	ND < 0.0020	0.0077
Manganese, Total	mg/L	NA	0.0976	0.0870	0.0741	0.0934	0.0842	0.0896	0.1140	0.0793
Iron, Dissolved	mg/L	NA	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250
Iron, Total	mg/L	NA	0.512	0.204	0.171	0.290	0.321	0.280	0.525	0.211
Additoinal MNA Parameters										
Sulfide, Total	mg/L	NA	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05
Total Organic Carbon	mg/L	NA	4.1	4.2	4.1	4.1	4.2	4.1	4.2	4.1
Nitrate, Total	mg/L	NA	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	0.054	ND < 0.050
Phosphorus, Total	mg/L	NA	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100

Notes:
1. Unit Abbreviations: °C - degrees celcius, mg/L - milligrams per liter, SU - standard units, mV - millivolts, µS/cm - microsiemens per centimeter, NTU - nephelometric turbidity unit, pCi/L - picocuries per liter, FT BLE - feet below lake elevation.
2. ND - Non Detects. NDs reported as less than the Method Detection Limit (MDL) or adjusted Practical Quanitation Limit (PQL) basd on data validation.
3. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
4. J - Flags are estimated values based on data validation.
5. Site Groundwater Protection Standards (GWPS) from Table 3-1, Background Groundwater Quality Standards from the Newton Groundwater Monitoring Plan.
6. For pH, the values represent the upper / lower limits. Values outside of these values represents a statistical exceedance.
7. No values are present above the Site GWPS, therefore, no highlighting is used in the table.

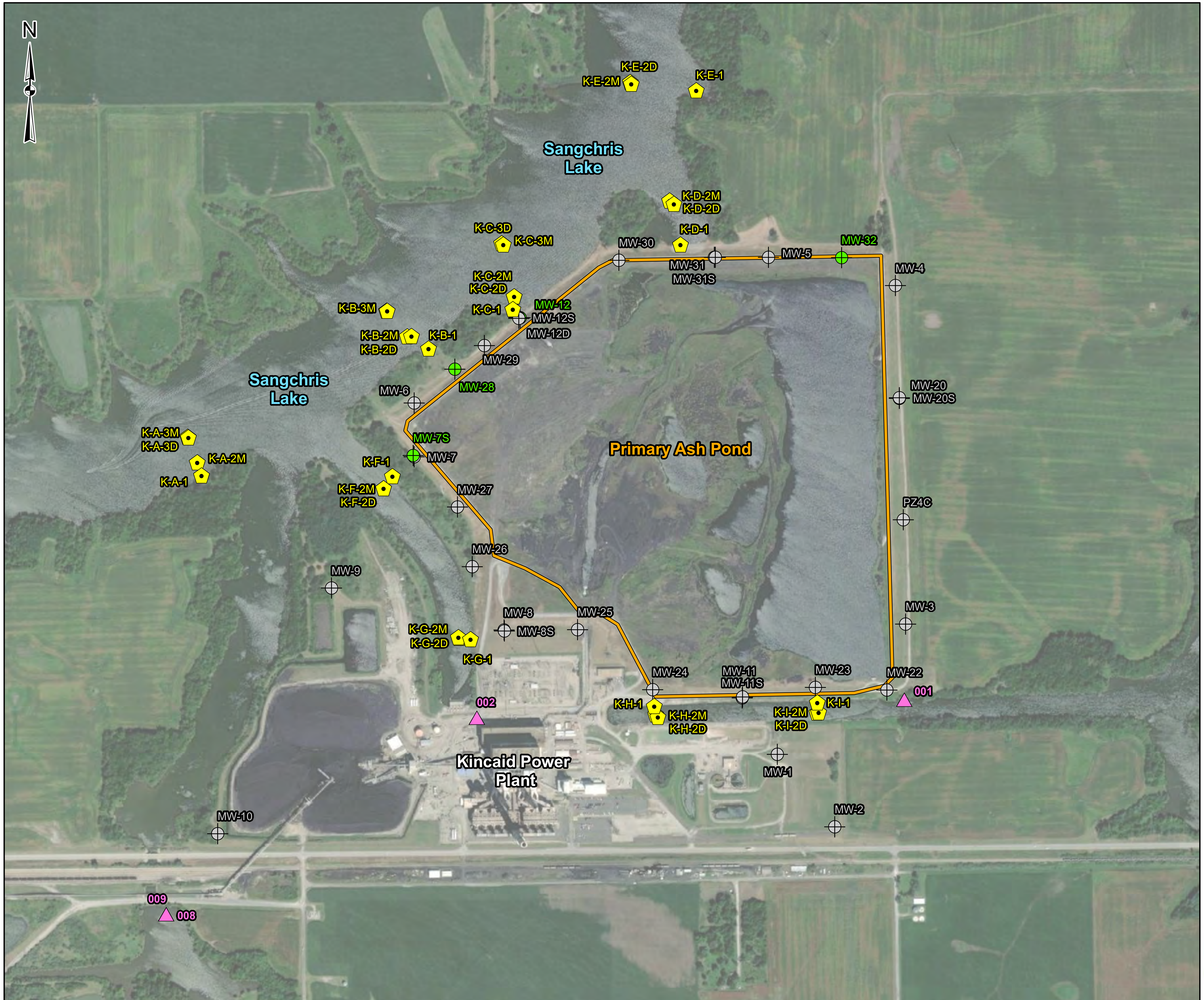
Prepared by: GTM
Checked by: RP
Reviewed by: PJB

Table 1
Sangchris Lake Sampling Results
Kincaid Power Plant
Christian County, Illinois

Analyte	Units	Site GWPS	K-G-2M	K-G-2D	K-H-1	K-H-2M	K-H-2D	K-I-1	K-I-2M	K-I-2D
Field Parameters										
Dissolved Oxygen	mg/L	NA	6.58	6.49	4.87	6.03	6.14	4.17	4.67	5.13
Redox Potential	mV	NA	149.0	145.5	125.8	124.0	122.4	102.4	120.6	120.8
Specific Conductance	µS/cm	NA	322.7	322.6	328.1	326.2	324.6	320.0	324.3	324.0
Temperature	°C	NA	23.3	23.3	24.5	23.9	24.1	27.2	27.2	26.1
Turbidity	NTU	NA	11.7	32.9	12.7	11.1	11.7	13.0	12.5	12.5
Sample Depth	FT BLE	NA	11.6	23.2	3.0	4.1	8.1	3.6	5.1	10.1
Part 845 Constituents										
Antimony, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Total	mg/L	0.01	0.0027	0.0034	0.0025	0.0026	0.0025	0.0025	0.0023	0.0025
Barium, Total	mg/L	2	0.0672	0.0844	0.0676	0.0680	0.0681	0.0692	0.0687	0.0688
Beryllium, Total	mg/L	0.004	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Total	mg/L	2	0.0432	0.0411	0.0370	0.0353	0.0365	0.0386	0.0389	0.0389
Cadmium, Total	mg/L	0.005	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Total	mg/L	NA	31.8	33.9	32.6	32.0	31.6 J	33.1	32.1	31.2
Chloride, Total	mg/L	200	21	21	20	21	20	21	20	20
Chromium, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Total	mg/L	0.006	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Fluoride, Total	mg/L	4	0.36	0.36	0.35	0.36	0.36	0.36	0.36	0.36
Lead, Total	mg/L	0.0075	ND < 0.0010	0.0011	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Total	mg/L	0.04	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Total	mg/L	0.002	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020	ND < 0.00020
Molybdenum, Total	mg/L	0.1	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
pH	SU	5.6 - 9.0	8.28	8.36	8.31	8.31	8.32	8.29	8.32	8.33
Radium (226+228)	pCi/L	5	ND	ND	ND	ND	ND	ND	ND	ND
Selenium, Total	mg/L	0.05	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Sulfate, Total	mg/L	300	31	31	31	31	31	31	31	31
Thalium, Total	mg/L	0.002	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Total Dissolved Solids	mg/L	1,200	174	178	172	176	176	162	166	164
Dissolved Metals										
Antimony, Dissolved	mg/L	NA	0.0041	ND < 0.0010	ND < 0.0010	ND < 0.0010	0.0024	ND < 0.0010	ND < 0.0010	ND < 0.0010
Arsenic, Dissolved	mg/L	NA	0.0022	0.0021	0.0021	0.0021	0.0021	0.0022	0.0022	0.0020
Barium, Dissolved	mg/L	NA	0.0535	0.0529	0.0539	0.0538	0.0527	0.0563	0.0534	0.0534
Beryllium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Boron, Dissolved	mg/L	NA	0.0509	0.0481	0.0481	0.0432	0.0511	0.0514	0.0450	0.0484
Cadmium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Calcium, Dissolved	mg/L	NA	29.0	29.2	30.4	29.1	29.0 J	29.0	29.0	29.2
Chromium, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Cobalt, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lead, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Lithium, Dissolved	mg/L	NA	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030	ND < 0.0030
Mercury, Dissolved	mg/L	NA	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002	ND < 0.0002
Molybdenum, Dissolved	mg/L	NA	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015	ND < 0.0015
Selenium, Dissolved	mg/L	NA	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010	ND < 0.0010
Thalium, Dissolved	mg/L	NA	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100	ND < 0.00100
Iron Speciation										
Ferric Iron	mg/L	NA	0.190	1.600	0.230	0.250	0.210	0.210	0.220	0.260
Ferrous Iron	mg/L	NA	0.032	0.075	0.043	0.032	0.032	0.032	0.046	0.043
Additional Major Cations/Anions										
Alkalinity, Bicarbonate	mg/L	NA	116	115	118	111	118	115	115	119
Alkalinity, Carbonate	mg/L	NA	0	0	0	5	0	0	4	0
Sodium, Dissolved	mg/L	NA	11.2	11.0	11.6	11.0	12.0	11.1	11.0	11.0
Sodium, Total	mg/L	NA	12.2	12.6	12.5	12.3	12.2	12.6	12.3	12.1
Magnesium, Dissolved	mg/L	NA	17.2	17.2	18.2	17.2	17.4	17.2	17.4	17.2
Magnesium, Total	mg/L	NA	18.8	19.8	19.4	19.0	18.7 J	19.6	19.1	18.8
Potassium, Dissolved	mg/L	NA	2.55	2.54	2.64	2.54	2.55	2.55	2.54	2.53
Potassium, Total	mg/L	NA	2.82	3.06	2.86	2.81	2.79	2.93	2.80	2.79
Manganese, Dissolved	mg/L	NA	ND < 0.0020	0.0026	0.0041	ND < 0.0020	0.0027	0.0013	ND < 0.0020	ND < 0.0020
Manganese, Total	mg/L	NA	0.0786	0.2250	0.0839	0.0852	0.0841	0.0887	0.0850	0.0876
Iron, Dissolved	mg/L	NA	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250	ND < 0.0250
Iron, Total	mg/L	NA	0.220	1.640	0.275	0.284	0.245	0.238	0.261	0.306
Additoinal MNA Parameters										
Sulfide, Total	mg/L	NA	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05	ND < 0.05
Total Organic Carbon	mg/L	NA	4.0	4.2	4.1	4.1	4.3	4.1	4.1	4.0
Nitrate, Total	mg/L	NA	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	ND < 0.050	0.125	ND < 0.050
Phosphorus, Total	mg/L	NA	ND < 0.100	0.148	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100	ND < 0.100

Notes:
1. Unit Abbreviations: °C - degrees celcius, mg/L - milligrams per liter, SU - standard units, mV - millivolts, µS/cm - microsiemens per centimeter, NTU - nephelometric turbidity unit, pCi/L - picocuries per liter, FT BLE - feet below lake elevation.
2. ND - Non Detects. NDs reported as less than the Method Detection Limit (MDL) or adjusted Practical Quanitation Limit (PQL) basd on data validation.
3. Radium (226 + 228) is reported as the sum of the Radium 226 and the Radium 228 activity concentrations unless the sum of the Radium 226 and Radium 228 Minimum Detectable Concentrations (MDC) is higher in which case it is displayed as ND.
4. J - Flags are estimated values based on data validation.
5. Site Groundwater Protection Standards (GWPS) from Table 3-1, Background Groundwater Quality Standards from the Newton Groundwater Monitoring Plan.
6. For pH, the values represent the upper / lower limits. Values outside of these values represents a statistical exceedance.
7. No values are present above the Site GWPS, therefore, no highlighting is used in the table.

Figures



LEGEND

- Primary Ash Pond Boundary
- NPDES Outfall Locations
- Surface Water Sampling Location
- Part 845 Well With Potential Exceedances
- Part 845 Well With No Potential Exceedances

0 250 500 1,000 1,500
Feet

NOTE(S)

1. LOCATIONS FOR SURFACE WATER SAMPLES WERE OBTAINED DURING SAMPLING USING A TRIMBLE GEO7X UNIT.
2. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
3. NPDES - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM.

REFERENCE(S)

1. RAMBOLL 2021. GROUNDWATER MONITORING PLAN, ASH POND, KINCAID POWER PLANT, KINCAID, ILLINOIS.
2. RAMBOLL 2021. TABLE 2 SUMMARY OF POTENTIAL EXCEEDANCES.
3. NPDES PERMIT NO. IL0002241.

CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT

PROJECT
MONITORED NATURAL ATTENUATION EVALUATION

TITLE
SANGCHRIS LAKE SURFACE WATER SAMPLING LOCATIONS

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	10/21/2021
DESIGNED	JSI
PREPARED	ETF
REVIEWED	BTT
APPROVED	PJB

PROJECT NO. 21454831

FIGURE 1

APPENDIX A

Surface Water Sampling Field Forms

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-A-1   Sample No. K-A-1

Sample Date 10/6/2021   Time 1500   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 2.5 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1451	
Volume Discharged	gals	—	
pH	Standard	8.79	
Spec. Cond.	uS/CM	293.2	
Turbidity	NTU	12.6	
Temperature	°C	23.8	
Dissolved Oxygen	mg/l	6.98	
Redox Potential	+/- mV	94.5	

Northing: 1069374.57
Easting: 654339.41
Elevation: 483.08

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	500mL HDPE	Yes	HNO_3
3	Chloride Fluoride Sulfate TDS Alkalinity	1.25L HDPE	No	None
4	Sulfide	250mL HDPE		NaOH Zn Acetate
5	Nitrate	250mL HDPE		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	1L HDPE		HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA Collected K-FB-1 @ 1505

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-A-2   Sample No. K-A-2M

Sample Date 10/6/2021   Time ~~1519~~ 1520   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 10.3 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1519	
Volume Discharged	gals		
pH	Standard	8.72	
Spec. Cond.	µS/CM	287.2	
Turbidity	NTU	10.1	
Temperature	°C	23.8	
Dissolved Oxygen	mg/l	7.74	
Redox Potential	+/- mV	93.0	

Northing: 1069463.73
Easting: 654312.33
Elevation: 480.44

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	NaOH Zn Acetate
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-A-2   Sample No. K-A-2D
Sample Date 10/6/2021   Time 1533   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 10.3 Ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1531	
Volume Discharged	gals	—	
pH	Standard	8.69	
Spec. Cond.	uS/CM	288.8	
Turbidity	NTU	14.1	
Temperature	°C	23.6	
Dissolved Oxygen	mg/l	7.65	
Redox Potential	+/- mV	94.3	

Northing: 1069470.45
Easting: 654309.81
Elevation: 479.59

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	NO	HNO_3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE		NaOH Zn Acetate
5	Nitrate	⊥		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	⊥	⊥	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation **Project No. : 21454831**

WEATHER CONDITIONS

Temperature 70°F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-A-3 Sample No. K-A-3M

Sample Date 10/6/2021 Time 1605 Sample By EMS

Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 15.0 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1604	
Volume Discharged	gals	—	
pH	Standard	8.61	
Spec. Cond.	uS/CM	291.2	
Turbidity	NTU	11.3	
Temperature	°C	23.8	
Dissolved Oxygen	mg/l	6.27	
Redox Potential	+/- mV	97.5	

Northing: 1069637.04
Easting: 654254.55
Elevation: 477.39

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2 x 125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-A-3   Sample No. K-A-3D

Sample Date 10/6/2021   Time 1620   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 15.0 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1619	
Volume Discharged	gals	—	
pH	Standard	8.73	
Spec. Cond.	uS/CM	295.0	
Turbidity	NTU	23.2	
Temperature	°C	~~8.73~~ 22.8	
Dissolved Oxygen	mg/l	7.53	
Redox Potential	+/- mV	97.9	

Northing: 1069638.30
Easting: 654251.26
Elevation: 478.69

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	ZN Acetate / NaOH
5	Nitrate	⊥	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	⊥	⊥	HNO_3
9	Ferrous/Ferric Iron	2 x 125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65°F   Weather Rain

SAMPLE INFORMATION

Sample Location K-B-1   Sample No. K-B-1

Sample Date 10/6/2021   Time 1232   Sample By ESMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 1 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1227	
Volume Discharged	gals	–	
pH	Standard	8.52	
Spec. Cond.	uS/CM	298.6	
Turbidity	NTU	13.5	
Temperature	°C	24.1	
Dissolved Oxygen	mg/l	7.27	
Redox Potential	+/- mV	93.0	

Northing: 1070203.67
Easting: 655893.84
Elevation: 482.73

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE		ZN Acetate NaOH
5	Nitrate	↓		None
6	Total Organic Carbon	125ml Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	↓		HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation — Project No. : 21454831

WEATHER CONDITIONS

Temperature: 65 'F — Weather: Rain

SAMPLE INFORMATION

Sample Location: K-B-2 — Sample No.: K-B-2M
Sample Date: 10/6/2021 — Time: 1343 — Sample By: EMS
Sample Method: Peristaltic — Sample Type: GRAB

Appearance of Sample: Clear + colorless
Depth to Bottom of Lake: 9.7 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1342	
Volume Discharged	gals	—	
pH	Standard	8.48	
Spec. Cond.	uS/CM	296.7	
Turbidity	NTU	10.7	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	68.5	
Redox Potential	+/- mV	81.4	

Northing: 1070290.75
Easting: 655780.21
Elevation: 478.58

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	NO	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H2SO4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: Offset to get to depth ~10 ft due to lake bottom drop off

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F   Weather Cloudy

SAMPLE INFORMATION

Sample Location K-B-2   Sample No. K-B-2D

Sample Date 10/6/2021   Time 1358   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 9.7 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1355	
Volume Discharged	gals	–	
pH	Standard	8.40	
Spec. Cond.	uS/CM	291.6	
Turbidity	NTU	11.6	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	6.39	
Redox Potential	+/- mV	88.2	

Northing: 1070289.06
Easting: 655750.05
Elevation: 479.40 ft H2O

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: Offset to get depth ~10 ft due to lake bottom dropoff

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65 °F   Weather Cloudy

SAMPLE INFORMATION

Sample Location K-B-3   Sample No. K-B-3M

Sample Date 10/6/2021   Time 1425   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless

Depth to Bottom of Lake: 17.2 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1418	
Volume Discharged	gals	–	
pH	Standard	8.45	
Spec. Cond.	uS/CM	293.2	
Turbidity	NTU	10.9	
Temperature	°C	24.1	
Dissolved Oxygen	mg/l	6.78	
Redox Potential	+/- mV	89.3	

Northing: 1070464.63
Easting: 655618.37
Elevation: 480.38 ft MAE

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	ZnAcetat NaOH
5	Nitrate	⊥	|	None
6	Total Organic Carbon	125mL Glass	|	H2SO4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	⊥	⊥	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

SURFACE WATER SAMPLE COLLECTION FORM

GOLDER
MEMBER OF WSP

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-B-3   Sample No. K-B-3D

Sample Date 10/6/2021   Time 1438   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless

Depth to Bottom of Lake: 17.2 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1436	
Volume Discharged	gals	—	
pH	Standard	8.53	
Spec. Cond.	uS/CM	294.0	
Turbidity	NTU	19.8	
Temperature	°C	23.5	
Dissolved Oxygen	mg/l	7.02	
Redox Potential	+/- mV	92.2	

Northing: 1070463.91
Easting: 655615.30
Elevation: 474.74

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE		ZnAcetate NaOH
5	Nitrate	↓		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70° F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-C-1   Sample No. K-C-1
Sample Date 10/6/2021   Time 1027   Sample By EML
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless
Depth to Bottom of Lake: 2.7 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1026	
Volume Discharged	gals	—	
pH	Standard	8.51	
Spec. Cond.	uS/CM	298.1	
Turbidity	NTU	10.1	
Temperature	°C	24.1	
Dissolved Oxygen	mg/l	6.43	
Redox Potential	+/- mV	79.0	

Northing: 1070457.81
Easting: 656470.57
Elevation: 485.71 ft HAE

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	↓	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-C-2   Sample No. K-C-2M
Sample Date 10/6/2021   Time 1053   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 8.3 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1050	
Volume Discharged	gals	—	
pH	Standard	8.40	
Spec. Cond.	uS/CM	301.2	
Turbidity	NTU	9.69	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	4.92	
Redox Potential	+/- mV	86.0	

Northing: 1070544.96
Easting: 656480.01
Elevation: 484.50 ft HAE

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	NO	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H2SO4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-C-2   Sample No. K-C-2D
Sample Date 10/6/2021   Time 1108   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 8.3ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1107	
Volume Discharged	gals	–	
pH	Standard	8.35	
Spec. Cond.	μS/CM	301.4	
Turbidity	NTU	11.6	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	5.90	
Redox Potential	+/- mV	86.7	

Northing: 1070541.87
Easting: 686480.99
Elevation: 481.57

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	│	Zn acetate NaOH
5	Nitrate	⊥	│	None
6	Total Organic Carbon	125mL Glass	│	H_2SO_4
7	Phosphorus	1L HDPE	│	None
8	Radium 226 & 228	⊥	⊥	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation
Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F Weather Cloudy

SAMPLE INFORMATION

Sample Location K-C-3
Sample No. K-C-3M
Sample Date 10/6/2021 Time 1135
Sample By EMB
Sample Method Peristaltic
Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 19.8 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1131	
Volume Discharged	gals	—	
pH	Standard	8.35	
Spec. Cond.	µS/CM	297.5	
Turbidity	NTU	11.2	
Temperature	°C	24.0	
Dissolved Oxygen	mg/l	6.23	
Redox Potential	+/- mV	86.7	

Northing: 1070897.80
Easting: 656414.38
Elevation: 479.64

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	│	Zn Acetate/NaOH
5	Nitrate	↓	│	None
6	Total Organic Carbon	125mL Glass	│	H_2SO_4
7	Phosphorus	1L HDPE	│	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: Collect N-DUP-1 @ 1135

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature ~~Ac~~ 70 °F   Weather Cloudy & Light Rain

SAMPLE INFORMATION

Sample Location K-C-3   Sample No. K-C-3-D
Sample Date 10/6/2021   Time 1200   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless, Some light suspended solids
Depth to Bottom of Lake: 19.8 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1158	
Volume Discharged	gals	–	
pH	Standard	8.29	
Spec. Cond.	uS/CM	296.4	
Turbidity	NTU	25.4	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	4.55	
Redox Potential	+/- mV	91.6	

Northing: SEE Remarks
Easting: Below
Elevation:

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	NO	HNO3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	NO	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	⊥	|	None
6	Total Organic Carbon	125mL Glass	|	H2SO4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	⊥	⊥	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/NO	HCL

REMARKS: 1070906.25
656402.77
450.77

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65'F   Weather Overcast

SAMPLE INFORMATION

Sample Location K-D-1   Sample No. K-D-1

Sample Date 10/6/2021   Time 0933   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless

Depth to Bottom of Lake: 2.1 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0932	
Volume Discharged	gals	—	
pH	Standard	8.49	
Spec. Cond.	uS/CM	351.4	
Turbidity	NTU	9.11	
Temperature	°C	23.5	
Dissolved Oxygen	mg/l	5.33	
Redox Potential	+/- mV	77.7	

Northing: 1070873.41
Easting: 657615.64
Elevation: 481.28

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	↓		HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation **Project No. : 21454831**

WEATHER CONDITIONS

Temperature 70 °F Weather Overcast

SAMPLE INFORMATION

Sample Location K-D-2 Sample No. K-D-2M

Sample Date 10/6/2021 Time 0953 Sample By EMS

Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear + Colorless

Depth to Bottom of Lake: 13.2 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0952	
Volume Discharged	gals	—	
pH	Standard	8.43	
Spec. Cond.	uS/CM	301.1	
Turbidity	NTU	7.66	
Temperature	°C	23.6	
Dissolved Oxygen	mg/l	5.55	
Redox Potential	+/- mV	79.8	

Northing: 1071148.52
Easting: 657574.79
Elevation: 480.20 ft Hgc

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	ZnAcetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F   Weather Overcast

SAMPLE INFORMATION

Sample Location K-D-2   Sample No. K-D-2D
Sample Date 10/6/2021   Time 1006   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless
Depth to Bottom of Lake: 13.2 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1005	
Volume Discharged	gals	—	
pH	Standard	8.37	
Spec. Cond.	uS/CM	298.7	
Turbidity	NTU	13.5	
Temperature	°C	23.7	
Dissolved Oxygen	mg/l	5.85	
Redox Potential	+/- mV	80.9	

Northing: 1071173.19
Easting: 657547.29
Elevation: 481.14

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	↓	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	↓	⊥	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65° F   Weather Overcast

SAMPLE INFORMATION

Sample Location K-E-1   Sample No. K-E-1
Sample Date 10/6/21   Time 0820   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 3.3 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0820	
Volume Discharged	gals	—	
pH	Standard	8.35	
Spec. Cond.	u S/CM	3590	
Turbidity	NTU	8.87	
Temperature	°_C__	23.6	
Dissolved Oxygen	mg/l	59.0	
Redox Potential	+/- mV	80.7	

Northing: 1071915.04
Easting: 657742.92
Elevation: 480.41 ft HAE

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	⊥	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	⊥	⊥	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: Off set by 60ft due to algae, West

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65 °F   Weather Cloudy

SAMPLE INFORMATION

Sample Location K-E-2   Sample No. K-E-2M
Sample Date 10/6/2021   Time 0845   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear + Colorless
Depth to Bottom of Lake: 19.8 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0845	
Volume Discharged	gals	—	
pH	Standard	8.37	
Spec. Cond.	uS/CM	355.0	
Turbidity	NTU	10.0	
Temperature	°C	23.8	
Dissolved Oxygen	mg/l	69.7	
Redox Potential	+/- mV	79.1	

Northing: 1071967.45
Easting: 657303.41
Elevation: 477.64 ft HAE

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	⊥	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	⊥	⊥	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 65' F   Weather Cloudy

SAMPLE INFORMATION

Sample Location K-E-2D   Sample No. K-E-2D

Sample Date 10/6/21   Time 0858   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear - Colorless

Depth to Bottom of Lake: 19.8 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0858	
Volume Discharged	gals	—	
pH	Standard	8.36	
Spec. Cond.	µS/CM	354.7	
Turbidity	NTU	16.2	
Temperature	°C	23.7	
Dissolved Oxygen	mg/l	5.95	
Redox Potential	+/- mV	78.3	

Northing: 1071980.75

Easting: 657296.91

Elevation: 474.51

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	↓	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	↓	⊥	HNO_3
9	Ferrous/Ferric Iron	2 125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-F-1   Sample No. K-F-1

Sample Date 10/6/2021   Time 1712   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 1.1 ft

Other Water Sample notes: NL

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1709	
Volume Discharged	gals	-	
pH	Standard	8.64	
Spec. Cond.	uS/CM	293.6	
Turbidity	NTU	12.3	
Temperature	°C	24.0	
Dissolved Oxygen	mg/l	6.60	
Redox Potential	+/- mV	98.5	

Northing: 1069342.91
Easting: 655631.63
Elevation: 480.93

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	|	Zn Acetate NaOH
5	Nitrate	↓	|	None
6	Total Organic Carbon	125mL Glass	|	H_2SO_4
7	Phosphorus	1L HDPE	|	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-F-2   Sample No. K-F-2M
Sample Date 10/6/2021 Time 1732   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 22.4
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1731	
Volume Discharged	gals	-	
pH	Standard	8.64	
Spec. Cond.	uS/CM	291.2	
Turbidity	NTU	11.5	
Temperature	°C	23.7	
Dissolved Oxygen	mg/l	7.45	
Redox Potential	+/- mV	98.2	

Northing: 39° 35' 44.4"
Easting: 89° 29' 58.9"
Elevation: 590 ft

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE		ZnAcetate/NaOH
5	Nitrate	↓		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	↓	↓	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-F-2   Sample No. K-F-2D

Sample Date 10/6/2021   Time 1748   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 22.4 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1747	
Volume Discharged	gals	—	
pH	Standard	8.58	
Spec. Cond.	uS/CM	291.5	
Turbidity	NTU	19.7	
Temperature	°C	23.4	
Dissolved Oxygen	mg/l	7.64	
Redox Potential	+/- mV	99.6	

Northing: 39° 35' 49.4"

Easting: 89° 29' 58.9"

Elevation: ~~462 m~~ 590 ft

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	~~Yes~~	Zn Acetate NaOH
5	Nitrate	⊥		None
6	Total Organic Carbon	125mL Glass		H2SO4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	⊥	⊥	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation **Project No. : 21454831**

WEATHER CONDITIONS

Temperature 60 °F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-G-1 Sample No. K-G-1

Sample Date 10/7/2021 Time 0750 Sample By EMS

Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 1.7 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0749	
Volume Discharged	gals	–	
pH	Standard	8.28	
Spec. Cond.	µS/CM	329.6	
Turbidity	NTU	~~23.0~~ 11.9	
Temperature	°C	23.0	
Dissolved Oxygen	mg/l	5.62	
Redox Potential	+/- mV	166.4	

Northing: 1068228.56
Easting: 656138.78
Elevation: 498.75

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 60 °F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-G-2   Sample No. K-G-2M

Sample Date 10/7/2021   Time 0813   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 23.2 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0812	
Volume Discharged	gals	—	
pH	Standard	8.28	
Spec. Cond.	µS/CM	322.7	
Turbidity	NTU	~~23.3~~ 11.7	
Temperature	°C	23.3	
Dissolved Oxygen	mg/l	6.58	
Redox Potential	+/- mV	149.0	

Northing: 1068243.71
Easting: 656055.54
Elevation: 480.79

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 60'F   Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-G-2   Sample No. K-G-2D

Sample Date 10/7/2021   Time 0825   Sample By EMS

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: ~~NA~~ Clear, brownish

Depth to Bottom of Lake: 23.2 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	0824	
Volume Discharged	gals	–	
pH	Standard	8.36	
Spec. Cond.	uS/CM	322.6	
Turbidity	NTU	~~23.3~~ 32.9	
Temperature	°C	23.3	
Dissolved Oxygen	mg/l	6.49	
Redox Potential	+/- mV	145.5	

Northing: 1068238.51
Easting: 656060.40
Elevation: 478.85

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H2SO4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCl

REMARKS:

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70' F   Weather Rain

SAMPLE INFORMATION

Sample Location K-H-1   Sample No. K-H-1

Sample Date 10/7/2021   Time 1101   Sample By EMG

Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 3 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1100	
Volume Discharged	gals	-	
pH	Standard	8.31	
Spec. Cond.	uS/CM	328.1	
Turbidity	NTU	12.7	
Temperature	°_C__	24.5	
Dissolved Oxygen	mg/l	4.87	
Redox Potential	+/- mV	125.8	

Northing: 1067750.64
Easting: 657372.06
Elevation: 474.55

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes / No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70'F   Weather Rain

SAMPLE INFORMATION

Sample Location K-H-2   Sample No. K-H-2M
Sample Date 10/7/2021   Time 1122   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 8.1 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1121	
Volume Discharged	gals	–	
pH	Standard	8.31	
Spec. Cond.	uS/CM	326.2	
Turbidity	NTU	11.1	
Temperature	°C	23.9	
Dissolved Oxygen	mg/l	6.03	
Redox Potential	+/- mV	124.0	

Northing: 1067677.33
Easting: 657395.95
Elevation: 475.39

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	⊥	Yes	⊥
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	⊥	Zn Acetate NaOH
5	Nitrate	⊥	⊥	None
6	Total Organic Carbon	125mL Glass	⊥	H_2SO_4
7	Phosphorus	1L HDPE	⊥	None
8	Radium 226 & 228	⊥	⊥	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation   Project No. : 21454831

WEATHER CONDITIONS

Temperature 70°F   Weather Rain

SAMPLE INFORMATION

Sample Location K-H-2   Sample No. K-H-2D
Sample Date 10/7/2021   Time 1142   Sample By EMS
Sample Method Peristaltic   Sample Type GRAB

Appearance of Sample: Clear & colorless
Depth to Bottom of Lake: 8.1 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1141	
Volume Discharged	gals	~	
pH	Standard	8.32	
Spec. Cond.	uS/CM	324.6	
Turbidity	NTU	11.7	
Temperature	°C	24.1	
Dissolved Oxygen	mg/l	6.19	
Redox Potential	+/- mV	122.4	

Northing: 1067695.13
Easting: 657381.26
Elevation: 479.71

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓		None
6	Total Organic Carbon	125mL Glass		H_2SO_4
7	Phosphorus	1L HDPE		None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: Collect K-MS/MSD-1

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation **Project No. : 21454831**

WEATHER CONDITIONS

Temperature & 70° F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-I-2 Sample No. K-I-2

Sample Date 10/7/2021 Time 1010 Sample By EMS

Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear - Colorless

Depth to Bottom of Lake: 3.6 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1009	
Volume Discharged	gals	-	
pH	Standard	8.29	
Spec. Cond.	uS/CM	320.0	
Turbidity	NTU	13.0	
Temperature	°C	27.2	
Dissolved Oxygen	mg/l	4.17	
Redox Potential	+/- mV	102.4	

Northing: 1067752.81
Easting: 658477.77
Elevation: 476.39

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals (S)	~~FEHD~~ ↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

GOLDER MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation Project No. : 21454831

WEATHER CONDITIONS

Temperature 70 °F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-I-2 Sample No. ~~K-A~~ K-I-2M

Sample Date 10/7/2021 Time 1028 Sample By EMS

Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear & Colorless

Depth to Bottom of Lake: 10.1 ft

Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1027	
Volume Discharged	gals	—	
pH	Standard	8.32	
Spec. Cond.	uS/CM	324.3	
Turbidity	NTU	12.5	
Temperature	°C	27.2	
Dissolved Oxygen	mg/l	4.67	
Redox Potential	+/- mV	120.6	

Northing: 1067685.13
Easting: 658484.60
Elevation: 478.90

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	│	Zn Acetate NaOH
5	Nitrate	↓	│	None
6	Total Organic Carbon	125mL Glass	│	H_2SO_4
7	Phosphorus	1L HDPE	│	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:

Bailer: Other: Peristaltic Pump

GOLDER
MEMBER OF WSP

SURFACE WATER SAMPLE COLLECTION FORM

Project Ref: Surface Water Sampling - Kincaid & Newton - MNA Evaluation **Project No. : 21454831**

WEATHER CONDITIONS

Temperature 70°F Weather Partly Cloudy

SAMPLE INFORMATION

Sample Location K-I-2 Sample No. K-I-2M 2D
Sample Date 10/7/2021 Time 1041 Sample By EMS
Sample Method Peristaltic Sample Type GRAB

Appearance of Sample: Clear & Colorless
Depth to Bottom of Lake: 10.1 ft
Other Water Sample notes: NA

FIELD MEASUREMENTS

Parameter	Units	Measurement	Sample
Time	hhmm	1037	
Volume Discharged	gals	—	
pH	Standard	6.33	
Spec. Cond.	uS/CM	324.0	
Turbidity	NTU	12.5	
Temperature	°C	26.1	
Dissolved Oxygen	mg/l	5.13	
Redox Potential	+/- mV	120.8	

Northing: 1067683.43
Easting: 658474.76
Elevation: 457.15

LABORATORY CONTAINERS

Sub-Sample	Analysis Requested	Type and Size of Sample Container	Filtered (Yes or No)	Type of Preservative
1	Total Metals	500mL HDPE	No	HNO_3
2	Dissolved Metals	↓	Yes	↓
3	Chloride Fluoride Sulfate TDS Alkalinity	1L HDPE	No	None
4	Sulfide	250mL HDPE	↓	Zn Acetate NaOH
5	Nitrate	↓	↓	None
6	Total Organic Carbon	125mL Glass	↓	H_2SO_4
7	Phosphorus	1L HDPE	↓	None
8	Radium 226 & 228	↓	↓	HNO_3
9	Ferrous/Ferric Iron	2x125mL HDPE	Yes/No	HCL

REMARKS: NA

NA = Not applicable

SAMPLING METHODS:
Bailer: Other: Peristaltic Pump

APPENDIX B

Laboratory Analytical Data

November 12, 2021

Jeffrey Ingram
Golder Associates, Inc
13515 Barrett Parkway Drive, Suite 260
Ballwin, MO 63021
TEL: (314) 984-8800
FAX:

Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: Kincaid SW Sampling

WorkOrder: 21100448

Dear Jeffrey Ingram:

TEKLAB, INC received 26 samples on 10/7/2021 12:35:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley

Elizabeth A. Hurley
Project Manager
(618)344-1004 ex 33
ehurley@teklabinc.com

Report Contents

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

This reporting package includes the following:

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method’s recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

Qualifiers

# -	Unknown hydrocarbon
C -	RL shown is a Client Requested Quantitation Limit
H -	Holding times exceeded
J -	Analyte detected below quantitation limits
ND -	Not Detected at the Reporting Limit
S -	Spike Recovery outside recovery limits
X -	Value exceeds Maximum Contaminant Level
B -	Analyte detected in associated Method Blank
E -	Value above quantitation range
I -	Associated internal standard was outside method criteria
M -	Manual Integration used to determine area response
R -	RPD outside accepted recovery limits
T -	TIC(Tentatively identified compound)

Case Narrative

http://www.teklabinc.com/

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Cooler Receipt Temp: 2.8 °C

Radium-226 and Radium-228 analysis was performed by Pace Analytical Services, LLC. See attached report for results.

Thallium by ICPMS analysis performed by Pace Analytical Gulf Coast. See attached for results and QC summary.

Locations

Collinsville

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email jhriley@teklabinc.com

Springfield

Address 3920 Pintail Dr
Springfield, IL 62711-9415
Phone (217) 698-1004
Fax (217) 698-1005
Email KKlostermann@teklabinc.com

Kansas City

Address 8421 Nieman Road
Lenexa, KS 66214
Phone (913) 541-1998
Fax (913) 541-1998
Email jhriley@teklabinc.com

Collinsville Air

Address 5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
Phone (618) 344-1004
Fax (618) 344-1005
Email EHurley@teklabinc.com

Chicago

Address 1319 Butterfield Rd.
Downers Grove, IL 60515
Phone (630) 324-6855
Fax
Email arenner@teklabinc.com

Accreditations

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling
Work Order: 21100448
Report Date: 12-Nov-21

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2022	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2022	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2022	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2022	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2022	Collinsville
Arkansas	ADEQ	88-0966		3/14/2022	Collinsville
Illinois	IDPH	17584		5/31/2021	Collinsville
Kentucky	UST	0073		1/31/2022	Collinsville
Missouri	MDNR	00930		5/31/2021	Collinsville
Missouri	MDNR	930		1/31/2022	Collinsville

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

Lab ID: 21100448-001 | **Client Sample ID:** K-F-2D

Matrix: GROUNDWATER | **Collection Date:** 10/06/2021 17:48

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**0.054**	mg/L	1	10/07/2021 17:38	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 16:38	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.49**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 9:29	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:47	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:54	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**112**	mg/L	1	10/08/2021 8:51	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**8**	mg/L	1	10/08/2021 8:51	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**204**	mg/L	1	10/12/2021 18:59	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 19:16	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:06	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 16:39	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100	S	**29.2**	mg/L	1	10/15/2021 20:37	183849
Magnesium	NELAP	0.0500		**18.0**	mg/L	1	10/15/2021 20:37	183849
Potassium	NELAP	0.100		**2.77**	mg/L	1	10/15/2021 20:37	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 20:37	183849
Matrix spike control limits for Ca are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.8**	mg/L	1	10/15/2021 19:28	183833
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/15/2021 19:28	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:28	183833
Potassium	NELAP	0.100		**3.04**	mg/L	1	10/15/2021 19:28	183833
Sodium	NELAP	0.0500		**12.0**	mg/L	1	10/15/2021 19:28	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0039**	mg/L	5	10/21/2021 4:31	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 16:20	183849
Barium	NELAP	0.0010		**0.0550**	mg/L	5	10/21/2021 4:31	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:20	183849
Boron	NELAP	0.0250		**0.0407**	mg/L	5	10/17/2021 16:20	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:20	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:20	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:20	183849

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-001
Client Sample ID: K-F-2D
Matrix: GROUNDWATER
Collection Date: 10/06/2021 17:48

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 16:20	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:20	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 16:20	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 4:31	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:20	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:20	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:02	183833
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/17/2021 20:39	183833
Barium	NELAP	0.0010	B	**0.0723**	mg/L	5	10/21/2021 1:02	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:39	183833
Boron	NELAP	0.0250		**0.0447**	mg/L	5	10/17/2021 20:39	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:39	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:39	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:39	183833
Iron	NELAP	0.0250		**0.525**	mg/L	5	10/17/2021 20:39	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:39	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:39	183833
Manganese	NELAP	0.0020		**0.114**	mg/L	5	10/21/2021 1:02	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:39	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:39	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:30	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:07	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-002 **Client Sample ID:** K-F-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 17:32

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 17:46	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 17:15	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.26**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:31	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:49	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:55	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**108**	mg/L	1	10/08/2021 9:03	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**9**	mg/L	1	10/08/2021 9:03	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**214**	mg/L	1	10/12/2021 18:59	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 19:22	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.35**	mg/L	1	10/08/2021 10:08	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 17:16	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.6**	mg/L	1	10/15/2021 20:42	183849
Magnesium	NELAP	0.0500		**17.7**	mg/L	1	10/15/2021 20:42	183849
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/15/2021 20:42	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 20:42	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.8**	mg/L	1	10/15/2021 19:33	183833
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/15/2021 19:33	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:33	183833
Potassium	NELAP	0.100		**3.03**	mg/L	1	10/15/2021 19:33	183833
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/15/2021 19:33	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0038**	mg/L	5	10/21/2021 5:15	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 16:43	183849
Barium	NELAP	0.0010		**0.0558**	mg/L	5	10/21/2021 5:15	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:43	183849
Boron	NELAP	0.0250		**0.0451**	mg/L	5	10/17/2021 16:43	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:43	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:43	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:43	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 16:43	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-002 **Client Sample ID:** K-F-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 17:32

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:43	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 16:43	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:15	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:43	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:43	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:20	183833
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/17/2021 21:33	183833
Barium	NELAP	0.0010	B	**0.0703**	mg/L	5	10/21/2021 1:20	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:33	183833
Boron	NELAP	0.0250		**0.0471**	mg/L	5	10/17/2021 21:33	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:33	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:33	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:33	183833
Iron	NELAP	0.0250		**0.280**	mg/L	5	10/17/2021 21:33	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:33	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 21:33	183833
Manganese	NELAP	0.0020		**0.0896**	mg/L	5	10/21/2021 1:20	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:33	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:33	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:33	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:09	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-003 **Client Sample ID:** K-F-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 17:12

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 17:49	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 17:24	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.30**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:33	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:50	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:55	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**107**	mg/L	1	10/08/2021 9:09	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**10**	mg/L	1	10/08/2021 9:09	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**188**	mg/L	1	10/12/2021 18:59	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 19:29	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.35**	mg/L	1	10/08/2021 10:09	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 17:24	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.7**	mg/L	1	10/15/2021 20:43	183849
Magnesium	NELAP	0.0500		**17.7**	mg/L	1	10/15/2021 20:43	183849
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/15/2021 20:43	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 20:43	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.4**	mg/L	1	10/15/2021 19:34	183833
Magnesium	NELAP	0.0500		**19.4**	mg/L	1	10/15/2021 19:34	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:34	183833
Potassium	NELAP	0.100		**3.05**	mg/L	1	10/15/2021 19:34	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 19:34	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0012**	mg/L	5	10/21/2021 5:21	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 16:51	183849
Barium	NELAP	0.0010		**0.0562**	mg/L	5	10/21/2021 5:21	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:51	183849
Boron	NELAP	0.0250		**0.0421**	mg/L	5	10/17/2021 16:51	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:51	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:51	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:51	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 16:51	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-003 **Client Sample ID:** K-F-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 17:12

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:51	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 16:51	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:21	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:51	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:51	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:26	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 21:40	183833
Barium	NELAP	0.0010	B	**0.0711**	mg/L	5	10/21/2021 1:26	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:40	183833
Boron	NELAP	0.0250		**0.0463**	mg/L	5	10/17/2021 21:40	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:40	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:40	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:40	183833
Iron	NELAP	0.0250		**0.321**	mg/L	5	10/17/2021 21:40	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:40	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 21:40	183833
Manganese	NELAP	0.0020		**0.0842**	mg/L	5	10/21/2021 1:26	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:40	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:40	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:35	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:11	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-004
Client Sample ID: K-A-3D
Matrix: GROUNDWATER
Collection Date: 10/06/2021 16:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 17:51	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**30**	mg/L	1	10/18/2021 17:31	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.90**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.028**	mg/L	1	10/19/2021 9:34	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:52	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:56	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**106**	mg/L	1	10/08/2021 9:16	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**14**	mg/L	1	10/08/2021 9:16	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**188**	mg/L	1	10/12/2021 19:20	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.3**	mg/L	1	10/08/2021 19:35	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.35**	mg/L	1	10/08/2021 10:12	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 17:32	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.5**	mg/L	1	10/15/2021 20:45	183849
Magnesium	NELAP	0.0500		**18.3**	mg/L	1	10/15/2021 20:45	183849
Potassium	NELAP	0.100		**2.84**	mg/L	1	10/15/2021 20:45	183849
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/15/2021 20:45	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**32.6**	mg/L	1	10/15/2021 19:36	183833
Magnesium	NELAP	0.0500		**20.1**	mg/L	1	10/15/2021 19:36	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:36	183833
Potassium	NELAP	0.100		**3.15**	mg/L	1	10/15/2021 19:36	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 19:36	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:27	183849
Arsenic	NELAP	0.0010		**0.0023**	mg/L	5	10/17/2021 16:58	183849
Barium	NELAP	0.0010		**0.0520**	mg/L	5	10/21/2021 5:27	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:58	183849
Boron	NELAP	0.0250		**0.0470**	mg/L	5	10/17/2021 16:58	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:58	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:58	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:58	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 16:58	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-004 **Client Sample ID:** K-A-3D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 16:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:58	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 16:58	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:27	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 16:58	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 16:58	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:33	183833
Arsenic	NELAP	0.0010		**0.0029**	mg/L	5	10/17/2021 21:48	183833
Barium	NELAP	0.0010	B	**0.0706**	mg/L	5	10/21/2021 1:33	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:48	183833
Boron	NELAP	0.0250		**0.0486**	mg/L	5	10/17/2021 21:48	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:48	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:48	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:48	183833
Iron	NELAP	0.0250		**0.929**	mg/L	5	10/17/2021 21:48	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:48	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 21:48	183833
Manganese	NELAP	0.0020		**0.117**	mg/L	5	10/21/2021 1:33	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:48	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:48	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:37	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:18	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-005 **Client Sample ID:** K-A-3M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 16:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 17:53	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 17:53	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.21**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:35	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:53	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:57	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**107**	mg/L	1	10/08/2021 9:22	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**9**	mg/L	1	10/08/2021 9:22	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**196**	mg/L	1	10/12/2021 19:21	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 19:41	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:14	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 17:54	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.7**	mg/L	1	10/15/2021 20:57	183849
Magnesium	NELAP	0.0500		**17.7**	mg/L	1	10/15/2021 20:57	183849
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/15/2021 20:57	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 20:57	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.5**	mg/L	1	10/15/2021 19:38	183833
Magnesium	NELAP	0.0500		**19.5**	mg/L	1	10/15/2021 19:38	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:38	183833
Potassium	NELAP	0.100		**3.06**	mg/L	1	10/15/2021 19:38	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 19:38	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:33	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 17:06	183849
Barium	NELAP	0.0010		**0.0551**	mg/L	5	10/21/2021 5:33	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:06	183849
Boron	NELAP	0.0250		**0.0452**	mg/L	5	10/17/2021 17:06	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:06	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:06	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:06	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 17:06	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-005 **Client Sample ID:** K-A-3M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 16:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:06	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 17:06	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:33	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:06	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:06	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:39	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 21:56	183833
Barium	NELAP	0.0010	B	**0.0704**	mg/L	5	10/21/2021 1:39	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:56	183833
Boron	NELAP	0.0250		**0.0483**	mg/L	5	10/17/2021 21:56	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:56	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:56	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:56	183833
Iron	NELAP	0.0250		**0.230**	mg/L	5	10/17/2021 21:56	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:56	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 21:56	183833
Manganese	NELAP	0.0020		**0.0845**	mg/L	5	10/21/2021 1:39	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 21:56	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 21:56	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:40	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:21	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

Lab ID: 21100448-006 | **Client Sample ID:** K-A-2D

Matrix: GROUNDWATER | **Collection Date:** 10/06/2021 15:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 17:55	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 18:01	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.39**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.025**	mg/L	1	10/19/2021 9:36	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:54	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:58	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**106**	mg/L	1	10/08/2021 9:28	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**11**	mg/L	1	10/08/2021 9:28	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**182**	mg/L	1	10/12/2021 19:21	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.3**	mg/L	1	10/08/2021 19:48	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:16	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 18:02	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.2**	mg/L	1	10/15/2021 20:58	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 20:58	183849
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/15/2021 20:58	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 20:58	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.6**	mg/L	1	10/15/2021 19:48	183833
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/15/2021 19:48	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:48	183833
Potassium	NELAP	0.100		**3.06**	mg/L	1	10/15/2021 19:48	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 19:48	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:39	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 17:14	183849
Barium	NELAP	0.0010		**0.0555**	mg/L	5	10/21/2021 5:39	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:14	183849
Boron	NELAP	0.0250		**0.0459**	mg/L	5	10/17/2021 17:14	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:14	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:14	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:14	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 17:14	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-006 **Client Sample ID:** K-A-2D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 15:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:14	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 17:14	183849
Manganese	NELAP	0.0020		**0.0032**	mg/L	5	10/21/2021 5:39	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:14	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:14	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 1:45	183833
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/17/2021 22:03	183833
Barium	NELAP	0.0010	B	**0.0701**	mg/L	5	10/21/2021 1:45	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:03	183833
Boron	NELAP	0.0250		**0.0564**	mg/L	5	10/17/2021 22:03	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:03	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:03	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:03	183833
Iron	NELAP	0.0250		**0.416**	mg/L	5	10/17/2021 22:03	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:03	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 22:03	183833
Manganese	NELAP	0.0020		**0.0929**	mg/L	5	10/21/2021 1:45	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:03	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:03	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:51	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:27	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-007 **Client Sample ID:** K-A-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 15:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:10	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 18:09	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.22**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:37	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 8:55	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/08/2021 14:59	R301111
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**106**	mg/L	1	10/08/2021 9:35	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**11**	mg/L	1	10/08/2021 9:35	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**190**	mg/L	1	10/12/2021 19:21	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.3**	mg/L	1	10/08/2021 19:54	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:26	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 18:10	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.2**	mg/L	1	10/15/2021 21:00	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 21:00	183849
Potassium	NELAP	0.100		**2.83**	mg/L	1	10/15/2021 21:00	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 21:00	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.0**	mg/L	1	10/15/2021 19:50	183833
Magnesium	NELAP	0.0500		**19.2**	mg/L	1	10/15/2021 19:50	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:50	183833
Potassium	NELAP	0.100		**2.99**	mg/L	1	10/15/2021 19:50	183833
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/15/2021 19:50	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:45	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 17:52	183849
Barium	NELAP	0.0010		**0.0549**	mg/L	5	10/21/2021 5:45	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:52	183849
Boron	NELAP	0.0250		**0.0454**	mg/L	5	10/17/2021 17:52	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:52	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:52	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:52	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 17:52	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:52	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-007 **Client Sample ID:** K-A-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 15:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 17:52	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:45	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:52	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:52	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:16	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 22:11	183833
Barium	NELAP	0.0010	B	**0.0673**	mg/L	5	10/21/2021 2:16	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:11	183833
Boron	NELAP	0.0250		**0.0469**	mg/L	5	10/17/2021 22:11	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:11	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:11	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:11	183833
Iron	NELAP	0.0250		**0.238**	mg/L	5	10/17/2021 22:11	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:11	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 22:11	183833
Manganese	NELAP	0.0020		**0.0787**	mg/L	5	10/21/2021 2:16	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:11	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:11	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:54	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:30	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-008
Client Sample ID: K-A-1
Matrix: GROUNDWATER
Collection Date: 10/06/2021 15:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:19	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**30**	mg/L	1	10/18/2021 18:17	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.25**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/19/2021 9:39	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:30	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/08/2021 14:59	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**105**	mg/L	1	10/08/2021 9:40	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**11**	mg/L	1	10/08/2021 9:40	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**194**	mg/L	1	10/12/2021 19:22	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 20:01	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:28	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 18:18	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.1**	mg/L	1	10/15/2021 21:02	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 21:02	183849
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/15/2021 21:02	183849
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/15/2021 21:02	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.2**	mg/L	1	10/15/2021 19:51	183833
Magnesium	NELAP	0.0500		**19.3**	mg/L	1	10/15/2021 19:51	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:51	183833
Potassium	NELAP	0.100		**3.03**	mg/L	1	10/15/2021 19:51	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 19:51	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:52	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 17:59	183849
Barium	NELAP	0.0010		**0.0553**	mg/L	5	10/21/2021 5:52	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:59	183849
Boron	NELAP	0.0250		**0.0411**	mg/L	5	10/17/2021 17:59	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:59	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:59	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:59	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 17:59	183849

Laboratory Results

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling
Lab ID: 21100448-008
Matrix: GROUNDWATER
Work Order: 21100448
Report Date: 12-Nov-21
Client Sample ID: K-A-1
Collection Date: 10/06/2021 15:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:59	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 17:59	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 5:52	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 17:59	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 17:59	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:22	183833
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/17/2021 22:18	183833
Barium	NELAP	0.0010	B	**0.0694**	mg/L	5	10/21/2021 2:22	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:18	183833
Boron	NELAP	0.0250		**0.0504**	mg/L	5	10/17/2021 22:18	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:18	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:18	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:18	183833
Iron	NELAP	0.0250		**0.263**	mg/L	5	10/17/2021 22:18	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:18	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 22:18	183833
Manganese	NELAP	0.0020		**0.0808**	mg/L	5	10/21/2021 2:22	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:18	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:18	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:56	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:32	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-009 **Client Sample ID:** K-B-3D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 14:38

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:21	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**30**	mg/L	1	10/18/2021 18:25	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.55**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.054**	mg/L	1	10/19/2021 9:41	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:32	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	SR	**< 0.05**	mg/L	1	10/08/2021 15:00	R301111
RPD for MS/MSD was outside control limits.								
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**109**	mg/L	1	10/08/2021 9:47	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**7**	mg/L	1	10/08/2021 9:47	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**194**	mg/L	1	10/12/2021 19:22	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 20:39	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:30	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 18:26	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.9**	mg/L	1	10/15/2021 21:04	183849
Magnesium	NELAP	0.0500		**17.9**	mg/L	1	10/15/2021 21:04	183849
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/15/2021 21:04	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 21:04	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.9**	mg/L	1	10/15/2021 19:53	183833
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/15/2021 19:53	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:53	183833
Potassium	NELAP	0.100		**3.09**	mg/L	1	10/15/2021 19:53	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 19:53	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 5:58	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 18:07	183849
Barium	NELAP	0.0010		**0.0553**	mg/L	5	10/21/2021 5:58	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:07	183849
Boron	NELAP	0.0250		**0.0437**	mg/L	5	10/17/2021 18:07	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:07	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:07	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:07	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-009 **Client Sample ID:** K-B-3D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 14:38

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:07	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:07	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:07	183849
Manganese	NELAP	0.0020		**0.0087**	mg/L	5	10/21/2021 5:58	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:07	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:07	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:28	183833
Arsenic	NELAP	0.0010		**0.0028**	mg/L	5	10/17/2021 22:26	183833
Barium	NELAP	0.0010	B	**0.0738**	mg/L	5	10/21/2021 2:28	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:26	183833
Boron	NELAP	0.0250		**0.0518**	mg/L	5	10/17/2021 22:26	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:26	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:26	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:26	183833
Iron	NELAP	0.0250		**0.604**	mg/L	5	10/17/2021 22:26	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:26	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 22:26	183833
Manganese	NELAP	0.0020		**0.125**	mg/L	5	10/21/2021 2:28	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:26	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:26	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 14:58	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:34	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-010
Client Sample ID: K-B-3M
Matrix: GROUNDWATER
Collection Date: 10/06/2021 14:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**0.094**	mg/L	1	10/07/2021 18:23	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 18:46	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.23**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.028**	mg/L	1	10/19/2021 9:43	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:33	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/09/2021 12:12	R301111
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**113**	mg/L	1	10/08/2021 9:53	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**4**	mg/L	1	10/08/2021 9:53	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**202**	mg/L	1	10/12/2021 19:22	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.3**	mg/L	1	10/08/2021 14:23	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:32	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 18:47	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.8**	mg/L	1	10/15/2021 21:05	183849
Magnesium	NELAP	0.0500		**17.8**	mg/L	1	10/15/2021 21:05	183849
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/15/2021 21:05	183849
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 21:05	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.6**	mg/L	1	10/15/2021 19:55	183833
Magnesium	NELAP	0.0500		**19.5**	mg/L	1	10/15/2021 19:55	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:55	183833
Potassium	NELAP	0.100		**3.04**	mg/L	1	10/15/2021 19:55	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 19:55	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:04	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 18:15	183849
Barium	NELAP	0.0010		**0.0547**	mg/L	5	10/21/2021 6:04	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:15	183849
Boron	NELAP	0.0250		**0.0466**	mg/L	5	10/17/2021 18:15	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:15	183849
Chromium	NELAP	0.0015		**0.0024**	mg/L	5	10/17/2021 18:15	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:15	183849
Iron	NELAP	0.0250		**0.0371**	mg/L	5	10/17/2021 18:15	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:15	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-010 **Client Sample ID:** K-B-3M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 14:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:15	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 6:04	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:15	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:15	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:34	183833
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/17/2021 22:34	183833
Barium	NELAP	0.0010	B	**0.0732**	mg/L	5	10/21/2021 2:34	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:34	183833
Boron	NELAP	0.0250		**0.0471**	mg/L	5	10/17/2021 22:34	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:34	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:34	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:34	183833
Iron	NELAP	0.0250		**0.261**	mg/L	5	10/17/2021 22:34	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:34	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 22:34	183833
Manganese	NELAP	0.0020		**0.104**	mg/L	5	10/21/2021 2:34	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 22:34	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 22:34	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:00	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:37	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Laboratory Results

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-011
Client Sample ID: K-B-2D
Matrix: GROUNDWATER
Collection Date: 10/06/2021 13:58

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:25	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 18:55	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.30**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 9:45	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:34	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:11	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**119**	mg/L	1	10/08/2021 9:58	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 9:58	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**190**	mg/L	1	10/12/2021 19:22	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 20:45	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:34	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 18:55	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.9**	mg/L	1	10/15/2021 21:07	183849
Magnesium	NELAP	0.0500		**17.9**	mg/L	1	10/15/2021 21:07	183849
Potassium	NELAP	0.100		**2.80**	mg/L	1	10/15/2021 21:07	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:07	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.4**	mg/L	1	10/15/2021 19:56	183833
Magnesium	NELAP	0.0500		**18.8**	mg/L	1	10/15/2021 19:56	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:56	183833
Potassium	NELAP	0.100		**2.96**	mg/L	1	10/15/2021 19:56	183833
Sodium	NELAP	0.0500		**11.9**	mg/L	1	10/15/2021 19:56	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:35	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 18:22	183849
Barium	NELAP	0.0010		**0.0551**	mg/L	5	10/21/2021 6:35	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:22	183849
Boron	NELAP	0.0250		**0.0403**	mg/L	5	10/17/2021 18:22	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:22	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:22	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:22	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:22	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-011 **Client Sample ID:** K-B-2D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 13:58

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:22	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:22	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 6:35	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:22	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:22	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:40	183833
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/17/2021 23:12	183833
Barium	NELAP	0.0010	B	**0.0712**	mg/L	5	10/21/2021 2:40	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:12	183833
Boron	NELAP	0.0250		**0.0472**	mg/L	5	10/17/2021 23:12	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:12	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:12	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:12	183833
Iron	NELAP	0.0250		**0.330**	mg/L	5	10/17/2021 23:12	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:12	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:12	183833
Manganese	NELAP	0.0020		**0.0989**	mg/L	5	10/21/2021 2:40	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:12	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:12	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:03	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:39	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-012
Client Sample ID: K-B-2M
Matrix: GROUNDWATER
Collection Date: 10/06/2021 13:43

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:28	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 19:15	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.22**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 9:46	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:36	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:12	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**107**	mg/L	1	10/08/2021 10:09	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:09	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**198**	mg/L	1	10/12/2021 19:22	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 20:51	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:36	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 19:16	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/15/2021 21:09	183849
Magnesium	NELAP	0.0500		**18.0**	mg/L	1	10/15/2021 21:09	183849
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/15/2021 21:09	183849
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/15/2021 21:09	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.5**	mg/L	1	10/15/2021 19:58	183833
Magnesium	NELAP	0.0500		**19.5**	mg/L	1	10/15/2021 19:58	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 19:58	183833
Potassium	NELAP	0.100		**3.04**	mg/L	1	10/15/2021 19:58	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 19:58	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:41	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 18:30	183849
Barium	NELAP	0.0010		**0.0537**	mg/L	5	10/21/2021 6:41	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:30	183849
Boron	NELAP	0.0250		**0.0404**	mg/L	5	10/17/2021 18:30	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:30	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:30	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:30	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:30	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-012 **Client Sample ID:** K-B-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 13:43

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:30	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:30	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 6:41	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:30	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:30	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:47	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 23:19	183833
Barium	NELAP	0.0010	B	**0.0716**	mg/L	5	10/21/2021 2:47	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:19	183833
Boron	NELAP	0.0250		**0.0517**	mg/L	5	10/17/2021 23:19	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:19	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:19	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:19	183833
Iron	NELAP	0.0250		**0.254**	mg/L	5	10/17/2021 23:19	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:19	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:19	183833
Manganese	NELAP	0.0020		**0.0946**	mg/L	5	10/21/2021 2:47	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:19	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:19	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:05	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:41	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-013 **Client Sample ID:** K-B-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 12:32

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:30	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**32**	mg/L	1	10/18/2021 19:36	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.21**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 9:47	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:37	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:13	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**112**	mg/L	1	10/08/2021 10:15	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**6**	mg/L	1	10/08/2021 10:15	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**198**	mg/L	1	10/12/2021 19:23	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.5**	mg/L	1	10/08/2021 20:58	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:38	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 19:38	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.8**	mg/L	1	10/15/2021 21:20	183849
Magnesium	NELAP	0.0500		**18.3**	mg/L	1	10/15/2021 21:20	183849
Potassium	NELAP	0.100		**2.85**	mg/L	1	10/15/2021 21:20	183849
Sodium	NELAP	0.0500		**11.7**	mg/L	1	10/15/2021 21:20	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**32.0**	mg/L	1	10/15/2021 20:00	183833
Magnesium	NELAP	0.0500		**19.7**	mg/L	1	10/15/2021 20:00	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:00	183833
Potassium	NELAP	0.100		**3.07**	mg/L	1	10/15/2021 20:00	183833
Sodium	NELAP	0.0500		**12.5**	mg/L	1	10/15/2021 20:00	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:47	183849
Arsenic	NELAP	0.0010		**0.0020**	mg/L	5	10/17/2021 18:37	183849
Barium	NELAP	0.0010		**0.0573**	mg/L	5	10/21/2021 6:47	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:37	183849
Boron	NELAP	0.0250		**0.0558**	mg/L	5	10/17/2021 18:37	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:37	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:37	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:37	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:37	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-013 **Client Sample ID:** K-B-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 12:32

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:37	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:37	183849
Manganese	NELAP	0.0020		**0.0233**	mg/L	5	10/21/2021 6:47	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:37	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:37	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:53	183833
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/17/2021 23:27	183833
Barium	NELAP	0.0010	B	**0.0702**	mg/L	5	10/21/2021 2:53	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:27	183833
Boron	NELAP	0.0250		**0.0649**	mg/L	5	10/17/2021 23:27	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:27	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:27	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:27	183833
Iron	NELAP	0.0250		**0.240**	mg/L	5	10/17/2021 23:27	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:27	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:27	183833
Manganese	NELAP	0.0020		**0.0948**	mg/L	5	10/21/2021 2:53	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:27	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:27	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:07	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:44	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-014
Client Sample ID: K-C-3D
Matrix: GROUNDWATER
Collection Date: 10/06/2021 12:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:32	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 19:45	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.63**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.068**	mg/L	1	10/19/2021 9:48	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:38	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:15	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**119**	mg/L	1	10/08/2021 10:20	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:20	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**190**	mg/L	1	10/12/2021 19:35	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.4**	mg/L	1	10/08/2021 21:04	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:40	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 19:46	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.1**	mg/L	1	10/15/2021 21:22	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 21:22	183849
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/15/2021 21:22	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:22	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.8**	mg/L	1	10/15/2021 20:01	183833
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/15/2021 20:01	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:01	183833
Potassium	NELAP	0.100		**3.09**	mg/L	1	10/15/2021 20:01	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 20:01	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:53	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 18:45	183849
Barium	NELAP	0.0010		**0.0543**	mg/L	5	10/21/2021 6:53	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:45	183849
Boron	NELAP	0.0250		**0.0463**	mg/L	5	10/17/2021 18:45	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:45	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:45	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:45	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:45	183849

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

Lab ID: 21100448-014 | **Client Sample ID:** K-C-3D

Matrix: GROUNDWATER | **Collection Date:** 10/06/2021 12:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:45	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:45	183849
Manganese	NELAP	0.0020		**0.0436**	mg/L	5	10/21/2021 6:53	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:45	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:45	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 2:59	183833
Arsenic	NELAP	0.0010		**0.0028**	mg/L	5	10/17/2021 23:35	183833
Barium	NELAP	0.0010	B	**0.0786**	mg/L	5	10/21/2021 2:59	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:35	183833
Boron	NELAP	0.0250		**0.0498**	mg/L	5	10/17/2021 23:35	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:35	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:35	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:35	183833
Iron	NELAP	0.0250		**0.693**	mg/L	5	10/17/2021 23:35	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:35	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:35	183833
Manganese	NELAP	0.0020		**0.168**	mg/L	5	10/21/2021 2:59	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:35	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:35	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:14	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:46	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-015
Client Sample ID: K-C-3M
Matrix: GROUNDWATER
Collection Date: 10/06/2021 11:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:47	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 19:52	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.25**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.043**	mg/L	1	10/19/2021 9:50	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/08/2021 9:40	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/09/2021 14:18	R301111
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**116**	mg/L	1	10/08/2021 10:26	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:26	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**192**	mg/L	1	10/12/2021 19:36	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 21:10	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:50	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 19:54	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/15/2021 21:24	183849
Magnesium	NELAP	0.0500		**18.0**	mg/L	1	10/15/2021 21:24	183849
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/15/2021 21:24	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:24	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.9**	mg/L	1	10/15/2021 20:11	183833
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/15/2021 20:11	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:11	183833
Potassium	NELAP	0.100		**3.02**	mg/L	1	10/15/2021 20:11	183833
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/15/2021 20:11	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 6:59	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 18:53	183849
Barium	NELAP	0.0010		**0.0552**	mg/L	5	10/21/2021 6:59	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:53	183849
Boron	NELAP	0.0250		**0.0407**	mg/L	5	10/17/2021 18:53	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:53	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:53	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:53	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 18:53	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:53	183849

Laboratory Results

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21
Lab ID: 21100448-015 **Client Sample ID:** K-C-3M
Matrix: GROUNDWATER **Collection Date:** 10/06/2021 11:35

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 18:53	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 6:59	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 18:53	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 18:53	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 3:05	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 23:42	183833
Barium	NELAP	0.0010	B	**0.0720**	mg/L	5	10/21/2021 3:05	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:42	183833
Boron	NELAP	0.0250		**0.0452**	mg/L	5	10/17/2021 23:42	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:42	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:42	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:42	183833
Iron	NELAP	0.0250		**0.298**	mg/L	5	10/17/2021 23:42	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:42	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:42	183833
Manganese	NELAP	0.0020		**0.101**	mg/L	5	10/21/2021 3:05	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:42	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:42	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:16	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 18:57	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-016 **Client Sample ID:** K-C-2D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 11:08

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:49	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 20:00	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.34**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.036**	mg/L	1	10/19/2021 9:51	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:43	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:20	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**118**	mg/L	1	10/08/2021 10:32	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:32	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**202**	mg/L	1	10/12/2021 19:36	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.0**	mg/L	1	10/08/2021 21:17	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:51	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:02	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/15/2021 21:29	183849
Magnesium	NELAP	0.0500		**18.0**	mg/L	1	10/15/2021 21:29	183849
Potassium	NELAP	0.100		**2.80**	mg/L	1	10/15/2021 21:29	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:29	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100	S	**31.5**	mg/L	1	10/15/2021 20:13	183833
Magnesium	NELAP	0.0500		**19.5**	mg/L	1	10/15/2021 20:13	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:13	183833
Potassium	NELAP	0.100		**3.10**	mg/L	1	10/15/2021 20:13	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 20:13	183833
Matrix spike control limits for Ca are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0039**	mg/L	5	10/21/2021 7:18	183849
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/17/2021 20:01	183849
Barium	NELAP	0.0010		**0.0565**	mg/L	5	10/21/2021 7:18	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:01	183849
Boron	NELAP	0.0250		**0.0421**	mg/L	5	10/17/2021 20:01	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:01	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:01	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:01	183849

Client: Golder Associates, Inc

Work Order: 21100448

Client Project: Kincaid SW Sampling

Report Date: 12-Nov-21

Lab ID: 21100448-016

Client Sample ID: K-C-2D

Matrix: GROUNDWATER

Collection Date: 10/06/2021 11:08

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 20:01	183849
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:01	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:01	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 7:18	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:01	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:01	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 3:11	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/17/2021 23:50	183833
Barium	NELAP	0.0010	B	**0.0741**	mg/L	5	10/21/2021 3:11	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:50	183833
Boron	NELAP	0.0250		**0.0517**	mg/L	5	10/17/2021 23:50	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:50	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:50	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:50	183833
Iron	NELAP	0.0250		**0.378**	mg/L	5	10/17/2021 23:50	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:50	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 23:50	183833
Manganese	NELAP	0.0020		**0.0992**	mg/L	5	10/21/2021 3:11	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 23:50	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 23:50	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:23	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 19:00	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-017 **Client Sample ID:** K-C-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 10:53

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:51	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**32**	mg/L	1	10/18/2021 20:09	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.23**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:54	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:45	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:22	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**117**	mg/L	1	10/08/2021 10:38	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:38	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**200**	mg/L	1	10/12/2021 19:36	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 21:23	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:53	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:10	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.2**	mg/L	1	10/15/2021 21:30	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 21:30	183849
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/15/2021 21:30	183849
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/15/2021 21:30	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.1**	mg/L	1	10/15/2021 20:18	183833
Magnesium	NELAP	0.0500		**19.3**	mg/L	1	10/15/2021 20:18	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:18	183833
Potassium	NELAP	0.100		**3.06**	mg/L	1	10/15/2021 20:18	183833
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/15/2021 20:18	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0012**	mg/L	5	10/21/2021 7:24	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 20:09	183849
Barium	NELAP	0.0010		**0.0559**	mg/L	5	10/21/2021 7:24	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:09	183849
Boron	NELAP	0.0250		**0.0429**	mg/L	5	10/17/2021 20:09	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:09	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:09	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:09	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 20:09	183849

Client: Golder Associates, Inc
Work Order: 21100448
Client Project: Kincaid SW Sampling
Report Date: 12-Nov-21
Lab ID: 21100448-017
Client Sample ID: K-C-2M
Matrix: GROUNDWATER
Collection Date: 10/06/2021 10:53

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:09	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:09	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 7:24	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:09	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:09	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 4:07	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/18/2021 0:13	183833
Barium	NELAP	0.0010	B	**0.0708**	mg/L	5	10/21/2021 4:07	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:13	183833
Boron	NELAP	0.0250		**0.0491**	mg/L	5	10/18/2021 0:13	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:13	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:13	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:13	183833
Iron	NELAP	0.0250		**0.254**	mg/L	5	10/18/2021 0:13	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:13	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 0:13	183833
Manganese	NELAP	0.0020		**0.0908**	mg/L	5	10/21/2021 4:07	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:13	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:13	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:26	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 19:02	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/04/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21
Lab ID: 21100448-018 **Client Sample ID:** K-C-1
Matrix: GROUNDWATER **Collection Date:** 10/06/2021 10:27

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:54	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**32**	mg/L	1	10/18/2021 20:30	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.19**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/19/2021 9:56	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:46	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:23	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**112**	mg/L	1	10/08/2021 10:44	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**6**	mg/L	1	10/08/2021 10:44	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**216**	mg/L	1	10/12/2021 19:37	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 21:29	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:55	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:31	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.1**	mg/L	1	10/15/2021 21:32	183849
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/15/2021 21:32	183849
Potassium	NELAP	0.100		**2.86**	mg/L	1	10/15/2021 21:32	183849
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/15/2021 21:32	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.8**	mg/L	1	10/15/2021 20:20	183833
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/15/2021 20:20	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:20	183833
Potassium	NELAP	0.100		**3.02**	mg/L	1	10/15/2021 20:20	183833
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/15/2021 20:20	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 7:30	183849
Arsenic	NELAP	0.0010		**0.0023**	mg/L	5	10/17/2021 20:16	183849
Barium	NELAP	0.0010		**0.0561**	mg/L	5	10/21/2021 7:30	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:16	183849
Boron	NELAP	0.0250		**0.0429**	mg/L	5	10/17/2021 20:16	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:16	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:16	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:16	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 20:16	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-018 **Client Sample ID:** K-C-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 10:27

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:16	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:16	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 7:30	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:16	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:16	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 4:13	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/18/2021 0:20	183833
Barium	NELAP	0.0010	B	**0.0706**	mg/L	5	10/21/2021 4:13	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:20	183833
Boron	NELAP	0.0250		**0.0505**	mg/L	5	10/18/2021 0:20	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:20	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:20	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:20	183833
Iron	NELAP	0.0250		**0.210**	mg/L	5	10/18/2021 0:20	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:20	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 0:20	183833
Manganese	NELAP	0.0020		**0.0869**	mg/L	5	10/21/2021 4:13	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:20	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:20	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:28	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 19:04	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-019 **Client Sample ID:** K-D-2D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 10:06

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 18:58	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**32**	mg/L	1	10/18/2021 20:38	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.45**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.061**	mg/L	1	10/19/2021 9:58	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:48	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:25	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**117**	mg/L	1	10/08/2021 10:58	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 10:58	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**214**	mg/L	1	10/12/2021 19:38	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 21:36	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:57	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:39	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.7**	mg/L	1	10/15/2021 21:55	183849
Magnesium	NELAP	0.0500		**17.8**	mg/L	1	10/15/2021 21:55	183849
Potassium	NELAP	0.100		**2.78**	mg/L	1	10/15/2021 21:55	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:55	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.1**	mg/L	1	10/15/2021 20:22	183833
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/15/2021 20:22	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:22	183833
Potassium	NELAP	0.100		**3.06**	mg/L	1	10/15/2021 20:22	183833
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/15/2021 20:22	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0045**	mg/L	5	10/21/2021 8:14	183849
Arsenic	NELAP	0.0010		**0.0020**	mg/L	5	10/17/2021 20:24	183849
Barium	NELAP	0.0010		**0.0570**	mg/L	5	10/21/2021 8:14	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:24	183849
Boron	NELAP	0.0250		**0.0421**	mg/L	5	10/17/2021 20:24	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:24	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:24	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:24	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 20:24	183849

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Golder Associates, Inc

Work Order: 21100448

Client Project: Kincaid SW Sampling

Report Date: 12-Nov-21

Lab ID: 21100448-019

Client Sample ID: K-D-2D

Matrix: GROUNDWATER

Collection Date: 10/06/2021 10:06

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:24	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:24	183849
Manganese	NELAP	0.0020		**0.0032**	mg/L	5	10/21/2021 8:14	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:24	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:24	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 4:19	183833
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/18/2021 0:59	183833
Barium	NELAP	0.0010	B	**0.0737**	mg/L	5	10/21/2021 4:19	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:59	183833
Boron	NELAP	0.0250		**0.0513**	mg/L	5	10/18/2021 0:59	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:59	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:59	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:59	183833
Iron	NELAP	0.0250		**0.512**	mg/L	5	10/18/2021 0:59	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:59	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 0:59	183833
Manganese	NELAP	0.0020		**0.0976**	mg/L	5	10/21/2021 4:19	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 0:59	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 0:59	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:30	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 19:07	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-020 **Client Sample ID:** K-D-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 9:53

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:07	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 20:46	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.18**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.036**	mg/L	1	10/19/2021 9:59	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:49	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/09/2021 14:26	R301111
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**119**	mg/L	1	10/08/2021 11:04	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:04	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**200**	mg/L	1	10/12/2021 19:44	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.4**	mg/L	1	10/08/2021 14:49	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 10:58	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:47	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.8**	mg/L	1	10/15/2021 21:57	183849
Magnesium	NELAP	0.0500		**17.9**	mg/L	1	10/15/2021 21:57	183849
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/15/2021 21:57	183849
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 21:57	183849
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.8**	mg/L	1	10/15/2021 20:23	183833
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/15/2021 20:23	183833
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 20:23	183833
Potassium	NELAP	0.100		**3.02**	mg/L	1	10/15/2021 20:23	183833
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/15/2021 20:23	183833
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0012**	mg/L	5	10/21/2021 8:20	183849
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/17/2021 20:32	183849
Barium	NELAP	0.0010		**0.0560**	mg/L	5	10/21/2021 8:20	183849
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:32	183849
Boron	NELAP	0.0250		**0.0408**	mg/L	5	10/17/2021 20:32	183849
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:32	183849
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:32	183849
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:32	183849
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/17/2021 20:32	183849

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-020 **Client Sample ID:** K-D-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 9:53

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:32	183849
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/17/2021 20:32	183849
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/21/2021 8:20	183849
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/17/2021 20:32	183849
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/17/2021 20:32	183849
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/21/2021 4:25	183833
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/18/2021 1:06	183833
Barium	NELAP	0.0010	B	**0.0703**	mg/L	5	10/21/2021 4:25	183833
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 1:06	183833
Boron	NELAP	0.0250		**0.0484**	mg/L	5	10/18/2021 1:06	183833
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 1:06	183833
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 1:06	183833
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 1:06	183833
Iron	NELAP	0.0250		**0.213**	mg/L	5	10/18/2021 1:06	183833
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 1:06	183833
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 1:06	183833
Manganese	NELAP	0.0020		**0.0833**	mg/L	5	10/21/2021 4:25	183833
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 1:06	183833
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 1:06	183833
Sample result(s) for Ba exceed 10 times the method blank contamination. Data is reportable per the TNI Standard.								
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:32	183868
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 19:09	183866
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21
Lab ID: 21100448-021 **Client Sample ID:** K-D-1
Matrix: GROUNDWATER **Collection Date:** 10/06/2021 9:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:09	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**32**	mg/L	1	10/18/2021 20:55	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.51**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.025**	mg/L	1	10/19/2021 10:00	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:50	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/12/2021 14:34	R301164
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**115**	mg/L	1	10/08/2021 11:10	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**5**	mg/L	1	10/08/2021 11:10	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**210**	mg/L	1	10/12/2021 19:44	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 22:14	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:00	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 20:55	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.7**	mg/L	1	10/15/2021 18:51	183857
Magnesium	NELAP	0.0500		**17.7**	mg/L	1	10/15/2021 18:51	183857
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/15/2021 18:51	183857
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 18:51	183857
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**28.9**	mg/L	1	10/13/2021 18:25	183842
Magnesium	NELAP	0.0500		**17.7**	mg/L	1	10/13/2021 18:25	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:25	183842
Potassium	NELAP	0.100		**2.78**	mg/L	1	10/13/2021 18:25	183842
Sodium	NELAP	0.0500		**11.9**	mg/L	1	10/13/2021 18:25	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 21:04	183857
Arsenic	NELAP	0.0010		**0.0023**	mg/L	5	10/18/2021 5:35	183857
Barium	NELAP	0.0010		**0.0533**	mg/L	5	10/18/2021 5:35	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:35	183857
Boron	NELAP	0.0250		**0.0459**	mg/L	5	10/18/2021 5:35	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:35	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:35	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:35	183857
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 5:35	183857
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:35	183857

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-021 **Client Sample ID:** K-D-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 9:33

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 5:35	183857
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 5:35	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:35	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:35	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 22:43	183842
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/18/2021 8:53	183842
Barium	NELAP	0.0010		**0.0736**	mg/L	5	10/18/2021 8:53	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 8:53	183842
Boron	NELAP	0.0250		**0.0481**	mg/L	5	10/18/2021 8:53	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 8:53	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 8:53	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 8:53	183842
Iron	NELAP	0.0250		**0.533**	mg/L	5	10/18/2021 8:53	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 8:53	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 8:53	183842
Manganese	NELAP	0.0020		**0.125**	mg/L	5	10/18/2021 8:53	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 8:53	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 8:53	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:46	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:44	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/06/2021 0:00	R302385

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

Lab ID: 21100448-022 | **Client Sample ID:** K-E-2D

Matrix: GROUNDWATER | **Collection Date:** 10/06/2021 8:58

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:11	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 21:03	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.26**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.028**	mg/L	1	10/19/2021 10:01	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**0.021**	mg/L	1	10/08/2021 9:51	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/12/2021 14:35	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**120**	mg/L	1	10/08/2021 11:21	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:21	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**218**	mg/L	1	10/12/2021 19:47	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 22:20	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:02	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 21:03	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.5**	mg/L	1	10/15/2021 18:52	183857
Magnesium	NELAP	0.0500		**17.6**	mg/L	1	10/15/2021 18:52	183857
Potassium	NELAP	0.100		**2.78**	mg/L	1	10/15/2021 18:52	183857
Sodium	NELAP	0.0500		**11.3**	mg/L	1	10/15/2021 18:52	183857
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.9**	mg/L	1	10/13/2021 18:26	183842
Magnesium	NELAP	0.0500		**18.7**	mg/L	1	10/13/2021 18:26	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:26	183842
Potassium	NELAP	0.100		**2.93**	mg/L	1	10/13/2021 18:26	183842
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/13/2021 18:26	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 21:31	183857
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/18/2021 5:42	183857
Barium	NELAP	0.0010		**0.0522**	mg/L	5	10/18/2021 5:42	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:42	183857
Boron	NELAP	0.0250		**0.0435**	mg/L	5	10/18/2021 5:42	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:42	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:42	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:42	183857
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 5:42	183857

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-022 **Client Sample ID:** K-E-2D

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 8:58

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:42	183857
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 5:42	183857
Manganese	NELAP	0.0020		**0.0121**	mg/L	5	10/18/2021 5:42	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:42	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:42	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 23:03	183842
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/18/2021 9:01	183842
Barium	NELAP	0.0010		**0.0703**	mg/L	5	10/18/2021 9:01	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:01	183842
Boron	NELAP	0.0250		**0.0496**	mg/L	5	10/18/2021 9:01	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:01	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:01	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:01	183842
Iron	NELAP	0.0250		**0.290**	mg/L	5	10/18/2021 9:01	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:01	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 9:01	183842
Manganese	NELAP	0.0020		**0.0934**	mg/L	5	10/18/2021 9:01	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:01	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:01	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:51	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:49	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-023 **Client Sample ID:** K-E-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 8:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:26	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 21:24	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.14**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.036**	mg/L	1	10/19/2021 10:03	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:53	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/12/2021 14:37	R301164
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**118**	mg/L	1	10/08/2021 11:27	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:27	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**216**	mg/L	1	10/12/2021 19:48	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 22:27	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:12	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 21:24	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.8**	mg/L	1	10/15/2021 18:54	183857
Magnesium	NELAP	0.0500		**17.8**	mg/L	1	10/15/2021 18:54	183857
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/15/2021 18:54	183857
Sodium	NELAP	0.0500		**11.5**	mg/L	1	10/15/2021 18:54	183857
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**30.2**	mg/L	1	10/13/2021 18:28	183842
Magnesium	NELAP	0.0500		**18.3**	mg/L	1	10/13/2021 18:28	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:28	183842
Potassium	NELAP	0.100		**2.88**	mg/L	1	10/13/2021 18:28	183842
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/13/2021 18:28	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 21:34	183857
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/18/2021 5:50	183857
Barium	NELAP	0.0010		**0.0523**	mg/L	5	10/18/2021 5:50	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:50	183857
Boron	NELAP	0.0250		**0.0441**	mg/L	5	10/18/2021 5:50	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:50	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:50	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:50	183857
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 5:50	183857
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:50	183857

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-023 **Client Sample ID:** K-E-2M

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 8:45

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 5:50	183857
Manganese	NELAP	0.0020		**0.0061**	mg/L	5	10/18/2021 5:50	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:50	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:50	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 23:06	183842
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/18/2021 9:46	183842
Barium	NELAP	0.0010		**0.0633**	mg/L	5	10/18/2021 9:46	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:46	183842
Boron	NELAP	0.0250		**0.0455**	mg/L	5	10/18/2021 9:46	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:46	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:46	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:46	183842
Iron	NELAP	0.0250		**0.171**	mg/L	5	10/18/2021 9:46	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:46	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 9:46	183842
Manganese	NELAP	0.0020		**0.0741**	mg/L	5	10/18/2021 9:46	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:46	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:46	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:55	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:53	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-024 **Client Sample ID:** K-E-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 8:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:28	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 21:44	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.17**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.036**	mg/L	1	10/19/2021 10:04	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:56	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/12/2021 14:38	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**119**	mg/L	1	10/08/2021 11:33	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:33	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**214**	mg/L	1	10/12/2021 19:48	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 15:39	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:14	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 21:46	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100	S	**29.0**	mg/L	1	10/15/2021 19:11	183857
Magnesium	NELAP	0.0500	S	**17.9**	mg/L	1	10/15/2021 19:11	183857
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/15/2021 19:11	183857
Sodium	NELAP	0.0500		**11.4**	mg/L	1	10/15/2021 19:11	183857
Matrix spike control limits for Ca and Mg are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**29.6**	mg/L	1	10/13/2021 18:30	183842
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/13/2021 18:30	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:30	183842
Potassium	NELAP	0.100		**2.78**	mg/L	1	10/13/2021 18:30	183842
Sodium	NELAP	0.0500		**12.0**	mg/L	1	10/13/2021 18:30	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 21:37	183857
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/18/2021 5:57	183857
Barium	NELAP	0.0010		**0.0530**	mg/L	5	10/18/2021 5:57	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:57	183857
Boron	NELAP	0.0250		**0.0446**	mg/L	5	10/18/2021 5:57	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:57	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:57	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:57	183857

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21
Lab ID: 21100448-024 **Client Sample ID:** K-E-1
Matrix: GROUNDWATER **Collection Date:** 10/06/2021 8:20

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 5:57	183857
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:57	183857
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 5:57	183857
Manganese	NELAP	0.0020		**0.0032**	mg/L	5	10/18/2021 5:57	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 5:57	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 5:57	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 23:09	183842
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/18/2021 9:54	183842
Barium	NELAP	0.0010		**0.0671**	mg/L	5	10/18/2021 9:54	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:54	183842
Boron	NELAP	0.0250		**0.0474**	mg/L	5	10/18/2021 9:54	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:54	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:54	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:54	183842
Iron	NELAP	0.0250		**0.204**	mg/L	5	10/18/2021 9:54	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:54	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 9:54	183842
Manganese	NELAP	0.0020		**0.0870**	mg/L	5	10/18/2021 9:54	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 9:54	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 9:54	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 16:09	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 15:58	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21
Lab ID: 21100448-025 **Client Sample ID:** K-DUP-1
Matrix: GROUNDWATER **Collection Date:** 10/06/2021 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:30	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 21:52	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.26**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.039**	mg/L	1	10/19/2021 10:07	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:57	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/12/2021 14:39	R301164
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**116**	mg/L	1	10/08/2021 11:39	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:39	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**228**	mg/L	1	10/12/2021 19:48	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.0**	mg/L	1	10/08/2021 22:33	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.35**	mg/L	1	10/08/2021 11:16	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 21:53	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**28.5**	mg/L	1	10/15/2021 18:56	183857
Magnesium	NELAP	0.0500		**17.6**	mg/L	1	10/15/2021 18:56	183857
Potassium	NELAP	0.100		**2.77**	mg/L	1	10/15/2021 18:56	183857
Sodium	NELAP	0.0500		**11.3**	mg/L	1	10/15/2021 18:56	183857
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**29.6**	mg/L	1	10/13/2021 18:31	183842
Magnesium	NELAP	0.0500		**18.1**	mg/L	1	10/13/2021 18:31	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:31	183842
Potassium	NELAP	0.100		**2.84**	mg/L	1	10/13/2021 18:31	183842
Sodium	NELAP	0.0500		**12.0**	mg/L	1	10/13/2021 18:31	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0022**	mg/L	5	10/19/2021 21:47	183857
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/18/2021 6:20	183857
Barium	NELAP	0.0010		**0.0506**	mg/L	5	10/18/2021 6:20	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:20	183857
Boron	NELAP	0.0250		**0.0468**	mg/L	5	10/18/2021 6:20	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:20	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 6:20	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:20	183857
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 6:20	183857
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:20	183857

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

Lab ID: 21100448-025 | **Client Sample ID:** K-DUP-1

Matrix: GROUNDWATER | **Collection Date:** 10/06/2021 0:00

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 6:20	183857
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 6:20	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 6:20	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:20	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 23:13	183842
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/18/2021 10:01	183842
Barium	NELAP	0.0010		**0.0674**	mg/L	5	10/18/2021 10:01	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:01	183842
Boron	NELAP	0.0250		**0.0467**	mg/L	5	10/18/2021 10:01	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:01	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 10:01	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:01	183842
Iron	NELAP	0.0250		**0.297**	mg/L	5	10/18/2021 10:01	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:01	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 10:01	183842
Manganese	NELAP	0.0020		**0.0951**	mg/L	5	10/18/2021 10:01	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 10:01	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:01	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 16:19	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 16:16	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-026 **Client Sample ID:** K-FB-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 15:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/07/2021 19:32	R301019
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**< 10**	mg/L	1	10/18/2021 22:17	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**< 0.020**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/19/2021 10:08	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 9:58	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/12/2021 14:42	R301164
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**1**	mg/L	1	10/08/2021 11:44	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:44	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**30**	mg/L	1	10/12/2021 19:49	R301209
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**< 1.0**	mg/L	1	10/08/2021 22:40	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**< 0.10**	mg/L	1	10/08/2021 11:18	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**< 1**	mg/L	1	10/18/2021 22:18	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 18:57	183857
Magnesium	NELAP	0.0500		**< 0.0500**	mg/L	1	10/15/2021 18:57	183857
Potassium	NELAP	0.100		**< 0.100**	mg/L	1	10/15/2021 18:57	183857
Sodium	NELAP	0.0500		**< 0.0500**	mg/L	1	10/15/2021 18:57	183857
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:33	183842
Magnesium	NELAP	0.0500		**< 0.0500**	mg/L	1	10/13/2021 18:33	183842
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:33	183842
Potassium	NELAP	0.100		**< 0.100**	mg/L	1	10/13/2021 18:33	183842
Sodium	NELAP	0.0500		**< 0.0500**	mg/L	1	10/13/2021 18:33	183842
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 21:50	183857
Arsenic	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
Barium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
Boron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 6:28	183857
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 6:28	183857
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 6:28	183857
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Lab ID: 21100448-026 **Client Sample ID:** K-FB-1

Matrix: GROUNDWATER **Collection Date:** 10/06/2021 15:05

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 6:28	183857
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 6:28	183857
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 6:28	183857
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 6:28	183857
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 23:16	183842
Arsenic	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Barium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Boron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 10:47	183842
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 10:47	183842
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/18/2021 10:47	183842
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/18/2021 10:47	183842
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 10:47	183842
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/18/2021 10:47	183842
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 10:47	183842
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 16:23	183871
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 16:21	183871
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
Radium-228	*	0		**See Attached**	pci/L	1	10/26/2021 0:00	R302150
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
21100448-001	K-F-2D	Groundwater	9	10/06/2021 17:48
21100448-002	K-F-2M	Groundwater	9	10/06/2021 17:32
21100448-003	K-F-1	Groundwater	9	10/06/2021 17:12
21100448-004	K-A-3D	Groundwater	9	10/06/2021 16:20
21100448-005	K-A-3M	Groundwater	9	10/06/2021 16:05
21100448-006	K-A-2D	Groundwater	9	10/06/2021 15:33
21100448-007	K-A-2M	Groundwater	9	10/06/2021 15:20
21100448-008	K-A-1	Groundwater	9	10/06/2021 15:00
21100448-009	K-B-3D	Groundwater	9	10/06/2021 14:38
21100448-010	K-B-3M	Groundwater	9	10/06/2021 14:25
21100448-011	K-B-2D	Groundwater	9	10/06/2021 13:58
21100448-012	K-B-2M	Groundwater	9	10/06/2021 13:43
21100448-013	K-B-1	Groundwater	9	10/06/2021 12:32
21100448-014	K-C-3D	Groundwater	9	10/06/2021 12:00
21100448-015	K-C-3M	Groundwater	9	10/06/2021 11:35
21100448-016	K-C-2D	Groundwater	9	10/06/2021 11:08
21100448-017	K-C-2M	Groundwater	9	10/06/2021 10:53
21100448-018	K-C-1	Groundwater	9	10/06/2021 10:27
21100448-019	K-D-2D	Groundwater	9	10/06/2021 10:06
21100448-020	K-D-2M	Groundwater	9	10/06/2021 9:53
21100448-021	K-D-1	Groundwater	9	10/06/2021 9:33
21100448-022	K-E-2D	Groundwater	9	10/06/2021 8:58
21100448-023	K-E-2M	Groundwater	9	10/06/2021 8:45
21100448-024	K-E-1	Groundwater	9	10/06/2021 8:20
21100448-025	K-DUP-1	Groundwater	9	10/06/2021 0:00
21100448-026	K-FB-1	Groundwater	9	10/06/2021 15:05

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-001A	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 8:51
	Standard Methods 2320 B 1997, 2011				10/08/2021 8:51
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 18:59
	SW-846 9214 (Total)				10/08/2021 10:06
21100448-001B	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:38
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 16:38
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:09
	SW-846 9251 (Total)				10/18/2021 16:39
21100448-001C	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-001D	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 20:39
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:02
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:07
21100448-001E	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:37
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 16:20
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 4:31
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:30
21100448-001F	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:54
21100448-001G	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:16
21100448-001H	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:29
21100448-001I	K-F-2D	10/06/2021 17:48	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:47
21100448-002A	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:03
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:03

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 18:59
	SW-846 9214 (Total)				10/08/2021 10:08
21100448-002B	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:46
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 17:15
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:31
	SW-846 9251 (Total)				10/18/2021 17:16
21100448-002C	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-002D	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 21:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:20
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:09
21100448-002E	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:42
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 16:43
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:15
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:33
21100448-002F	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:55
21100448-002G	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:22
21100448-002H	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:31
21100448-002I	K-F-2M	10/06/2021 17:32	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:49
21100448-003A	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:09
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:09
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 18:59
	SW-846 9214 (Total)				10/08/2021 10:09
21100448-003B	K-F-1	10/06/2021 17:12	10/07/2021 12:35		

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:49
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 17:24
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:13
	SW-846 9251 (Total)				10/18/2021 17:24
21100448-003C	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-003D	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:34
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 21:40
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:26
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:11
21100448-003E	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:43
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 16:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:21
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:35
21100448-003F	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:55
21100448-003G	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:29
21100448-003H	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:33
21100448-003I	K-F-1	10/06/2021 17:12	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:50
21100448-004A	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:16
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:16
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:20
	SW-846 9214 (Total)				10/08/2021 10:12
21100448-004B	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:51
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 17:31
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:13

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9251 (Total)				10/18/2021 17:32
21100448-004C	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-004D	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:36
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 21:48
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:33
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:18
21100448-004E	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 16:58
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:27
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:37
21100448-004F	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:56
21100448-004G	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:35
21100448-004H	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:34
21100448-004I	K-A-3D	10/06/2021 16:20	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:52
21100448-005A	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:22
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:22
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:21
	SW-846 9214 (Total)				10/08/2021 10:14
21100448-005B	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:53
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 17:53
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:17
	SW-846 9251 (Total)				10/18/2021 17:54
21100448-005C	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00

Teklab, Inc. Environmental Laboratory

Dates Report

http://www.teklabinc.com/

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-005D	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:38
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 21:56
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:39
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:21
21100448-005E	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 17:06
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:33
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:40
21100448-005F	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:57
21100448-005G	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:41
21100448-005H	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:35
21100448-005I	K-A-3M	10/06/2021 16:05	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:53
21100448-006A	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:28
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:28
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:21
	SW-846 9214 (Total)				10/08/2021 10:16
21100448-006B	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 17:55
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:01
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:18
	SW-846 9251 (Total)				10/18/2021 18:02
21100448-006C	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-006D	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:48

Teklab, Inc. Environmental Laboratory

Dates Report

http://www.teklabinc.com/

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 22:03
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 1:45
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:27
21100448-006E	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 20:58
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 17:14
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:39
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:51
21100448-006F	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:58
21100448-006G	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:48
21100448-006H	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:36
21100448-006I	K-A-2D	10/06/2021 15:33	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:54
21100448-007A	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:35
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:35
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:21
	SW-846 9214 (Total)				10/08/2021 10:26
21100448-007B	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:10
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:09
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:18
	SW-846 9251 (Total)				10/18/2021 18:10
21100448-007C	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-007D	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:50
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 22:11
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:16
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:30

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-007E	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:00
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 17:52
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:45
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:54
21100448-007F	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:59
21100448-007G	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	SW-846 9060				10/08/2021 19:54
21100448-007H	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:37
21100448-007I	K-A-2M	10/06/2021 15:20	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 8:55
21100448-008A	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:40
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:40
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:22
	SW-846 9214 (Total)				10/08/2021 10:28
21100448-008B	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:19
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:17
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:19
	SW-846 9251 (Total)				10/18/2021 18:18
21100448-008C	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-008D	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:51
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 22:18
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:22
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:32
21100448-008E	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:02

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 17:59
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:52
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:56
21100448-008F	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 14:59
21100448-008G	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	SW-846 9060				10/08/2021 20:01
21100448-008H	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:39
21100448-008I	K-A-1	10/06/2021 15:00	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:30
21100448-009A	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:47
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:47
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:22
	SW-846 9214 (Total)				10/08/2021 10:30
21100448-009B	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:21
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:25
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:20
	SW-846 9251 (Total)				10/18/2021 18:26
21100448-009C	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-009D	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 22:26
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:28
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:34
21100448-009E	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:04
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:07
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 5:58
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 14:58

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-009F	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/08/2021 15:00
21100448-009G	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	SW-846 9060				10/08/2021 20:39
21100448-009H	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:41
21100448-009I	K-B-3D	10/06/2021 14:38	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:32
21100448-010A	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:53
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:53
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:22
	SW-846 9214 (Total)				10/08/2021 10:32
21100448-010B	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:23
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:46
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:21
	SW-846 9251 (Total)				10/18/2021 18:47
21100448-010C	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-010D	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:55
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 22:34
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:34
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:37
21100448-010E	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:05
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:15
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:04
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:00
21100448-010F	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 12:12
21100448-010G	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9060				10/08/2021 14:23
21100448-010H	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:43
21100448-010I	K-B-3M	10/06/2021 14:25	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:33
21100448-011A	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 9:58
	Standard Methods 2320 B 1997, 2011				10/08/2021 9:58
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:22
	SW-846 9214 (Total)				10/08/2021 10:34
21100448-011B	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:25
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 18:55
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:21
	SW-846 9251 (Total)				10/18/2021 18:55
21100448-011C	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-011D	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:56
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:12
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:40
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:39
21100448-011E	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:07
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:22
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:35
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:03
21100448-011F	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:11
21100448-011G	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	SW-846 9060				10/08/2021 20:45
21100448-011H	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:45
21100448-011I	K-B-2D	10/06/2021 13:58	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:34
21100448-012A	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:09
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:09
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:22
	SW-846 9214 (Total)				10/08/2021 10:36
21100448-012B	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:28
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 19:15
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:22
	SW-846 9251 (Total)				10/18/2021 19:16
21100448-012C	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-012D	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 19:58
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:19
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:47
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:41
21100448-012E	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:09
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:30
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:41
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:05
21100448-012F	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:12
21100448-012G	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	SW-846 9060				10/08/2021 20:51
21100448-012H	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:46
21100448-012I	K-B-2M	10/06/2021 13:43	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:36

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-013A	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:15
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:15
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:23
	SW-846 9214 (Total)				10/08/2021 10:38
21100448-013B	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:30
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 19:36
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:22
	SW-846 9251 (Total)				10/18/2021 19:38
21100448-013C	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-013D	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:00
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:27
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:53
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:44
21100448-013E	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:20
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:37
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:47
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:07
21100448-013F	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:13
21100448-013G	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	SW-846 9060				10/08/2021 20:58
21100448-013H	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:47
21100448-013I	K-B-1	10/06/2021 12:32	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:37
21100448-014A	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:20
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:20

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:35
	SW-846 9214 (Total)				10/08/2021 10:40
21100448-014B	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:32
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 19:45
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:22
	SW-846 9251 (Total)				10/18/2021 19:46
21100448-014C	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-014D	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:01
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:35
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 2:59
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:46
21100448-014E	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:22
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:45
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:53
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:14
21100448-014F	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:15
21100448-014G	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:04
21100448-014H	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:48
21100448-014I	K-C-3D	10/06/2021 12:00	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:38
21100448-015A	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:26
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:26
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:36
	SW-846 9214 (Total)				10/08/2021 10:50
21100448-015B	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:47
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 19:52
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:23
	SW-846 9251 (Total)				10/18/2021 19:54
21100448-015C	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-015D	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:11
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:42
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 3:05
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 18:57
21100448-015E	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:24
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 18:53
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 6:59
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:16
21100448-015F	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:18
21100448-015G	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:10
21100448-015H	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:50
21100448-015I	K-C-3M	10/06/2021 11:35	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:40
21100448-016A	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:32
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:32
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:36
	SW-846 9214 (Total)				10/08/2021 10:51
21100448-016B	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:49
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:00
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:23

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9251 (Total)				10/18/2021 20:02
21100448-016C	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-016D	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:13
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/17/2021 23:50
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 3:11
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 19:00
21100448-016E	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:29
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 20:01
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 7:18
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:23
21100448-016F	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:20
21100448-016G	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:17
21100448-016H	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:51
21100448-016I	K-C-2D	10/06/2021 11:08	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:43
21100448-017A	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:38
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:38
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:36
	SW-846 9214 (Total)				10/08/2021 10:53
21100448-017B	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:51
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:09
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:24
	SW-846 9251 (Total)				10/18/2021 20:10
21100448-017C	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-017D	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/04/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:18
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/18/2021 0:13
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 4:07
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 19:02
21100448-017E	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:30
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 20:09
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 7:24
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:26
21100448-017F	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:22
21100448-017G	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:23
21100448-017H	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:54
21100448-017I	K-C-2M	10/06/2021 10:53	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:45
21100448-018A	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:44
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:44
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:37
	SW-846 9214 (Total)				10/08/2021 10:55
21100448-018B	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:54
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:30
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:24
	SW-846 9251 (Total)				10/18/2021 20:31
21100448-018C	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-018D	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:20

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/18/2021 0:20
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 4:13
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 19:04
21100448-018E	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:32
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 20:16
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 7:30
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:28
21100448-018F	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:23
21100448-018G	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:29
21100448-018H	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:56
21100448-018I	K-C-1	10/06/2021 10:27	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:46
21100448-019A	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 10:58
	Standard Methods 2320 B 1997, 2011				10/08/2021 10:58
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:38
	SW-846 9214 (Total)				10/08/2021 10:57
21100448-019B	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 18:58
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:38
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:25
	SW-846 9251 (Total)				10/18/2021 20:39
21100448-019C	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-019D	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:22
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/18/2021 0:59
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 4:19
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 19:07

Dates Report

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling

Work Order: 21100448
Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-019E	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:55
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 20:24
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 8:14
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:30
21100448-019F	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:25
21100448-019G	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	SW-846 9060				10/08/2021 21:36
21100448-019H	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:58
21100448-019I	K-D-2D	10/06/2021 10:06	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:48
21100448-020A	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:04
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:04
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:44
	SW-846 9214 (Total)				10/08/2021 10:58
21100448-020B	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:07
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:46
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:25
	SW-846 9251 (Total)				10/18/2021 20:47
21100448-020C	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-020D	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:52	10/15/2021 20:23
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/18/2021 1:06
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:52	10/21/2021 4:25
	SW-846 7470A (Total)			10/12/2021 15:07	10/13/2021 19:09
21100448-020E	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:17	10/15/2021 21:57

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/17/2021 20:32
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:17	10/21/2021 8:20
	SW-846 7470A (Dissolved)			10/12/2021 15:32	10/13/2021 15:32
21100448-020F	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/09/2021 14:26
21100448-020G	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	SW-846 9060				10/08/2021 14:49
21100448-020H	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 9:59
21100448-020I	K-D-2M	10/06/2021 9:53	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:49
21100448-021A	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:10
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:10
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:44
	SW-846 9214 (Total)				10/08/2021 11:00
21100448-021B	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:09
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 20:55
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:26
	SW-846 9251 (Total)				10/18/2021 20:55
21100448-021C	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-021D	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:25
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 8:53
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 22:43
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 15:44
21100448-021E	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/06/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 18:51
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 5:35
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:04
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 15:46

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-021F	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:34
21100448-021G	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	SW-846 9060				10/08/2021 22:14
21100448-021H	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:00
21100448-021I	K-D-1	10/06/2021 9:33	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:50
21100448-022A	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:21
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:21
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:47
	SW-846 9214 (Total)				10/08/2021 11:02
21100448-022B	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:11
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 21:03
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:26
	SW-846 9251 (Total)				10/18/2021 21:03
21100448-022C	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-022D	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:26
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 9:01
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 23:03
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 15:49
21100448-022E	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 18:52
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 5:42
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:31
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 15:51
21100448-022F	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:35
21100448-022G	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9060				10/08/2021 22:20
21100448-022H	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:01
21100448-022I	K-E-2D	10/06/2021 8:58	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:51
21100448-023A	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:27
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:27
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:48
	SW-846 9214 (Total)				10/08/2021 11:12
21100448-023B	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:26
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 21:24
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:27
	SW-846 9251 (Total)				10/18/2021 21:24
21100448-023C	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-023D	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 9:46
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 23:06
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 15:53
21100448-023E	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 18:54
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 5:50
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:34
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 15:55
21100448-023F	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:37
21100448-023G	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	SW-846 9060				10/08/2021 22:27
21100448-023H	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:03
21100448-023I	K-E-2M	10/06/2021 8:45	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:53
21100448-024A	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:33
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:33
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:48
	SW-846 9214 (Total)				10/08/2021 11:14
21100448-024B	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:28
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 21:44
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:27
	SW-846 9251 (Total)				10/18/2021 21:46
21100448-024C	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-024D	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:30
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 9:54
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 23:09
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 15:58
21100448-024E	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 19:11
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 5:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:37
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 16:09
21100448-024F	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:38
21100448-024G	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	SW-846 9060				10/08/2021 15:39
21100448-024H	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:04
21100448-024I	K-E-1	10/06/2021 8:20	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:56

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100448-025A	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:39
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:39
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:48
	SW-846 9214 (Total)				10/08/2021 11:16
21100448-025B	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:30
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 21:52
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:28
	SW-846 9251 (Total)				10/18/2021 21:53
21100448-025C	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-025D	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:31
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 10:01
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 23:13
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 16:16
21100448-025E	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 18:56
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 6:20
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:47
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 16:19
21100448-025F	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:39
21100448-025G	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	SW-846 9060				10/08/2021 22:33
21100448-025H	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:07
21100448-025I	K-DUP-1	10/06/2021 0:00	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:57
21100448-026A	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:44
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:44

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total) 1997, 2011				10/12/2021 19:49
	SW-846 9214 (Total)				10/08/2021 11:18
21100448-026B	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	EPA 600 353.2 R2.0 (Total)				10/07/2021 19:32
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 22:17
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:28
	SW-846 9251 (Total)				10/18/2021 22:18
21100448-026C	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	EPA 903.0/904.0, Radium 226/228				10/26/2021 0:00
21100448-026D	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 12:36	10/13/2021 18:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/18/2021 10:47
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 12:36	10/19/2021 23:16
	SW-846 7470A (Total)			10/12/2021 15:48	10/13/2021 16:21
21100448-026E	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 13:20	10/15/2021 18:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/18/2021 6:28
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 13:20	10/19/2021 21:50
	SW-846 7470A (Dissolved)			10/12/2021 15:48	10/13/2021 16:23
21100448-026F	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	Standard Methods 4500-S D (Total) 2000				10/12/2021 14:42
21100448-026G	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	SW-846 9060				10/08/2021 22:40
21100448-026H	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:08
21100448-026I	K-FB-1	10/06/2021 15:05	10/07/2021 12:35		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 9:58

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

EPA 600 353.2 R2.0 (TOTAL)

Batch R301019 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	10/07/2021

Batch R301019 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.461**	0.5000	0	92.1	90	110	10/07/2021

Batch R301019 **SampType:** MS Units **mg/L**

SampID: 21100448-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.309**	0.2500	0.05400	102.2	90	110	10/07/2021

Batch R301019 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.310**	0.2500	0.05400	102.3	0.3094	0.13	10/07/2021

Batch R301019 **SampType:** MS Units **mg/L**

SampID: 21100448-007BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.246**	0.2500	0	98.4	90	110	10/07/2021

Batch R301019 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-007BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.253**	0.2500	0	101.1	0.2460	2.69	10/07/2021

Batch R301019 **SampType:** MS Units **mg/L**

SampID: 21100448-019BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.263**	0.2500	0.009600	101.2	90	110	10/07/2021

Batch R301019 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-019BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.267**	0.2500	0.009600	102.9	0.2626	1.62	10/07/2021

Client: Golder Associates, Inc | **Work Order:** 21100448

Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R301396 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	10/18/2021

Batch R301396 **SampType:** MBLK Units **mg/L**

SampID: MBLK TCLP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	*	10		**< 10**	7.620	0	0	-100	100	10/18/2021

Batch R301396 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**20**	20.00	0	100.5	90	110	10/18/2021

Batch R301396 **SampType:** MS Units **mg/L**

SampID: 21100448-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**49**	20.00	30.64	90.3	90	110	10/18/2021

Batch R301396 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	E	**50**	20.00	30.64	98.5	48.70	3.31	10/18/2021

Batch R301396 **SampType:** MS Units **mg/L**

SampID: 21100448-011BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**49**	20.00	30.91	91.1	90	110	10/18/2021

Batch R301396 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-011BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**50**	20.00	30.91	94.3	49.13	1.27	10/18/2021

Batch R301396 **SampType:** MS Units **mg/L**

SampID: 21100448-023BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**50**	20.00	31.18	92.0	90	110	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R301396 SampType: MSD Units mg/L RPD Limit 10

SampID: 21100448-023BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	E	**50**	20.00	31.18	95.4	49.58	1.34	10/18/2021

SM-3500-FE D, LABORATORY ANALYZED

Batch R301429 SampType: MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**< 0.020**	0.0080	0	0	-100	100	10/19/2021

Batch R301429 SampType: LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.49**	0.5000	0	97.6	90	110	10/19/2021

Batch R301429 SampType: MS Units mg/L

SampID: 21100448-001HMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.28**	0.2500	0.03200	100.0	85	115	10/19/2021

Batch R301429 SampType: MSD Units mg/L RPD Limit 15

SampID: 21100448-001HMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.28**	0.2500	0.03200	100.0	0.2820	0.00	10/19/2021

Batch R301429 SampType: MS Units mg/L

SampID: 21100448-009HMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.31**	0.2500	0.05400	101.2	85	115	10/19/2021

Batch R301429 SampType: MSD Units mg/L RPD Limit 15

SampID: 21100448-009HMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.31**	0.2500	0.05400	102.4	0.3070	0.97	10/19/2021

SM-3500-FE D, LABORATORY ANALYZED

Batch R301429 **SampType:** MS Units **mg/L**
SampID: 21100448-017HMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.27**	0.2500	0.02100	101.2	85	115	10/19/2021

Batch R301429 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-017HMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.28**	0.2500	0.02100	102.8	0.2740	1.45	10/19/2021

SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)

Batch R301035 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**< 0.020**	0.0080	0	0	-100	100	10/08/2021

Batch R301035 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.47**	0.5000	0	94.6	90	110	10/08/2021

Batch R301035 **SampType:** MS Units **mg/L**
SampID: 21100448-001IMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.26**	0.2500	0.01000	98.4	85	115	10/08/2021

Batch R301035 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-001IMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.26**	0.2500	0.01000	101.2	0.2560	2.70	10/08/2021

Batch R301035 **SampType:** MS Units **mg/L**
SampID: 21100448-008IMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.25**	0.2500	0	101.2	85	115	10/08/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)

Batch R301035 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 21100448-008IMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.27**	0.2500	0	106.8	0.2530	5.38	10/08/2021

Batch R301035 **SampType:** MS Units mg/L

SampID: 21100448-016IMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.26**	0.2500	0.01000	101.2	85	115	10/08/2021

Batch R301035 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 21100448-016IMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.27**	0.2500	0.01000	104.4	0.2630	3.00	10/08/2021

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301111 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**< 0.05**	0.0080	0	0	-100	100	10/08/2021

Batch R301111 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0	106.0	90	110	10/08/2021

Batch R301111 **SampType:** MS Units mg/L

SampID: 21100448-001FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.06**	0.0670	0.01800	58.2	85	115	10/08/2021

Batch R301111 **SampType:** MS Units mg/L

SampID: 21100448-002FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.04000	52.2	85	115	10/08/2021

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Golder Associates, Inc | **Work Order:** 21100448
Client Project: Kincaid SW Sampling | **Report Date:** 12-Nov-21

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-003FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02200	76.1	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-004FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.05**	0.0670	0.02400	40.3	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-005FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.02400	82.1	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-006FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.02400	82.1	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-007FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.08**	0.0670	0.02000	91.0	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-008FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.02600	76.1	85	115	10/08/2021

Batch R301111 **SampType:** MS Units **mg/L**
SampID: 21100448-009FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02200	70.1	85	115	10/08/2021

Batch R301111 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-009FMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfide, Total - Colorimetric		0.05	R	**0.08**	0.0670	0.02200	88.1	0.06900	16.00	10/08/2021

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-010FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.08**	0.0670	0.01800	94.0	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-011FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02200	67.2	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-012FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02400	70.1	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-013FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02200	76.1	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-014FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.05**	0.0670	0.03800	17.9	85	115	10/09/2021

Batch R301111 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-014FMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.05**	0.0670	0.03800	19.4	0.05000	1.98	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-015FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.10**	0.0670	0.02400	109.0	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-016FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.06**	0.0670	0.02200	58.2	85	115	10/09/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-017FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02000	76.1	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-018FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.02400	79.1	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-019FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.06**	0.0670	0.02200	52.2	85	115	10/09/2021

Batch R301111 **SampType:** MS Units **mg/L**

SampID: 21100448-020FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.08**	0.0670	0.02400	76.1	85	115	10/09/2021

Batch R301164 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**< 0.05**	0.0080	0	0	-100	100	10/12/2021

Batch R301164 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.06**	0.0670	0	92.5	90	110	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**

SampID: 21100448-021FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0	107.5	85	115	10/12/2021

Batch R301164 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-021FMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0	104.5	0.07200	2.82	10/12/2021

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100448-022FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.06**	0.0670	0.01200	68.7	85	115	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100448-023FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0.008000	86.6	85	115	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100448-024FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**< 0.05**	0.0670	0	62.7	85	115	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100448-025FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0.008000	86.6	85	115	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100448-026FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0	104.5	85	115	10/12/2021

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R301209 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/12/2021
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/12/2021
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/12/2021
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/12/2021

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R301209 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**980**	1000	0	98.0	90	110	10/12/2021
Total Dissolved Solids		20		**982**	1000	0	98.2	90	110	10/12/2021
Total Dissolved Solids		20		**982**	1000	0	98.2	90	110	10/12/2021
Total Dissolved Solids		20		**1000**	1000	0	100.2	90	110	10/12/2021

Batch R301209 **SampType:** DUP Units **mg/L** RPD Limit **5**
SampID: 21100448-005ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**190**				196.0	3.11	10/12/2021

Batch R301209 **SampType:** DUP Units **mg/L** RPD Limit **5**
SampID: 21100448-014ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**196**				190.0	3.11	10/12/2021

Batch R301209 **SampType:** DUP Units **mg/L** RPD Limit **5**
SampID: 21100448-020ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**200**				200.0	0.00	10/12/2021

Batch R301209 **SampType:** DUP Units **mg/L** RPD Limit **5**
SampID: 21100448-025ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**224**				228.0	1.77	10/12/2021

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R301049 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	10/08/2021

Batch R301049 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.25		**1.52**	1.520	0	100.3	90	110	10/08/2021

Teklab Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R301049 **SampType:** MS Units **mg/L**

SampID: 21100448-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.50**	0.5000	0	99.2	85	115	10/08/2021

Batch R301049 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.50**	0.5000	0	100.2	0.4960	1.00	10/08/2021

Batch R301049 **SampType:** MS Units **mg/L**

SampID: 21100448-011BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.47**	0.5000	0	93.8	85	115	10/08/2021

Batch R301049 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-011BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.51**	0.5000	0	101.6	0.4690	7.98	10/08/2021

Batch R301049 **SampType:** MS Units **mg/L**

SampID: 21100448-025BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.49**	0.5000	0	98.8	85	115	10/08/2021

Batch R301049 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100448-025BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	H	**0.51**	0.5000	0	102.2	0.4940	3.38	10/08/2021

SW-846 9060

Batch R301074 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**< 1.0**	0.4500	0	0	-100	100	10/08/2021

Client: Golder Associates, Inc **Work Order:** 21100448
Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 9060

Batch R301074 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		4.0		**16.6**	16.50	0	100.8	90	110	10/08/2021

Batch R301074 **SampType:** MS Units **mg/L**
SampID: 21100448-010GMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.0**	5.000	4.320	93.0	85	115	10/08/2021

Batch R301074 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 21100448-010GMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.2**	5.000	4.320	97.2	8.970	2.31	10/08/2021

Batch R301074 **SampType:** MS Units **mg/L**
SampID: 21100448-020GMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.0**	5.000	4.420	92.6	85	115	10/08/2021

Batch R301074 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 21100448-020GMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.0**	5.000	4.420	91.6	9.050	0.55	10/08/2021

Batch R301074 **SampType:** MS Units **mg/L**
SampID: 21100448-024GMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.0**	5.000	4.180	96.8	85	115	10/08/2021

Batch R301074 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 21100448-024GMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.1**	5.000	4.180	98.0	9.020	0.66	10/08/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 9214 (TOTAL)

Batch R300986 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0370	0	0	-100	100	10/07/2021

Batch R300986 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.99**	1.000	0	98.8	90	110	10/07/2021

Batch R300986 **SampType:** MS Units **mg/L**

SampID: 21100448-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.44**	2.000	0.3550	104.4	75	125	10/08/2021

Batch R300986 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.46**	2.000	0.3550	105.4	2.444	0.77	10/08/2021

Batch R300986 **SampType:** MS Units **mg/L**

SampID: 21100448-014AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.47**	2.000	0.3550	105.6	75	125	10/08/2021

Batch R300986 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-014AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.47**	2.000	0.3550	105.6	2.467	0.00	10/08/2021

Batch R300986 **SampType:** MS Units **mg/L**

SampID: 21100448-022AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.48**	2.000	0.3560	106.0	75	125	10/08/2021

Batch R300986 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-022AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.46**	2.000	0.3560	105.4	2.477	0.53	10/08/2021

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

SW-846 9214 (TOTAL)

Batch R300986 **SampType:** MS Units **mg/L**

SampID: 21100448-026AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.11**	2.000	0	105.4	75	125	10/08/2021

Batch R300986 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-026AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.16**	2.000	0	107.8	2.109	2.20	10/08/2021

SW-846 9251 (TOTAL)

Batch R301397 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**< 1**	0.5000	0	0	-100	100	10/18/2021

Batch R301397 **SampType:** MBLK Units **mg/L**

SampID: MBLK TCLP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	*	1		**< 1**	0.5000	0	0	-100	100	10/18/2021

Batch R301397 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**20**	20.00	0	101.9	90	110	10/18/2021

Batch R301397 **SampType:** MS Units **mg/L**

SampID: 21100448-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**39**	20.00	20.65	90.3	85	115	10/18/2021

Batch R301397 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		**39**	20.00	20.65	93.6	38.71	1.69	10/18/2021

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling

Work Order: 21100448
Report Date: 12-Nov-21

SW-846 9251 (TOTAL)

Batch R301397 **SampType:** MS Units **mg/L**
SampID: 21100448-011BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**39**	20.00	20.47	91.2	85	115	10/18/2021

Batch R301397 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-011BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		**39**	20.00	20.47	91.3	38.72	0.03	10/18/2021

Batch R301397 **SampType:** MS Units **mg/L**
SampID: 21100448-023BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**38**	20.00	20.36	90.3	85	115	10/18/2021

Batch R301397 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-023BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		**38**	20.00	20.36	89.7	38.41	0.29	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183849 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183849

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**< 0.0500**	0.0068	0	0	-100	100	10/15/2021
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	10/15/2021
Barium		0.0025		**< 0.0025**	0.0007	0	0	-100	100	10/15/2021
Beryllium		0.0005	S	**< 0.0005**	0.0002	0	150.0	-100	100	10/15/2021
Boron		0.0200		**< 0.0200**	0.0090	0	0	-100	100	10/15/2021
Cadmium		0.0020		**< 0.0020**	0.0005	0	0	-100	100	10/15/2021
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/15/2021
Chromium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	10/15/2021
Cobalt		0.0050		**< 0.0050**	0.0020	0	0	-100	100	10/15/2021
Iron		0.0400		**< 0.0400**	0.0200	0	0	-100	100	10/15/2021
Lead		0.0150		**< 0.0150**	0.0014	0	0	-100	100	10/15/2021
Lithium		0.0050		**< 0.0050**	0.0019	0	0	-100	100	10/15/2021
Magnesium		0.0500		**< 0.0500**	0.0070	0	0	-100	100	10/15/2021
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	10/15/2021
Molybdenum		0.0100		**< 0.0100**	0.0037	0	0	-100	100	10/15/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/15/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/15/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183849 **SampType:** LCS Units **mg/L**

SampID: LCS-183849

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**0.433**	0.5000	0	86.5	85	115	10/15/2021
Arsenic		0.0250		**0.481**	0.5000	0	96.1	85	115	10/15/2021
Barium		0.0025		**1.80**	2.000	0	89.8	85	115	10/15/2021
Beryllium		0.0005	B	**0.0448**	0.0500	0	89.6	85	115	10/15/2021
Boron		0.0200		**0.450**	0.5000	0	90.1	85	115	10/15/2021
Cadmium		0.0020		**0.0452**	0.0500	0	90.4	85	115	10/15/2021
Calcium		0.100		**2.24**	2.500	0	89.5	85	115	10/15/2021
Chromium		0.0050		**0.175**	0.2000	0	87.6	85	115	10/15/2021
Cobalt		0.0050		**0.454**	0.5000	0	90.7	85	115	10/15/2021
Iron		0.0400		**1.74**	2.000	0	86.8	85	115	10/15/2021
Lead		0.0150		**0.452**	0.5000	0	90.4	85	115	10/15/2021
Lithium		0.0050		**0.443**	0.5000	0	88.6	85	115	10/15/2021
Magnesium		0.0500		**2.29**	2.500	0	91.4	85	115	10/15/2021
Manganese		0.0070		**0.452**	0.5000	0	90.4	85	115	10/15/2021
Molybdenum		0.0100		**0.435**	0.5000	0	87.0	85	115	10/15/2021
Potassium		0.100		**2.42**	2.500	0	96.7	85	115	10/15/2021
Sodium		0.0500		**2.23**	2.500	0	89.2	85	115	10/15/2021

Batch 183849 **SampType:** MS Units **mg/L**

SampID: 21100448-001EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**31.2**	2.500	29.15	80.4	75	125	10/15/2021
Magnesium		0.0500		**20.2**	2.500	18.00	88.4	75	125	10/15/2021
Potassium		0.100		**5.13**	2.500	2.773	94.3	75	125	10/15/2021
Sodium		0.0500		**13.4**	2.500	11.45	79.6	75	125	10/15/2021

Batch 183849 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-001EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**30.9**	2.500	29.15	69.2	31.16	0.90	10/15/2021
Magnesium		0.0500		**20.0**	2.500	18.00	80.8	20.21	0.95	10/15/2021
Potassium		0.100		**5.19**	2.500	2.773	96.8	5.131	1.21	10/15/2021
Sodium		0.0500		**13.5**	2.500	11.45	82.8	13.44	0.59	10/15/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183849 **SampType:** MS Units mg/L

SampID: 21100448-015EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**30.8**	2.500	28.96	75.2	75	125	10/15/2021
Magnesium		0.0500		**20.1**	2.500	17.97	83.9	75	125	10/15/2021
Potassium		0.100		**5.13**	2.500	2.792	93.4	75	125	10/15/2021
Sodium		0.0500		**13.4**	2.500	11.42	78.8	75	125	10/15/2021

Batch 183849 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 21100448-015EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**31.0**	2.500	28.96	80.4	30.84	0.42	10/15/2021
Magnesium		0.0500		**20.3**	2.500	17.97	91.2	20.07	0.91	10/15/2021
Potassium		0.100		**5.15**	2.500	2.792	94.5	5.129	0.50	10/15/2021
Sodium		0.0500		**13.5**	2.500	11.42	81.6	13.39	0.52	10/15/2021

Batch 183857 **SampType:** MBLK Units mg/L

SampID: MBLK-183857

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**< 0.0500**	0.0068	0	0	-100	100	10/15/2021
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	10/15/2021
Barium		0.0025		**< 0.0025**	0.0007	0	0	-100	100	10/15/2021
Beryllium		0.0005		**< 0.0005**	0.0002	0	0	-100	100	10/15/2021
Boron		0.0200		**< 0.0200**	0.0090	0	0	-100	100	10/15/2021
Cadmium		0.0020		**< 0.0020**	0.0005	0	0	-100	100	10/15/2021
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/15/2021
Chromium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	10/15/2021
Cobalt		0.0050		**< 0.0050**	0.0020	0	0	-100	100	10/15/2021
Iron		0.0400		**< 0.0400**	0.0200	0	0	-100	100	10/15/2021
Lead		0.0150		**< 0.0150**	0.0014	0	0	-100	100	10/15/2021
Lithium	*	0.0050		**< 0.0050**	0.0019	0	0	-100	100	10/15/2021
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	10/15/2021
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	10/15/2021
Molybdenum		0.0100		**< 0.0100**	0.0037	0	0	-100	100	10/15/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/15/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/15/2021

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183857 **SampType:** LCS Units **mg/L**

SampID: LCS-183857

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500	S	**0.419**	0.5000	0	83.8	85	115	10/15/2021
Arsenic		0.0250		**0.478**	0.5000	0	95.6	85	115	10/15/2021
Barium		0.0025		**1.78**	2.000	0	89.2	85	115	10/15/2021
Beryllium		0.0005		**0.0446**	0.0500	0	89.2	85	115	10/15/2021
Boron		0.0200		**0.448**	0.5000	0	89.5	85	115	10/15/2021
Cadmium		0.0020		**0.0470**	0.0500	0	94.0	85	115	10/15/2021
Calcium		0.100		**2.22**	2.500	0	88.8	85	115	10/15/2021
Chromium		0.0050		**0.177**	0.2000	0	88.4	85	115	10/15/2021
Cobalt		0.0050		**0.442**	0.5000	0	88.4	85	115	10/15/2021
Iron		0.0400		**1.73**	2.000	0	86.7	85	115	10/15/2021
Lead		0.0150		**0.454**	0.5000	0	90.7	85	115	10/15/2021
Lithium	*	0.0050		**0.433**	0.5000	0	86.7	85	115	10/15/2021
Magnesium		0.0500		**2.28**	2.500	0	91.1	85	115	10/15/2021
Manganese		0.0070		**0.449**	0.5000	0	89.8	85	115	10/15/2021
Molybdenum		0.0100		**0.428**	0.5000	0	85.6	85	115	10/15/2021
Potassium		0.100		**2.40**	2.500	0	95.9	85	115	10/15/2021
Sodium		0.0500		**2.21**	2.500	0	88.3	85	115	10/15/2021

Batch 183857 **SampType:** MS Units **mg/L**

SampID: 21100448-024EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**30.4**	2.500	29.01	54.8	75	125	10/15/2021
Magnesium		0.0500	S	**19.7**	2.500	17.85	72.3	75	125	10/15/2021
Potassium		0.100		**5.08**	2.500	2.790	91.8	75	125	10/15/2021
Sodium		0.0500		**13.3**	2.500	11.39	76.0	75	125	10/15/2021

Batch 183857 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-024EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**30.7**	2.500	29.01	66.8	30.38	0.98	10/15/2021
Magnesium		0.0500		**19.9**	2.500	17.85	80.7	19.66	1.05	10/15/2021
Potassium		0.100		**5.18**	2.500	2.790	95.6	5.084	1.86	10/15/2021
Sodium		0.0500		**13.5**	2.500	11.39	82.8	13.29	1.27	10/15/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 183833 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183833

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**< 0.0500**	0.0068	0	0	-100	100	10/15/2021
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	10/15/2021
Barium		0.0025		**< 0.0025**	0.0007	0	0	-100	100	10/15/2021
Beryllium		0.0005		**< 0.0005**	0.0002	0	100.0	-100	100	10/15/2021
Boron		0.0200		**< 0.0200**	0.0090	0	0	-100	100	10/15/2021
Cadmium		0.0020		**< 0.0020**	0.0005	0	0	-100	100	10/15/2021
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/15/2021
Chromium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	10/15/2021
Cobalt		0.0050		**< 0.0050**	0.0020	0	0	-100	100	10/15/2021
Iron		0.0400		**< 0.0400**	0.0200	0	0	-100	100	10/15/2021
Lead		0.0150		**< 0.0150**	0.0014	0	0	-100	100	10/15/2021
Lithium		0.0050		**< 0.0050**	0.0019	0	0	-100	100	10/15/2021
Magnesium		0.0500		**< 0.0500**	0.0060	0	0	-100	100	10/15/2021
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	10/15/2021
Molybdenum		0.0100		**< 0.0100**	0.0037	0	0	-100	100	10/15/2021
Phosphorus		0.100		**< 0.100**	0.0259	0	0	-100	100	10/15/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/15/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/15/2021

Client: Golder Associates, Inc

Client Project: Kincaid SW Sampling

Work Order: 21100448

Report Date: 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 183833 **SampType:** LCS Units **mg/L**

SampID: LCS-183833

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**0.514**	0.5000	0	102.8	85	115	10/15/2021
Arsenic		0.0250		**0.560**	0.5000	0	112.0	85	115	10/15/2021
Barium		0.0025		**2.16**	2.000	0	108.0	85	115	10/15/2021
Beryllium		0.0005		**0.0522**	0.0500	0	104.4	85	115	10/15/2021
Boron		0.0200		**0.516**	0.5000	0	103.2	85	115	10/15/2021
Cadmium		0.0020		**0.0518**	0.0500	0	103.6	85	115	10/15/2021
Calcium		0.100		**2.59**	2.500	0	103.8	85	115	10/15/2021
Chromium		0.0050		**0.200**	0.2000	0	100.2	85	115	10/15/2021
Cobalt		0.0050		**0.523**	0.5000	0	104.6	85	115	10/15/2021
Iron		0.0400		**2.06**	2.000	0	103.0	85	115	10/15/2021
Lead		0.0150		**0.524**	0.5000	0	104.7	85	115	10/15/2021
Lithium		0.0050		**0.505**	0.5000	0	100.9	85	115	10/15/2021
Magnesium		0.0500		**2.65**	2.500	0	105.8	85	115	10/15/2021
Manganese		0.0070		**0.519**	0.5000	0	103.9	85	115	10/15/2021
Molybdenum		0.0100		**0.501**	0.5000	0	100.2	85	115	10/15/2021
Phosphorus		0.100		**1.06**	1.000	0	105.7	85	115	10/15/2021
Potassium		0.100		**2.71**	2.500	0	108.4	85	115	10/15/2021
Sodium		0.0500		**2.54**	2.500	0	101.6	85	115	10/15/2021

Batch 183833 **SampType:** MS Units **mg/L**

SampID: 21100448-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**34.2**	2.500	31.83	94.8	75	125	10/15/2021
Magnesium		0.0500		**22.0**	2.500	19.60	97.0	75	125	10/15/2021
Phosphorus		0.100		**1.11**	1.000	0.06850	104.6	75	125	10/15/2021
Potassium		0.100		**5.65**	2.500	3.038	104.4	75	125	10/15/2021
Sodium		0.0500		**14.5**	2.500	12.04	99.6	75	125	10/15/2021

Batch 183833 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**34.5**	2.500	31.83	107.2	34.20	0.90	10/15/2021
Magnesium		0.0500		**22.1**	2.500	19.60	99.5	22.03	0.28	10/15/2021
Phosphorus		0.100		**1.12**	1.000	0.06850	105.0	1.114	0.42	10/15/2021
Potassium		0.100		**5.67**	2.500	3.038	105.2	5.648	0.36	10/15/2021
Sodium		0.0500		**14.6**	2.500	12.04	103.2	14.53	0.62	10/15/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 183833 **SampType:** MS Units **mg/L**

SampID: 21100448-016DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**34.9**	2.500	31.53	136.4	75	125	10/15/2021
Magnesium		0.0500		**22.5**	2.500	19.52	119.7	75	125	10/15/2021
Phosphorus		0.100		**1.14**	1.000	0.06600	107.7	75	125	10/15/2021
Potassium		0.100		**5.86**	2.500	3.100	110.6	75	125	10/15/2021
Sodium		0.0500		**15.1**	2.500	12.32	110.8	75	125	10/15/2021

Batch 183833 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-016DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**34.1**	2.500	31.53	103.2	34.94	2.40	10/15/2021
Magnesium		0.0500		**22.1**	2.500	19.52	105.1	22.51	1.64	10/15/2021
Phosphorus		0.100		**1.13**	1.000	0.06600	106.2	1.143	1.38	10/15/2021
Potassium		0.100		**5.70**	2.500	3.100	103.9	5.865	2.91	10/15/2021
Sodium		0.0500		**14.7**	2.500	12.32	93.6	15.09	2.89	10/15/2021

Batch 183842 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183842

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/13/2021
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	10/13/2021
Phosphorus		0.100		**< 0.100**	0.0259	0	0	-100	100	10/13/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/13/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/13/2021

Batch 183842 **SampType:** LCS Units **mg/L**

SampID: LCS-183842

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.54**	2.500	0	101.7	85	115	10/13/2021
Magnesium		0.0500		**2.47**	2.500	0	99.0	85	115	10/13/2021
Phosphorus		0.100		**1.04**	1.000	0	103.7	85	115	10/13/2021
Potassium		0.100		**2.55**	2.500	0	101.9	85	115	10/13/2021
Sodium		0.0500		**2.54**	2.500	0	101.6	85	115	10/13/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183849 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183849

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/21/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/17/2021
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	10/21/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/17/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/17/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/17/2021
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	10/17/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/17/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/17/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/17/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/17/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/21/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/17/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/17/2021

Batch 183849 **SampType:** LCS Units **mg/L**

SampID: LCS-183849

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.452**	0.5000	0	90.5	80	120	10/21/2021
Arsenic		0.0010		**0.455**	0.5000	0	91.1	80	120	10/17/2021
Barium		0.0010		**1.94**	2.000	0	97.0	80	120	10/21/2021
Beryllium		0.0010		**0.0439**	0.0500	0	87.8	80	120	10/17/2021
Boron		0.0250		**0.460**	0.5000	0	92.0	80	120	10/17/2021
Cadmium		0.0010		**0.0442**	0.0500	0	88.5	80	120	10/17/2021
Chromium		0.0015		**0.180**	0.2000	0	90.0	80	120	10/17/2021
Cobalt		0.0010		**0.460**	0.5000	0	92.0	80	120	10/17/2021
Iron		0.0250		**1.80**	2.000	0	90.1	80	120	10/17/2021
Lead		0.0010		**0.456**	0.5000	0	91.2	80	120	10/17/2021
Lithium	*	0.0030		**0.461**	0.5000	0	92.2	80	120	10/17/2021
Manganese		0.0020		**0.477**	0.5000	0	95.3	80	120	10/21/2021
Molybdenum		0.0015		**0.454**	0.5000	0	90.7	80	120	10/17/2021
Selenium		0.0010		**0.406**	0.5000	0	81.2	80	120	10/17/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183849 **SampType:** MS Units **mg/L**

SampID: 21100448-001EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.478**	0.5000	0.003940	94.8	75	125	10/21/2021
Arsenic		0.0010		**0.473**	0.5000	0.002243	94.1	75	125	10/17/2021
Barium		0.0010		**2.06**	2.000	0.05501	100.0	75	125	10/21/2021
Beryllium		0.0010		**0.0461**	0.0500	0	92.2	75	125	10/17/2021
Boron		0.0250		**0.505**	0.5000	0.04070	92.9	75	125	10/17/2021
Cadmium		0.0010		**0.0449**	0.0500	0	89.8	75	125	10/17/2021
Chromium		0.0015		**0.186**	0.2000	0	93.1	75	125	10/17/2021
Cobalt		0.0010		**0.469**	0.5000	0	93.8	75	125	10/17/2021
Iron		0.0250		**1.88**	2.000	0	93.8	75	125	10/17/2021
Lead		0.0010		**0.473**	0.5000	0	94.6	75	125	10/17/2021
Lithium	*	0.0030		**0.478**	0.5000	0	95.6	75	125	10/17/2021
Manganese		0.0020		**0.483**	0.5000	0.001563	96.2	75	125	10/21/2021
Molybdenum		0.0015		**0.476**	0.5000	0.001149	94.9	75	125	10/17/2021
Selenium		0.0010		**0.422**	0.5000	0	84.4	75	125	10/17/2021

Batch 183849 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-001EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.477**	0.5000	0.003940	94.7	0.4780	0.15	10/21/2021
Arsenic		0.0010		**0.473**	0.5000	0.002243	94.1	0.4725	0.09	10/17/2021
Barium		0.0010		**2.07**	2.000	0.05501	100.8	2.056	0.75	10/21/2021
Beryllium		0.0010		**0.0458**	0.0500	0	91.6	0.04608	0.65	10/17/2021
Boron		0.0250		**0.493**	0.5000	0.04070	90.5	0.5054	2.48	10/17/2021
Cadmium		0.0010		**0.0444**	0.0500	0	88.7	0.04492	1.29	10/17/2021
Chromium		0.0015		**0.186**	0.2000	0	92.8	0.1861	0.26	10/17/2021
Cobalt		0.0010		**0.473**	0.5000	0	94.5	0.4690	0.79	10/17/2021
Iron		0.0250		**1.94**	2.000	0	97.0	1.875	3.38	10/17/2021
Lead		0.0010		**0.466**	0.5000	0	93.2	0.4731	1.56	10/17/2021
Lithium	*	0.0030		**0.475**	0.5000	0	94.9	0.4778	0.67	10/17/2021
Manganese		0.0020		**0.483**	0.5000	0.001563	96.3	0.4826	0.14	10/21/2021
Molybdenum		0.0015		**0.468**	0.5000	0.001149	93.3	0.4755	1.67	10/17/2021
Selenium		0.0010		**0.417**	0.5000	0	83.3	0.4220	1.29	10/17/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183849 **SampType:** MS Units **mg/L**

SampID: 21100448-015EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.481**	0.5000	0	96.3	75	125	10/21/2021
Arsenic		0.0010		**0.463**	0.5000	0.002189	92.2	75	125	10/17/2021
Barium		0.0010		**2.07**	2.000	0.05518	100.6	75	125	10/21/2021
Beryllium		0.0010		**0.0423**	0.0500	0	84.6	75	125	10/17/2021
Boron		0.0250		**0.477**	0.5000	0.04072	87.3	75	125	10/17/2021
Cadmium		0.0010		**0.0429**	0.0500	0	85.8	75	125	10/17/2021
Chromium		0.0015		**0.173**	0.2000	0	86.6	75	125	10/17/2021
Cobalt		0.0010		**0.435**	0.5000	0	87.0	75	125	10/17/2021
Iron		0.0250		**1.77**	2.000	0	88.5	75	125	10/17/2021
Lead		0.0010		**0.472**	0.5000	0	94.5	75	125	10/17/2021
Lithium	*	0.0030		**0.443**	0.5000	0	88.6	75	125	10/17/2021
Manganese		0.0020		**0.481**	0.5000	0.0009201	96.1	75	125	10/21/2021
Molybdenum		0.0015		**0.436**	0.5000	0.0007886	87.1	75	125	10/17/2021
Selenium		0.0010		**0.448**	0.5000	0	89.6	75	125	10/17/2021

Batch 183849 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-015EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.483**	0.5000	0	96.6	0.4813	0.40	10/21/2021
Arsenic		0.0010		**0.468**	0.5000	0.002189	93.1	0.4633	0.98	10/17/2021
Barium		0.0010		**2.07**	2.000	0.05518	100.9	2.068	0.26	10/21/2021
Beryllium		0.0010		**0.0423**	0.0500	0	84.6	0.04231	0.00	10/17/2021
Boron		0.0250		**0.480**	0.5000	0.04072	87.9	0.4775	0.61	10/17/2021
Cadmium		0.0010		**0.0424**	0.0500	0	84.9	0.04288	1.04	10/17/2021
Chromium		0.0015		**0.171**	0.2000	0	85.4	0.1731	1.34	10/17/2021
Cobalt		0.0010		**0.431**	0.5000	0	86.1	0.4351	1.05	10/17/2021
Iron		0.0250		**1.79**	2.000	0	89.4	1.770	1.09	10/17/2021
Lead		0.0010		**0.480**	0.5000	0	96.0	0.4724	1.61	10/17/2021
Lithium	*	0.0030		**0.444**	0.5000	0	88.9	0.4428	0.37	10/17/2021
Manganese		0.0020		**0.490**	0.5000	0.0009201	97.8	0.4812	1.83	10/21/2021
Molybdenum		0.0015		**0.438**	0.5000	0.0007886	87.4	0.4361	0.43	10/17/2021
Selenium		0.0010		**0.451**	0.5000	0	90.2	0.4479	0.67	10/17/2021

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling

Work Order: 21100448
Report Date: 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183857 **SampType:** MBLK Units **mg/L**
SampID: MBLK-183857

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/19/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/18/2021
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	10/18/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/18/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/18/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/18/2021
Chromium		0.0015		**< 0.0015**	0.0010	0	0	-100	100	10/18/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/18/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/18/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/18/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/18/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/18/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/18/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/18/2021

Batch 183857 **SampType:** LCS Units **mg/L**
SampID: LCS-183857

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.458**	0.5000	0	91.6	80	120	10/19/2021
Arsenic		0.0010		**0.465**	0.5000	0	93.0	80	120	10/18/2021
Barium		0.0010		**1.92**	2.000	0	96.0	80	120	10/18/2021
Beryllium		0.0010		**0.0432**	0.0500	0	86.4	80	120	10/18/2021
Boron		0.0250		**0.444**	0.5000	0	88.7	80	120	10/18/2021
Cadmium		0.0010		**0.0436**	0.0500	0	87.2	80	120	10/18/2021
Chromium		0.0015		**0.179**	0.2000	0	89.5	80	120	10/18/2021
Cobalt		0.0010		**0.462**	0.5000	0	92.4	80	120	10/18/2021
Iron		0.0250		**1.69**	2.000	0	84.4	80	120	10/18/2021
Lead		0.0010		**0.464**	0.5000	0	92.8	80	120	10/18/2021
Lithium	*	0.0030		**0.446**	0.5000	0	89.2	80	120	10/18/2021
Manganese		0.0020		**0.464**	0.5000	0	92.9	80	120	10/18/2021
Molybdenum		0.0015		**0.448**	0.5000	0	89.6	80	120	10/18/2021
Selenium		0.0010		**0.434**	0.5000	0	86.7	80	120	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183857 **SampType:** MS Units **mg/L**

SampID: 21100448-024EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.456**	0.5000	0	91.3	75	125	10/19/2021
Arsenic		0.0010		**0.457**	0.5000	0.002070	90.9	75	125	10/18/2021
Barium		0.0010		**1.89**	2.000	0.05298	91.9	75	125	10/18/2021
Beryllium		0.0010		**0.0441**	0.0500	0	88.1	75	125	10/18/2021
Boron		0.0250		**0.487**	0.5000	0.04455	88.5	75	125	10/18/2021
Cadmium		0.0010		**0.0423**	0.0500	0	84.6	75	125	10/18/2021
Chromium		0.0015		**0.173**	0.2000	0	86.7	75	125	10/18/2021
Cobalt		0.0010		**0.440**	0.5000	0	88.1	75	125	10/18/2021
Iron		0.0250		**1.71**	2.000	0	85.6	75	125	10/18/2021
Lead		0.0010		**0.457**	0.5000	0	91.3	75	125	10/18/2021
Lithium	*	0.0030		**0.460**	0.5000	0	92.0	75	125	10/18/2021
Manganese		0.0020		**0.454**	0.5000	0.003153	90.1	75	125	10/18/2021
Molybdenum		0.0015		**0.445**	0.5000	0.0009474	88.8	75	125	10/18/2021
Selenium		0.0010		**0.428**	0.5000	0	85.6	75	125	10/18/2021

Batch 183857 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-024EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.465**	0.5000	0	93.0	0.4564	1.85	10/19/2021
Arsenic		0.0010		**0.463**	0.5000	0.002070	92.1	0.4567	1.27	10/18/2021
Barium		0.0010		**1.92**	2.000	0.05298	93.5	1.890	1.77	10/18/2021
Beryllium		0.0010		**0.0452**	0.0500	0	90.5	0.04406	2.61	10/18/2021
Boron		0.0250		**0.486**	0.5000	0.04455	88.2	0.4871	0.30	10/18/2021
Cadmium		0.0010		**0.0426**	0.0500	0	85.2	0.04232	0.66	10/18/2021
Chromium		0.0015		**0.178**	0.2000	0	89.2	0.1734	2.89	10/18/2021
Cobalt		0.0010		**0.445**	0.5000	0	89.0	0.4403	1.09	10/18/2021
Iron		0.0250		**1.80**	2.000	0	90.0	1.713	4.94	10/18/2021
Lead		0.0010		**0.470**	0.5000	0	93.9	0.4567	2.78	10/18/2021
Lithium	*	0.0030		**0.468**	0.5000	0	93.5	0.4601	1.62	10/18/2021
Manganese		0.0020		**0.463**	0.5000	0.003153	92.0	0.4536	2.09	10/18/2021
Molybdenum		0.0015		**0.455**	0.5000	0.0009474	90.8	0.4451	2.16	10/18/2021
Selenium		0.0010		**0.427**	0.5000	0	85.4	0.4279	0.26	10/18/2021

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183833 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183833

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/21/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/17/2021
Barium		0.0010	S	**0.0011**	0.0007	0	160.8	-100	100	10/21/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/17/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/17/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/17/2021
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	10/17/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/17/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/17/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/17/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/17/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/21/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/17/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/17/2021

Batch 183833 **SampType:** LCS Units **mg/L**

SampID: LCS-183833

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.528**	0.5000	0	105.6	80	120	10/21/2021
Arsenic		0.0010		**0.512**	0.5000	0	102.5	80	120	10/17/2021
Barium		0.0010	B	**2.20**	2.000	0	110.2	80	120	10/21/2021
Beryllium		0.0010		**0.0475**	0.0500	0	95.0	80	120	10/17/2021
Boron		0.0250		**0.492**	0.5000	0	98.3	80	120	10/17/2021
Cadmium		0.0010		**0.0488**	0.0500	0	97.7	80	120	10/17/2021
Chromium		0.0015		**0.190**	0.2000	0	95.1	80	120	10/17/2021
Cobalt		0.0010		**0.487**	0.5000	0	97.4	80	120	10/17/2021
Iron		0.0250		**2.01**	2.000	0	100.6	80	120	10/17/2021
Lead		0.0010		**0.526**	0.5000	0	105.1	80	120	10/17/2021
Lithium	*	0.0030		**0.501**	0.5000	0	100.1	80	120	10/17/2021
Manganese		0.0020		**0.529**	0.5000	0	105.8	80	120	10/21/2021
Molybdenum		0.0015		**0.489**	0.5000	0	97.9	80	120	10/17/2021
Selenium		0.0010		**0.500**	0.5000	0	100.0	80	120	10/17/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183833 **SampType:** MS Units **mg/L**

SampID: 21100448-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.529**	0.5000	0.0005575	105.6	75	125	10/21/2021
Arsenic		0.0010		**0.531**	0.5000	0.002486	105.7	75	125	10/17/2021
Barium		0.0010	B	**2.26**	2.000	0.07227	109.5	75	125	10/21/2021
Beryllium		0.0010		**0.0515**	0.0500	0	103.0	75	125	10/17/2021
Boron		0.0250		**0.563**	0.5000	0.04466	103.7	75	125	10/17/2021
Cadmium		0.0010		**0.0504**	0.0500	0	100.8	75	125	10/17/2021
Chromium		0.0015		**0.199**	0.2000	0	99.4	75	125	10/17/2021
Cobalt		0.0010		**0.510**	0.5000	0.0002067	102.1	75	125	10/17/2021
Iron		0.0250		**2.52**	2.000	0.5251	99.9	75	125	10/17/2021
Lead		0.0010		**0.538**	0.5000	0	107.6	75	125	10/17/2021
Lithium	*	0.0030		**0.529**	0.5000	0	105.8	75	125	10/17/2021
Manganese		0.0020		**0.640**	0.5000	0.1138	105.2	75	125	10/21/2021
Molybdenum		0.0015		**0.514**	0.5000	0.0008084	102.7	75	125	10/17/2021
Selenium		0.0010		**0.491**	0.5000	0	98.2	75	125	10/17/2021

Batch 183833 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.532**	0.5000	0.0005575	106.2	0.5286	0.58	10/21/2021
Arsenic		0.0010		**0.525**	0.5000	0.002486	104.4	0.5311	1.23	10/17/2021
Barium		0.0010	B	**2.28**	2.000	0.07227	110.5	2.263	0.87	10/21/2021
Beryllium		0.0010		**0.0491**	0.0500	0	98.1	0.05149	4.81	10/17/2021
Boron		0.0250		**0.557**	0.5000	0.04466	102.5	0.5629	1.05	10/17/2021
Cadmium		0.0010		**0.0482**	0.0500	0	96.4	0.05040	4.41	10/17/2021
Chromium		0.0015		**0.194**	0.2000	0	97.1	0.1987	2.33	10/17/2021
Cobalt		0.0010		**0.484**	0.5000	0.0002067	96.8	0.5105	5.28	10/17/2021
Iron		0.0250		**2.75**	2.000	0.5251	111.2	2.524	8.52	10/17/2021
Lead		0.0010		**0.527**	0.5000	0	105.5	0.5378	1.96	10/17/2021
Lithium	*	0.0030		**0.516**	0.5000	0	103.1	0.5292	2.60	10/17/2021
Manganese		0.0020		**0.646**	0.5000	0.1138	106.5	0.6397	1.06	10/21/2021
Molybdenum		0.0015		**0.500**	0.5000	0.0008084	99.8	0.5143	2.81	10/17/2021
Selenium		0.0010		**0.505**	0.5000	0	101.1	0.4912	2.85	10/17/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183833 **SampType:** MS Units **mg/L**

SampID: 21100448-016DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.553**	0.5000	0	110.6	75	125	10/21/2021
Arsenic		0.0010		**0.523**	0.5000	0.002620	104.0	75	125	10/17/2021
Barium		0.0010	B	**2.30**	2.000	0.07412	111.2	75	125	10/21/2021
Beryllium		0.0010		**0.0520**	0.0500	0	104.1	75	125	10/17/2021
Boron		0.0250		**0.575**	0.5000	0.05171	104.6	75	125	10/17/2021
Cadmium		0.0010		**0.0509**	0.0500	0	101.8	75	125	10/17/2021
Chromium		0.0015		**0.200**	0.2000	0	100.2	75	125	10/17/2021
Cobalt		0.0010		**0.506**	0.5000	0.0001928	101.2	75	125	10/17/2021
Iron		0.0250		**2.47**	2.000	0.3782	104.8	75	125	10/17/2021
Lead		0.0010		**0.536**	0.5000	0	107.1	75	125	10/17/2021
Lithium	*	0.0030		**0.543**	0.5000	0	108.5	75	125	10/17/2021
Manganese		0.0020		**0.637**	0.5000	0.09921	107.7	75	125	10/21/2021
Molybdenum		0.0015		**0.532**	0.5000	0.001080	106.3	75	125	10/17/2021
Selenium		0.0010		**0.485**	0.5000	0	97.0	75	125	10/17/2021

Batch 183833 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100448-016DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.541**	0.5000	0	108.2	0.5529	2.20	10/21/2021
Arsenic		0.0010		**0.521**	0.5000	0.002620	103.7	0.5225	0.24	10/18/2021
Barium		0.0010	B	**2.29**	2.000	0.07412	110.7	2.297	0.43	10/21/2021
Beryllium		0.0010		**0.0524**	0.0500	0	104.9	0.05205	0.73	10/18/2021
Boron		0.0250		**0.589**	0.5000	0.05171	107.4	0.5745	2.45	10/18/2021
Cadmium		0.0010		**0.0491**	0.0500	0	98.2	0.05089	3.56	10/18/2021
Chromium		0.0015		**0.202**	0.2000	0	100.8	0.2005	0.60	10/18/2021
Cobalt		0.0010		**0.504**	0.5000	0.0001928	100.7	0.5062	0.50	10/18/2021
Iron		0.0250		**2.42**	2.000	0.3782	102.0	2.475	2.35	10/18/2021
Lead		0.0010		**0.547**	0.5000	0	109.3	0.5357	2.04	10/18/2021
Lithium	*	0.0030		**0.545**	0.5000	0	109.0	0.5425	0.45	10/18/2021
Manganese		0.0020		**0.628**	0.5000	0.09921	105.8	0.6375	1.47	10/21/2021
Molybdenum		0.0015		**0.510**	0.5000	0.001080	101.9	0.5325	4.23	10/18/2021
Selenium		0.0010		**0.482**	0.5000	0	96.4	0.4852	0.62	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183842 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183842

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/19/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/18/2021
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	10/18/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/18/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/18/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/18/2021
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	10/18/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/18/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/18/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/18/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/18/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/18/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/18/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/18/2021

Batch 183842 **SampType:** LCS Units **mg/L**

SampID: LCS-183842

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.512**	0.5000	0	102.5	80	120	10/19/2021
Arsenic		0.0010		**0.501**	0.5000	0	100.2	80	120	10/18/2021
Barium		0.0010		**2.12**	2.000	0	106.0	80	120	10/18/2021
Beryllium		0.0010		**0.0476**	0.0500	0	95.1	80	120	10/18/2021
Boron		0.0250		**0.504**	0.5000	0	100.8	80	120	10/18/2021
Cadmium		0.0010		**0.0468**	0.0500	0	93.6	80	120	10/18/2021
Chromium		0.0015		**0.185**	0.2000	0	92.7	80	120	10/18/2021
Cobalt		0.0010		**0.475**	0.5000	0	94.9	80	120	10/18/2021
Iron		0.0250		**1.88**	2.000	0	94.0	80	120	10/18/2021
Lead		0.0010		**0.504**	0.5000	0	100.7	80	120	10/18/2021
Lithium	*	0.0030		**0.515**	0.5000	0	103.1	80	120	10/18/2021
Manganese		0.0020		**0.514**	0.5000	0	102.9	80	120	10/18/2021
Molybdenum		0.0015		**0.470**	0.5000	0	93.9	80	120	10/18/2021
Selenium		0.0010		**0.506**	0.5000	0	101.2	80	120	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 7470A (DISSOLVED)

Batch 183868 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183868

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	10/13/2021

Batch 183868 **SampType:** LCS Units **mg/L**

SampID: LCS-183868

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00520**	0.0050	0	104.0	85	115	10/13/2021

Batch 183868 **SampType:** MS Units **mg/L**

SampID: 21100448-005EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00526**	0.0050	0	105.2	75	125	10/13/2021

Batch 183868 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-005EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00520**	0.0050	0	104.0	0.005258	1.10	10/13/2021

Batch 183868 **SampType:** MS Units **mg/L**

SampID: 21100448-015EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00526**	0.0050	0	105.2	75	125	10/13/2021

Batch 183868 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-015EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00517**	0.0050	0	103.4	0.005262	1.79	10/13/2021

Batch 183871 **SampType:** MS Units **mg/L**

SampID: 21100448-024EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00526**	0.0050	0	105.3	75	125	10/13/2021

Batch 183871 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-024EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00517**	0.0050	0	103.4	0.005263	1.81	10/13/2021

SW-846 7470A (TOTAL)

Batch 183866 **SampType:** MBLK Units **mg/L**
SampID: MBLK-183866

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	10/13/2021

Batch 183866 **SampType:** LCS Units **mg/L**
SampID: LCS-183866

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00522**	0.0050	0	104.4	85	115	10/13/2021

Batch 183866 **SampType:** MS Units **mg/L**
SampID: 21100448-003DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00536**	0.0050	0	107.2	75	125	10/13/2021

Batch 183866 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-003DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00524**	0.0050	0	104.8	0.005361	2.33	10/13/2021

Batch 183866 **SampType:** MS Units **mg/L**
SampID: 21100448-014DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00521**	0.0050	0	104.2	75	125	10/13/2021

Batch 183866 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100448-014DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00533**	0.0050	0	106.5	0.005209	2.21	10/13/2021

Batch 183871 **SampType:** MBLK Units **mg/L**
SampID: MBLK-183871

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	10/13/2021

Batch 183871 **SampType:** LCS Units **mg/L**
SampID: LCS-183871

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00530**	0.0050	0	105.9	85	115	10/13/2021

Client: Golder Associates, Inc **Work Order:** 21100448

Client Project: Kincaid SW Sampling **Report Date:** 12-Nov-21

SW-846 7470A (TOTAL)

Batch 183871 **SampType:** MS Units **mg/L**

SampID: 21100448-024DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00518**	0.0050	0	103.6	75	125	10/13/2021

Batch 183871 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100448-024DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00516**	0.0050	0	103.3	0.005178	0.27	10/13/2021

Teklab Inc. Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW Sampling

Work Order: 21100448
Report Date: 12-Nov-21

Carrier: Paul Reeves

Received By: PWR

Completed by: Ellie Hopkins
On: 07-Oct-21
Ellie Hopkins

Reviewed by: Marvin L. Darling II
On: 07-Oct-21
Marvin L. Darling

Pages to follow: Chain of custody 3 | Extra pages included 67

Question						
Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 2.8		
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐		
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐				

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Question			
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

pH strip #77492 / 75846 - PR/ERH 10/7/21

CHAIN OF CUSTODY

pg. 1 of 3 Work order # 21100448

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	Golder Associates, Inc
Address:	13515 Barrett Parkway Drive, Suite 260
City / State / Zip	Ballwin, MO 63021
Contact:	Jeffrey Ingram
Phone:	(314) 984-8800
E-Mail:	Jeffrey_Ingram@golder.com
Fax:	

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 2.8 °C LTG# 5

Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**

Lab Notes 77492 / 75840
EH/PR 10/7/21

Client Comments:
Total Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo P K Se Na Tl

Dissolved Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo K Se Na Tl

Field: pH, DO, ORP, Conductivity, Temp. and Turbidity

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No

Are these samples known to be hazardous? ☐ Yes ☐ No

Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number: Kincaid SW

Sample Collector's Name: Eric Schneider

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions: 21452831

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Bicarbonate	Carbonate	Chloride	Dissolved Metals	Ferric Iron	Ferrous Iron	Fluoride	Nitrate	SUB Ra226/228	Sulfate	Sulfide	TDS	TOC	Total Metals
21100448-001	K-F-2D	1748/10/6/21	2	4		1	2		1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-002	K-F-2M	1732/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-003	K-F-1	1712/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-004	K-A-3D	1620/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-005	K-A-3M	1605/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-006	K-A-2D	1533/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-007	K-A-2M	1520/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-008	K-A-1	1500/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-009	K-B-3D	1438/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-010	K-B-3M	1425/10/6/21	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

Courier

Relinquished By	Date/Time	Received By	Date/Time
[signature]	10/7/2021 0650	[signature]	10-7-21 1019
[signature]	10-7-21 1235	[signature]	10/7/21 1235

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 67929

CHAIN OF CUSTODY

pg. 2 of 3 Work order # 21100448

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client:	Golder Associates, Inc
Address:	13515 Barrett Parkway Drive, Suite 260
City / State / Zip	Ballwin, MO 63021
Contact:	Jeffrey Ingram
Phone:	(314) 984-8800
E-Mail:	Jeffrey_Ingram@golder.com
Fax:	

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ____ °C LTG# ____

Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**

Lab Notes

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No

Are these samples known to be hazardous? ☐ Yes ☐ No

Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments:

Total Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo P K Se Na Tl

Dissolved Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo K Se Na Tl

Field: pH, DO, ORP, Conductivity, Temp. and Turbidity

Project Name/Number	Sample Collector's Name
Kincaid SW	Eric Schneider

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)

Billing Instructions: 21454831

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Bicarbonate	Carbonate	Chloride	Dissolved Metals	Ferric Iron	Ferrous Iron	Fluoride	Nitrate	SUB Ra226/228	Sulfate	Sulfide	TDS	TOC	Total Metals
21100448-011	K-B-2D	1358 10/6/21	2	4		1	2		1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-012	K-B-2M	1343	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-013	K-B-1	1232	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-014	K-C-3D	1200	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-015	K-C-3M	1135	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-016	K-C-2D	1108	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-017	K-C-2M	1053	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-018	K-C-1	1027	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-019	K-D-2D	1006	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|
-020	K-D-2M	0953	|	|		|	|		|							|	|	|	|	|	|	|	|	|	|	|	|	|	|	|

Relinquished By	Date/Time	Received By	Date/Time
[signature] / Golder	10/7/21 0650	[signature]	10.7.21 1019
[signature]	10.7.21 1235	[signature]	10/7/21 1235

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 67929

CHAIN OF CUSTODY

pg. 3 of 3 Work order # 2110448

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Golder Associates, Inc
Address: 13515 Barrett Parkway Drive, Suite 260
City / State / Zip Ballwin, MO 63021
Contact: Jeffrey Ingram **Phone:** (314) 984-8800
E-Mail: Jeffrey_Ingram@golder.com **Fax:**

Samples on: ☐ ICE ☐ BLUE ICE ☐ NO ICE ____ °C LTG# ____
Preserved in: ☐ LAB ☐ FIELD **FOR LAB USE ONLY**
Lab Notes

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments:
Total Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo P K Se Na Tl
Dissolved Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo K Se Na Tl
Field: pH, DO, ORP, Conductivity, Temp. and Turbidity

Project Name/Number: Kincaid SW
Sample Collector's Name: Eric Schmidt

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)
Billing Instructions: 21454831

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Bicarbonate	Carbonate	Chloride	Dissolved Metals	Ferric Iron	Ferrous Iron	Fluoride	Nitrate	SUB Ra226/228	Sulfate	Sulfide	TDS	TOC	Total Metals
2110448-021	K-D-1	0933 10/6/21	2	4		1	2		1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
-022	K-E-2D	0858 "	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-023	K-E-2M	0845 "	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-024	K-E-1	0820 "	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-025	K-DUP-1	— "	2	4		1	2		1							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
-026	K-FB-1	1505 "	"	"		"	"		"							"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

Relinquished By	Date/Time	Received By	Date/Time
[signature]	10/7/2021 0650	[signature]	10-7-21 1019
[signature]	10-7-21 1235	[signature]	10/7/21 1235

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 67929

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 11/07/2021

Report # 221102380

Project 21100448

Samples Collected 10/6/21

Deliver To	***Additional Recipients***
Elizabeth Hurley Teklab, Inc 5445 Horseshoe Lake Road Collinsville, IL 62234 618-344-1004	NONE

PJLA Testing DoD ELAP

ISO 17025

NELAP ACCREDITED TNI LABORATORY

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

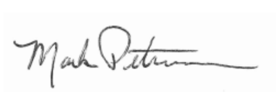
J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics **-** The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.



Authorized Signature
Pace Gulf Coast Report 221102380

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: Teklab Inc **Report:** 221102380

Pace Analytical Gulf Coast received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

No anomalies were found for the analyzed sample(s).

Sample Summary

Lab ID	Client ID	Matrix	Collect Date	Receive Date
22110238001	21100448-001	Water	10/06/21 17:48	10/20/21 10:05
22110238002	21100448-002	Water	10/06/21 17:32	10/20/21 10:05
22110238003	21100448-003	Water	10/06/21 17:12	10/20/21 10:05
22110238004	21100448-004	Water	10/06/21 16:20	10/20/21 10:05
22110238005	21100448-005	Water	10/06/21 16:05	10/20/21 10:05
22110238006	21100448-006	Water	10/06/21 15:33	10/20/21 10:05
22110238007	21100448-007	Water	10/06/21 15:20	10/20/21 10:05
22110238008	21100448-008	Water	10/06/21 15:00	10/20/21 10:05
22110238009	21100448-009	Water	10/06/21 14:38	10/20/21 10:05
22110238010	21100448-010	Water	10/06/21 14:25	10/20/21 10:05
22110238011	21100448-011	Water	10/06/21 13:58	10/20/21 10:05
22110238012	21100448-012	Water	10/06/21 13:43	10/20/21 10:05
22110238013	21100448-013	Water	10/06/21 12:32	10/20/21 10:05
22110238014	21100448-014	Water	10/06/21 12:00	10/20/21 10:05
22110238015	21100448-015	Water	10/06/21 11:35	10/20/21 10:05
22110238016	21100448-016	Water	10/06/21 11:08	10/20/21 10:05
22110238017	21100448-017	Water	10/06/21 10:53	10/20/21 10:05
22110238018	21100448-018	Water	10/06/21 10:27	10/20/21 10:05
22110238019	21100448-019	Water	10/06/21 10:06	10/20/21 10:05
22110238020	21100448-020	Water	10/06/21 09:53	10/20/21 10:05
22110238021	21100448-021	Water	10/06/21 09:33	10/20/21 10:05
22110238022	21100448-022	Water	10/06/21 08:58	10/20/21 10:05
22110238023	21100448-023	Water	10/06/21 08:45	10/20/21 10:05
22110238024	21100448-024	Water	10/06/21 08:20	10/20/21 10:05
22110238025	21100448-025	Water	10/06/21 00:01	10/20/21 10:05
22110238026	21100448-026	Water	10/06/21 15:05	10/20/21 10:05

Detect Summary

No analytes were detected for analyses performed by Pace Gulf Coast.

Sample Results

21100448-001	Collect Date	10/06/2021 17:48	Lab ID	22110238001
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 14:44	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:18	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-002	Collect Date	10/06/2021 17:32	Lab ID	22110238002
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 14:47	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:21	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-003	Collect Date	10/06/2021 17:12	Lab ID	22110238003
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 14:51	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:25	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-004	Collect Date	10/06/2021 16:20	Lab ID	22110238004
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 14:54	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:28	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-005	Collect Date	10/06/2021 16:05	Lab ID	22110238005
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 14:58	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:32	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-006	Collect Date	10/06/2021 15:33	Lab ID	22110238006
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:01	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:35	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-007	**Collect Date**	10/06/2021 15:20	**Lab ID**	22110238007
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:05	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:39	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-008	**Collect Date**	10/06/2021 15:00	**Lab ID**	22110238008
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:08	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:42	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-009	**Collect Date**	10/06/2021 14:38	**Lab ID**	22110238009
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:12	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:46	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-010	**Collect Date**	10/06/2021 14:25	**Lab ID**	22110238010
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:15	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 16:49	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-011	**Collect Date**	10/06/2021 13:58	**Lab ID**	22110238011
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:26	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:00	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-012	**Collect Date**	10/06/2021 13:43	**Lab ID**	22110238012
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:29	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:03	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-013	Collect Date	10/06/2021 12:32	Lab ID	22110238013
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:33	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:07	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-014	Collect Date	10/06/2021 12:00	Lab ID	22110238014
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:36	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:10	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-015	Collect Date	10/06/2021 11:35	Lab ID	22110238015
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:40	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:14	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-016	Collect Date	10/06/2021 11:08	Lab ID	22110238016
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:43	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:57	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-017	Collect Date	10/06/2021 10:53	Lab ID	22110238017
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:47	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:17	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-018	Collect Date	10/06/2021 10:27	Lab ID	22110238018
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:50	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:21	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-019	Collect Date	10/06/2021 10:06	Lab ID	22110238019
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:54	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:24	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-020	Collect Date	10/06/2021 09:53	Lab ID	22110238020
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 10:30	724635	EPA 3010A	1	11/06/21 15:57	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:28	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-021	**Collect Date**	10/06/2021 09:33	**Lab ID**	22110238021
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:19	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 11:15	724644	EPA 3005A Dissolved	1	11/06/21 17:31	725973	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-022	**Collect Date**	10/06/2021 08:58	**Lab ID**	22110238022
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:22	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:19	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-023	Collect Date	10/06/2021 08:45	Lab ID	22110238023
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:26	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:22	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-024	Collect Date	10/06/2021 08:20	Lab ID	22110238024
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:29	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:26	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100448-025	**Collect Date**	10/06/2021 00:01	**Lab ID**	22110238025
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:33	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:29	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100448-026	**Collect Date**	10/06/2021 15:05	**Lab ID**	22110238026
	Receive Date	10/20/2021 10:05	**Matrix**	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724636	EPA 3010A	1	11/05/21 16:36	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 06:30	724645	EPA 3005A Dissolved	1	11/05/21 17:33	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Inorganics QC Summary

Analytical Batch	Client ID	MB724635		LCS724635				LCSD724635				
725973	Lab ID	2260412		2260414				2260413				
Prep Batch	Sample Type	MB		LCS				LCSD				
724635	Prep Date	11/04/21 10:30		11/04/21 10:30				11/04/21 10:30				
Prep Method	Analysis Date	11/06/21 14:33		11/06/21 14:40				11/06/21 14:37				
EPA 3010A	Matrix	Water		Water				Water				
EPA 6020B		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	47.9	96	80 - 120	50.0	50.8	102	6	20

Analytical Batch	Client ID	MB724636		LCS724636				LCSD724636				
725918	Lab ID	2260415		2260417				2260416				
Prep Batch	Sample Type	MB		LCS				LCSD				
724636	Prep Date	11/05/21 05:15		11/05/21 05:15				11/05/21 05:15				
Prep Method	Analysis Date	11/05/21 16:08		11/05/21 16:15				11/05/21 16:12				
EPA 3010A	Matrix	Water		Water				Water				
EPA 6020B		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	51.3	103	80 - 120	50.0	50.7	101	1	20

Analytical Batch	Client ID	MB724644		LCS724644				LCSD724644				
725973	Lab ID	2260435		2260437				2260436				
Prep Batch	Sample Type	MB		LCS				LCSD				
724644	Prep Date	11/04/21 11:15		11/04/21 11:15				11/04/21 11:15				
Prep Method	Analysis Date	11/06/21 16:07		11/06/21 16:14				11/06/21 16:11				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020B Dissolved		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	49.2	98	80 - 120	50.0	49.7	99	1	20

Analytical Batch	Client ID	MB724645		LCS724645				LCSD724645				
725918	Lab ID	2260438		2260440				2260439				
Prep Batch	Sample Type	MB		LCS				LCSD				
724645	Prep Date	11/05/21 06:30		11/05/21 06:30				11/05/21 06:30				
Prep Method	Analysis Date	11/05/21 17:08		11/05/21 17:15				11/05/21 17:12				
EPA 3005A Dissolved	Matrix	Water		Water				Water				
EPA 6020B Dissolved		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	49.9	100	80 - 120	50.0	49.9	100	0	20

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☐ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: Client QC Level: 3

Comments: **Please Issue reports and invoices via email only**
Please analyze for Tl by SW-846 3005A, 6020A, Metals by ICPMS on your standard turn around time. Dissolved bottles distinguished with "D" on labels
Batch QC is required for all analyses requested.

Project# 21100448

Contact: Elizabeth A. Hurley Email: ehurley@teklabinc.com
Requested Due Date: STD TAT Billing/PO: 31994 Phone: (618) 344-1004 ext 33

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Total Tl	Dissolved Tl										
	21100448-001	10/6/2021 5:48:00 PM	HNO3	Groundwater	✓	✓										1
	21100448-002	10/6/2021 5:32:00 PM	HNO3	Groundwater	✓	✓										2
	21100448-003	10/6/2021 5:12:00 PM	HNO3	Groundwater	✓	✓										3
	21100448-004	10/6/2021 4:20:00 PM	HNO3	Groundwater	✓	✓										4
	21100448-005	10/6/2021 4:05:00 PM	HNO3	Groundwater	✓	✓										5
	21100448-006	10/6/2021 3:33:00 PM	HNO3	Groundwater	✓	✓										6
	21100448-007	10/6/2021 3:20:00 PM	HNO3	Groundwater	✓	✓										7
	21100448-008	10/6/2021 3:00:00 PM	HNO3	Groundwater	✓	✓										8
	21100448-009	10/6/2021 2:38:00 PM	HNO3	Groundwater	✓	✓										9
	21100448-010	10/6/2021 2:25:00 PM	HNO3	Groundwater	✓	✓										10
	21100448-011	10/6/2021 1:58:00 PM	HNO3	Groundwater	✓	✓										11

20.9E34

*Relinquished By	Date/Time	Received By	Date/Time
Mary Kemp	10/19/21 1800		
FedEx	10/20/21 1005	[signature]	10/20/21 1005

5300 5201 6584
6610 6529

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper autho... Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TN...

Client ID: 5233 - Teklab Inc
SDG: 221102380
PM: RWe

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☐ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: Client QC Level: 3

Comments: **Please Issue reports and invoices via email only**
Please analyze for Tl by SW-846 3005A, 6020A, Metals by ICPMS on your standard turn around time. Dissolved bottles distinguished with "D" on labels
Batch QC is required for all analyses requested.

Project# 21100448

Contact: Elizabeth A. Hurley Email: ehurley@teklabinc.com
Requested Due Date: STD TAT Billing/PO: 31994 Phone: (618) 344-1004 ext 33

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Total Tl	Dissolved Tl										
	21100448-012	10/6/2021 1:43:00 PM	HNO3	Groundwater	✓	✓										12
	21100448-013	10/6/2021 12:32:00 PM	HNO3	Groundwater	✓	✓										13
	21100448-014	10/6/2021 12:00:00 PM	HNO3	Groundwater	✓	✓										14
	21100448-015	10/6/2021 11:35:00 AM	HNO3	Groundwater	✓	✓										15
	21100448-016	10/6/2021 11:08:00 AM	HNO3	Groundwater	✓	✓										16
	21100448-017	10/6/2021 10:53:00 AM	HNO3	Groundwater	✓	✓										17
	21100448-018	10/6/2021 10:27:00 AM	HNO3	Groundwater	✓	✓										18
	21100448-019	10/6/2021 10:06:00 AM	HNO3	Groundwater	✓	✓										19
	21100448-020	10/6/2021 9:53:00 AM	HNO3	Groundwater	✓	✓										20
	21100448-021	10/6/2021 9:33:00 AM	HNO3	Groundwater	✓	✓										21
	21100448-022	10/6/2021 8:58:00 AM	HNO3	Groundwater	✓	✓										22

*Relinquished By	Date/Time	Received By	Date/Time
Mary Kemp	10/19/21 1800		
FedEx	10/14/21 1005	[signature]	10/14/21 1005

Client ID: 5233 - Teklab Inc
SDG: 221102380
PM: RWe

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☐ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: Client QC Level: 3

Comments: **Please Issue reports and invoices via email only**
Please analyze for Tl by SW-846 3005A, 6020A, Metals by ICPMS on your standard turn around time. Dissolved bottles distinguished with "D" on labels
Batch QC is required for all analyses requested.

Project# 21100448

Contact: Elizabeth A. Hurley
Email: ehurley@teklabinc.com
Requested Due Date: STD TAT
Billing/PO: 31994
Phone: (618) 344-1004 ext 33

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Total Tl	Dissolved Tl										
	21100448-023	10/6/2021 8:45:00 AM	HNO3	Groundwater	✓	✓										23
	21100448-024	10/6/2021 8:20:00 AM	HNO3	Groundwater	✓	✓										24
	21100448-025	10/6/2021	HNO3	Groundwater	✓	✓										25
	21100448-026	10/6/2021 3:05:00 PM	HNO3	Groundwater	✓	✓										26
			HNO3	Groundwater												
			HNO3	Groundwater												
			HNO3	Groundwater												
			HNO3	Groundwater												
			HNO3	Groundwater												
			HNO3	Groundwater												
			HNO3	Groundwater												

*Relinquished By	Date/Time	Received By	Date/Time
Mary Kemp	10/18/21 1800		
FedEx	10/20/21 1005	[signature]	10/20/21 1005

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper author[...]
Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TNI[...]

Client ID: 5233 - Teklab Inc
SDG: 221102380
PM: RWe

Pace Analytical®

SAMPLE RECEIVING CHECKLIST

221102380

SAMPLE DELIVERY GROUP 221102380

Client 5233 - Teklab Inc **PM** RWe	**Transport Method** FEDEX
Profile Number 290458	**Received By** Roberts, George S. McCune, Dodie N.
Line Item(s) 14 - TI 6020	**Receive Date(s)** 10/20/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E34	Temp °C
530052016610		20.9
530052016584		
530052016529		

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

October 30, 2021

Ms. Elizabeth Hurley
Teklab Inc.
5445 Horseshoe Lake Road
Collinsville, IL 62234

RE: Project: 21100448
Pace Project No.: 30445660

Dear Ms. Hurley:

Enclosed are the analytical results for sample(s) received by the laboratory on October 11, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

David A. Pichette
david.pichette@pacelabs.com
(724)850-5617
Project Manager

Enclosures

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: 21100448
Pace Project No.: 30445660

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 21100448
Pace Project No.: 30445660

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30445660001	**21100448-001**	Water	10/06/21 17:48	10/11/21 09:00
30445660002	**21100448-002**	Water	10/06/21 17:32	10/11/21 09:00
30445660003	**21100448-003**	Water	10/06/21 17:12	10/11/21 09:00
30445660004	**21100448-004**	Water	10/06/21 16:20	10/11/21 09:00
30445660005	**21100448-005**	Water	10/06/21 16:05	10/11/21 09:00
30445660006	**21100448-006**	Water	10/06/21 15:33	10/11/21 09:00
30445660007	**21100448-007**	Water	10/06/21 15:20	10/11/21 09:00
30445660008	**21100448-008**	Water	10/06/21 15:00	10/11/21 09:00
30445660009	**21100448-009**	Water	10/06/21 14:38	10/11/21 09:00
30445660010	**21100448-010**	Water	10/06/21 14:25	10/11/21 09:00
30445660011	**21100448-011**	Water	10/06/21 13:58	10/11/21 09:00
30445660012	**21100448-012**	Water	10/06/21 13:43	10/11/21 09:00
30445660013	**21100448-013**	Water	10/06/21 12:32	10/11/21 09:00
30445660014	**21100448-014**	Water	10/06/21 12:00	10/11/21 09:00
30445660015	**21100448-015**	Water	10/06/21 11:35	10/11/21 09:00
30445660016	**21100448-016**	Water	10/06/21 11:08	10/11/21 09:00
30445660017	**21100448-017**	Water	10/06/21 10:53	10/11/21 09:00
30445660018	**21100448-018**	Water	10/06/21 10:27	10/11/21 09:00
30445660019	**21100448-019**	Water	10/06/21 10:06	10/11/21 09:00
30445660020	**21100448-020**	Water	10/06/21 09:53	10/11/21 09:00
30445660021	**21100448-021**	Water	10/06/21 09:33	10/11/21 09:00
30445660022	**21100448-022**	Water	10/06/21 08:58	10/11/21 09:00
30445660023	**21100448-023**	Water	10/06/21 08:45	10/11/21 09:00
30445660024	**21100448-024**	Water	10/06/21 08:20	10/11/21 09:00
30445660025	**21100448-025**	Water	10/06/21 00:00	10/11/21 09:00
30445660026	**21100448-026**	Water	10/06/21 15:05	10/11/21 09:00

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 21100448
Pace Project No.: 30445660

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30445660001	**21100448-001**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660002	**21100448-002**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660003	**21100448-003**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660004	**21100448-004**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660005	**21100448-005**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660006	**21100448-006**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660007	**21100448-007**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660008	**21100448-008**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660009	**21100448-009**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660010	**21100448-010**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660011	**21100448-011**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660012	**21100448-012**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660013	**21100448-013**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660014	**21100448-014**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660015	**21100448-015**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660016	**21100448-016**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660017	**21100448-017**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660018	**21100448-018**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660019	**21100448-019**	EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 21100448
Pace Project No.: 30445660

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 904.0	VAL	1	PASI-PA
30445660020	**21100448-020**	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30445660021	**21100448-021**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30445660022	**21100448-022**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30445660023	**21100448-023**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30445660024	**21100448-024**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30445660025	**21100448-025**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30445660026	**21100448-026**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 21100448
Pace Project No.: 30445660

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Teklab Inc.
Date: October 30, 2021

General Information:
26 samples were analyzed for EPA 903.1 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 21100448
Pace Project No.: 30445660

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Teklab Inc.
Date: October 30, 2021

General Information:
26 samples were analyzed for EPA 904.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-001 **Lab ID: 30445660001** Collected: 10/06/21 17:48 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.149 ± 0.461 (0.892) C:NA T:79%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.396 ± 0.857 (1.89) C:72% T:68%**	pCi/L	10/26/21 15:02	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-002 **Lab ID: 30445660002** Collected: 10/06/21 17:32 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.339 (0.761) C:NA T:85%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.933 ± 1.01 (2.13) C:69% T:55%**	pCi/L	10/26/21 15:02	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-003 **Lab ID: 30445660003** Collected: 10/06/21 17:12 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.133 ± 0.369 (0.715) C:NA T:86%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.249 ± 0.769 (1.80) C:69% T:72%**	pCi/L	10/26/21 15:02	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-004 **Lab ID: 30445660004** Collected: 10/06/21 16:20 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.145 ± 0.567 (1.09) C:NA T:80%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.00719 ± 0.966 (2.22) C:69% T:56%**	pCi/L	10/26/21 15:02	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-005 **Lab ID: 30445660005** Collected: 10/06/21 16:05 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.219 ± 0.591 (1.10) C:NA T:87%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.693 ± 0.594 (1.20) C:70% T:62%**	pCi/L	10/26/21 14:55	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-006 **Lab ID: 30445660006** Collected: 10/06/21 15:33 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.161 ± 0.368 (0.867)** **C:NA T:71%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.13 ± 0.673 (1.26)** **C:72% T:57%**	pCi/L	10/26/21 14:55	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-007 **Lab ID: 30445660007** Collected: 10/06/21 15:20 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0694 ± 0.652 (1.26) C:NA T:87%**	pCi/L	10/28/21 13:47	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.168 ± 0.440 (0.980) C:76% T:77%**	pCi/L	10/26/21 14:55	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-008 **Lab ID: 30445660008** Collected: 10/06/21 15:00 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.209 ± 0.362 (0.913) C:NA T:93%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.839 ± 0.542 (1.04) C:78% T:68%**	pCi/L	10/26/21 14:55	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-009 **Lab ID: 30445660009** Collected: 10/06/21 14:38 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.403 ± 0.560 (0.934) C:NA T:61%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.196 ± 0.604 (1.36) C:73% T:51%**	pCi/L	10/26/21 14:55	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-010 **Lab ID: 30445660010** Collected: 10/06/21 14:25 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.231 ± 0.501 (1.15) C:NA T:87%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.495 ± 0.536 (1.13) C:75% T:69%**	pCi/L	10/26/21 14:56	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-011 | **Lab ID: 30445660011** | Collected: 10/06/21 13:58 | Received: 10/11/21 09:00 | Matrix: Water
PWS: | Site ID: | Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.174 ± 0.722 (1.38) C:NA T:75%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.730 ± 0.669 (1.68) C:69% T:48%**	pCi/L	10/26/21 14:56	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-012 **Lab ID: 30445660012** Collected: 10/06/21 13:43 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.397 ± 0.563 (0.954) C:NA T:82%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.918 ± 0.676 (1.33) C:71% T:52%**	pCi/L	10/26/21 14:56	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-013 **Lab ID: 30445660013** Collected: 10/06/21 12:32 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.147 ± 0.337 (0.543) C:NA T:82%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.0168 ± 0.598 (1.39) C:71% T:51%**	pCi/L	10/26/21 14:56	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-014 **Lab ID: 30445660014** Collected: 10/06/21 12:00 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.265 ± 0.450 (0.795) C:NA T:87%**	pCi/L	10/28/21 14:01	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.558 ± 1.14 (2.52) C:74% T:28%**	pCi/L	10/26/21 14:56	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-015 **Lab ID: 30445660015** Collected: 10/06/21 11:35 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0731 ± 0.333 (0.786) C:NA T:81%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.648 ± 0.556 (1.13) C:75% T:68%**	pCi/L	10/26/21 14:56	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-016 **Lab ID: 30445660016** Collected: 10/06/21 11:08 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.199 ± 0.344 (0.615) C:NA T:91%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.229 ± 0.634 (1.42) C:69% T:53%**	pCi/L	10/26/21 14:56	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-017 **Lab ID: 30445660017** Collected: 10/06/21 10:53 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.345 ± 0.317 (0.187) C:NA T:92%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.216 ± 0.404 (0.886) C:72% T:77%**	pCi/L	10/26/21 14:56	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-018 **Lab ID: 30445660018** Collected: 10/06/21 10:27 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0746 ± 0.341 (0.693) C:NA T:85%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.01 ± 0.627 (1.17) C:71% T:55%**	pCi/L	10/26/21 14:56	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-019 **Lab ID: 30445660019** Collected: 10/06/21 10:06 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.396 ± 0.468 (0.736) C:NA T:86%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.929 ± 0.871 (2.23) C:70% T:47%**	pCi/L	10/26/21 18:28	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-020 **Lab ID: 30445660020** Collected: 10/06/21 09:53 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.282 (0.455) C:NA T:91%**	pCi/L	10/28/21 14:21	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.246 ± 0.554 (1.23) C:74% T:73%**	pCi/L	10/26/21 18:28	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-021 **Lab ID: 30445660021** Collected: 10/06/21 09:33 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0580 ± 0.469 (0.967) C:NA T:95%**	pCi/L	10/28/21 15:44	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.609 ± 0.403 (0.768) C:79% T:72%**	pCi/L	10/26/21 13:31	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-022 | **Lab ID: 30445660022** | Collected: 10/06/21 08:58 | Received: 10/11/21 09:00 | Matrix: Water
PWS: | Site ID: | Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.288 ± 0.348 (0.945) C:NA T:91%**	pCi/L	10/28/21 15:44	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.0246 ± 0.355 (0.828) C:73% T:68%**	pCi/L	10/26/21 13:31	15262-20-1	

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-023 | **Lab ID: 30445660023** | Collected: 10/06/21 08:45 | Received: 10/11/21 09:00 | Matrix: Water
PWS: | Site ID: | Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.115 ± 0.264 (0.425) C:NA T:92%**	pCi/L	10/28/21 15:44	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.147 ± 0.329 (0.807) C:75% T:71%**	pCi/L	10/26/21 13:31	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-024 **Lab ID: 30445660024** Collected: 10/06/21 08:20 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.128 ± 0.307 (0.592) C:NA T:90%**	pCi/L	10/28/21 16:03	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.0423 ± 0.392 (0.923) C:73% T:70%**	pCi/L	10/26/21 13:31	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-025 | **Lab ID: 30445660025** | Collected: 10/06/21 00:00 | Received: 10/11/21 09:00 | Matrix: Water
PWS: | Site ID: | Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.191 ± 0.292 (0.765) C:NA T:93%**	pCi/L	10/28/21 16:03	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.492 ± 0.493 (1.02) C:67% T:68%**	pCi/L	10/26/21 13:31	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

Sample: 21100448-026 **Lab ID: 30445660026** Collected: 10/06/21 15:05 Received: 10/11/21 09:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0577 ± 0.263 (0.156) C:NA T:96%**	pCi/L	10/28/21 16:03	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.449 ± 0.339 (0.667) C:72% T:94%**	pCi/L	10/26/21 13:31	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

QC Batch:	468606	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
		Laboratory:	Pace Analytical Services - Greensburg

Associated Lab Samples: 30445660001, 30445660002, 30445660003, 30445660004, 30445660005, 30445660006, 30445660007, 30445660008, 30445660009, 30445660010, 30445660011, 30445660012, 30445660013, 30445660014, 30445660015, 30445660016, 30445660017, 30445660018, 30445660019, 30445660020

METHOD BLANK: 2262585 Matrix: Water

Associated Lab Samples: 30445660001, 30445660002, 30445660003, 30445660004, 30445660005, 30445660006, 30445660007, 30445660008, 30445660009, 30445660010, 30445660011, 30445660012, 30445660013, 30445660014, 30445660015, 30445660016, 30445660017, 30445660018, 30445660019, 30445660020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.144 ± 0.250 (0.630) C:NA T:95%	pCi/L	10/28/21 13:47	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

QC Batch: 468609 — Analysis Method: EPA 903.1
QC Batch Method: EPA 903.1 — Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30445660021, 30445660022, 30445660023, 30445660024, 30445660025, 30445660026

METHOD BLANK: 2262587 — Matrix: Water
Associated Lab Samples: 30445660021, 30445660022, 30445660023, 30445660024, 30445660025, 30445660026

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.0552 ± 0.325 (0.724) C:NA T:84%	pCi/L	10/28/21 15:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

QC Batch: 468610
QC Batch Method: EPA 904.0
Analysis Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30445660021, 30445660022, 30445660023, 30445660024, 30445660025, 30445660026

METHOD BLANK: 2262588 Matrix: Water
Associated Lab Samples: 30445660021, 30445660022, 30445660023, 30445660024, 30445660025, 30445660026

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.354 ± 0.302 (0.605) C:80% T:90%	pCi/L	10/26/21 13:30	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100448
Pace Project No.: 30445660

QC Batch: 468608
Analysis Method: EPA 904.0
QC Batch Method: EPA 904.0
Analysis Description: 904.0 Radium 228
Laboratory: Pace Analytical Services - Greensburg

Associated Lab Samples: 30445660001, 30445660002, 30445660003, 30445660004, 30445660005, 30445660006, 30445660007, 30445660008, 30445660009, 30445660010, 30445660011, 30445660012, 30445660013, 30445660014, 30445660015, 30445660016, 30445660017, 30445660018, 30445660019, 30445660020

METHOD BLANK: 2262586 Matrix: Water

Associated Lab Samples: 30445660001, 30445660002, 30445660003, 30445660004, 30445660005, 30445660006, 30445660007, 30445660008, 30445660009, 30445660010, 30445660011, 30445660012, 30445660013, 30445660014, 30445660015, 30445660016, 30445660017, 30445660018, 30445660019, 30445660020

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.609 ± 0.363 (0.665) C:72% T:85%	pCi/L	10/26/21 11:55	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 21100448
Pace Project No.: 30445660

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☑ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Cooler Temp: ______ Sampler: ______ QC Level: 3

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Comments: **Please Issue reports and invoices via email only**
Please analyze for Radium 22/228 per method.
IL site
Batch QC is required for all analyses requested.

Project# 21100448

Contact: Elizabeth Hurley Email: ehurley@teklabinc.com
Requested Due Date: 10-15 day TAT Billing/PO: 31937

Any changes to analysis/methods must be approved by Teklab, Inc.

Phone: ______

PLEASE NOTE:
NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

WO# : 30445660
30445660

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228
001	21100448 - 001	10/6/21 1748	HNO3	Groundwater	✓
002	21100448 - 002	10/6/21 1732	HNO3	Groundwater	✓
003	21100448 - 003	10/6/21 1712	HNO3	Groundwater	✓
004	21100448 - 004	10/6/21 1620	HNO3	Groundwater	✓
005	21100448 - 005	10/6/21 1605	HNO3	Groundwater	✓
006	21100448 - 006	10/6/21 1533	HNO3	Groundwater	✓
007	21100448 - 007	10/6/21 1520	HNO3	Groundwater	✓
008	21100448 - 008	10/6/21 1500	HNO3	Groundwater	✓
009	21100448 - 009	10/6/21 1438	HNO3	Groundwater	✓
010	21100448 - 010	10/6/21 1425	HNO3	Groundwater	✓
011	21100448 - 011	10/6/21 1358	HNO3	Groundwater	✓

*Relinquished By	Date/Time	Received By	Date/Time
[illegible]		[illegible]	10/11/21 0900

Pg ___ of ___

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☑ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: ____ Sampler: ____ QC Level: 3

Project#: 21100448

Contact: Elizabeth Hurley
Email: ehurley@teklabinc.com
Requested Due Date: 10-15 day TAT
Billing/PO: 31937

Comments: **Please Issue reports and invoices via email only**
Please analyze for Radium 22/228 per method.
IL site
Batch QC is required for all analyses requested.
Any changes to analysis/methods must be approved by Teklab, Inc.

Phone: ____

PLEASE NOTE

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

WO#: 30445660
PM: DAP Due Date: 11/01/21
CLIENT: TEKLAB

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228
012	21100448 - 012	10/6/21 1343	HNO3	Groundwater	✓
013	21100448 - 013	10/6/21 1232	HNO3	Groundwater	✓
014	21100448 - 014	10/6/21 1200	HNO3	Groundwater	✓
015	21100448 - 015	10/6/21 1135	HNO3	Groundwater	✓
016	21100448 - 016	10/6/21 1108	HNO3	Groundwater	✓
017	21100448 - 017	10/6/21 1053	HNO3	Groundwater	✓
018	21100448 - 018	10/6/21 1027	HNO3	Groundwater	✓
019	21100448 - 019	10/6/21 1006	HNO3	Groundwater	✓
020	21100448 - 020	10/6/21 0953	HNO3	Groundwater	✓
021	21100448 - 021	10/6/21 0933	HNO3	Groundwater	✓
022	21100448 - 022	10/6/21 0858	HNO3	Groundwater	✓

*Relinquished By	Date/Time	Received By	Date/Time
[signature]		[signature]	10/11/21 0900

SubCocRevA
3/2/2016

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☑ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: QC Level: 3

Comments: Please Issue reports and invoices via email only
Please analyze for Radium 22/228 per method.
IL site
Batch QC is required for all analyses requested.
Any changes to analysis/methods must be approved by Teklab, Inc.

Project# 21100448

Contact: Elizabeth Hurley Email: ehurley@teklabinc.com
Requested Due Date: 10-15 day TAT Billing/PO: 31937 Phone:

PLEASE NOTE: NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

WO# : 30445660
PM: DAP Due Date: 11/01/21
CLIENT: TEKLAB

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228
023	21100448 - 023	10/6/21 0845	HNO3	Groundwater	✔
024	21100448 - 024	10/6/21 0820	HNO3	Groundwater	✔
025	21100448 - 025	10/6/21	HNO3	Groundwater	✔
026	21100448 - 026	10/6/21 1505	HNO3	Groundwater	✔
			HNO3	Groundwater	
			HNO3	Groundwater	
			HNO3	Groundwater	
			HNO3	Groundwater	
			HNO3	Groundwater	
			HNO3	Groundwater	
			HNO3	Groundwater	

*Relinquished By	Date/Time	Received By	Date/Time
[signature]		[signature]	10/11/21 0900

SubCocRevA
3/2/2016

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical — Client Name: Teklab — Project # ____

Label	AR
LIMS Login	AR

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other ____

Tracking #: 5300 5201 5739/5717/5706

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Thermometer Used — Type of Ice: Wet Blue (None)

Cooler Temperature Observed Temp — °C Correction Factor: — °C Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 1OD0411 — Date and Initials of person examining contents: AL 10/15/21

Comments:	Yes	No	N/A	
Chain of Custody Present:	X			1.
Chain of Custody Filled Out:	X			2.
Chain of Custody Relinquished:		X		3.
Sampler Name & Signature on COC:		X		4.
Sample Labels match COC:	X			5.
-Includes date/time/ID Matrix: WT				
Samples Arrived within Hold Time:	X			6.
Short Hold Time Analysis (<72hr remaining):		X		7.
Rush Turn Around Time Requested:		X		8.
Sufficient Volume:	X			9.
Correct Containers Used:	X			10.
-Pace Containers Used:		X		
Containers Intact:	X			11.
Orthophosphate field filtered			X	12.
Hex Cr Aqueous sample field filtered			X	13.
Organic Samples checked for dechlorination:			X	14.
Filtered volume received for Dissolved tests			X	15.
All containers have been checked for preservation.	X			16.
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix				
All containers meet method preservation requirements.	X			Initial when completed: AL; Date/time of preservation; Lot # of added preservative
Headspace in VOA Vials (>6mm):			X	17.
Trip Blank Present:			X	18.
Trip Blank Custody Seals Present			X	
Rad Samples Screened < 0.5 mrem/hr	X			Initial when completed: AL; Date: 10/15/21; Survey Meter SN: 1503

Client Notification/ Resolution:

Person Contacted: ____ Date/Time: ____ Contacted By: ____

Comments/ Resolution: ____

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

WO# : 30445660
PM: DAP Due Date: 11/01/21
CLIENT: TEKLAB

David Pichette

From: Elizabeth A. Hurley <EHurley@TekLabInc.com>
Sent: Friday, October 15, 2021 1:54 PM
To: David Pichette
Subject: Teklab CoCs
Attachments: 21100448SUBCOC.pdf; 21100474SUBCOC.pdf

CAUTION: This email originated from outside Pace Analytical. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi, David,

Thanks, again, for calling about the missing CoCs. Copies are attached for your review/use.

Have a great day!

Elizabeth Hurley
Director of Customer Service

Teklab, Inc.
5445 Horseshoe Lake Road
Collinsville, IL 62234
Phone: (618) 344-1004
Ext. 33
Cell: (618) 791-8119
Fax: (618) 344-1005
E-mail: ehurley@teklabinc.com
www.teklabinc.com

WO#: 30445660
PM: DAP Due Date: 11/01/21
CLIENT: TEKLAB

Teklab, Inc. Environmental Laboratory

November 12, 2021

Jeffrey Ingram
Golder Associates, Inc
13515 Barrett Parkway Drive, Suite 260
Ballwin, MO 63021
TEL: (314) 984-8800
FAX:

Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: Kincaid SW

WorkOrder: 21100474

Dear Jeffrey Ingram:

TEKLAB, INC received 9 samples on 10/7/2021 3:00:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley

Elizabeth A. Hurley
Project Manager
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Golder Associates, Inc
Work Order: 21100474

Client Project: Kincaid SW
Report Date: 12-Nov-21

This reporting package includes the following:

Abbr Definition

- * Analytes on report marked with an asterisk are not NELAP accredited
- CCV Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
- CRQL A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
- DF Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
- DNI Did not ignite
- DUP Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
- ICV Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
- IDPH IL Dept. of Public Health
- LCS Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
- LCSD Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
- MBLK Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
- MDL "The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
- MS Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
- MSD Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
- MW Molecular weight
- NC Data is not acceptable for compliance purposes
- ND Not Detected at the Reporting Limit
- NELAP NELAP Accredited
- PQL Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
- RL The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
- RPD Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
- SPK The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
- Surr Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
- TIC Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
- TNTC Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
C -	RL shown is a Client Requested Quantitation Limit	E -	Value above quantitation range
H -	Holding times exceeded	I -	Associated internal standard was outside method criteria
J -	Analyte detected below quantitation limits	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	T -	TIC(Tentatively identified compound)
X -	Value exceeds Maximum Contaminant Level		

Case Narrative

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Cooler Receipt Temp: 7.4 °C

Radium-226 and Radium-228 analysis was performed by Pace Analytical Services, LLC. See attached report for results.

Thallium by ICPMS analysis performed by Pace Analytical Gulf Coast. See attached for results and QC summary.

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	arenner@teklabinc.com

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2022	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2022	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2022	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2022	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2022	Collinsville
Arkansas	ADEQ	88-0966		3/14/2022	Collinsville
Illinois	IDPH	17584		5/31/2021	Collinsville
Kentucky	UST	0073		1/31/2022	Collinsville
Missouri	MDNR	00930		5/31/2021	Collinsville
Missouri	MDNR	930		1/31/2022	Collinsville

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-001 **Client Sample ID:** K-G-1

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 7:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 17:55	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 22:19	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.17**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.043**	mg/L	1	10/19/2021 10:09	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:05	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:26	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**121**	mg/L	1	10/08/2021 11:47	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:47	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**172**	mg/L	1	10/13/2021 14:34	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/08/2021 23:11	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:25	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 22:20	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100	S	**30.9**	mg/L	1	10/14/2021 21:22	183830
Magnesium	NELAP	0.0500	S	**18.4**	mg/L	1	10/14/2021 21:22	183830
Potassium	NELAP	0.100		**2.66**	mg/L	1	10/14/2021 21:22	183830
Sodium	NELAP	0.0500		**11.7**	mg/L	1	10/16/2021 19:48	183830
Matrix spike control limits for Ca and Mg are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**33.0**	mg/L	1	10/16/2021 21:19	183831
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/16/2021 21:19	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 14:30	183831
Potassium	NELAP	0.100		**2.86**	mg/L	1	10/16/2021 21:19	183831
Sodium	NELAP	0.0500		**12.7**	mg/L	1	10/16/2021 21:19	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/18/2021 17:44	183830
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/16/2021 9:10	183830
Barium	NELAP	0.0010		**0.0538**	mg/L	5	10/16/2021 9:10	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:10	183830
Boron	NELAP	0.0250		**0.0482**	mg/L	5	10/16/2021 9:10	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:10	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 9:10	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:10	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-001 **Client Sample ID:** K-G-1

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 7:50

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 9:10	183830
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:10	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 9:10	183830
Manganese	NELAP	0.0020		**0.0077**	mg/L	5	10/18/2021 17:44	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 9:10	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:10	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:07	183831
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/16/2021 0:07	183831
Barium	NELAP	0.0010		**0.0683**	mg/L	5	10/16/2021 0:07	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:05	183831
Boron	NELAP	0.0250		**0.0472**	mg/L	5	10/14/2021 4:05	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:07	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:05	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:05	183831
Iron	NELAP	0.0250		**0.211**	mg/L	5	10/14/2021 4:05	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:07	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:05	183831
Manganese	NELAP	0.0020		**0.0793**	mg/L	5	10/14/2021 4:05	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 0:07	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:07	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:01	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 12:54	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-002 **Client Sample ID:** K-G-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 8:13

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 17:57	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 22:27	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.19**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 10:10	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:06	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:28	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**116**	mg/L	1	10/08/2021 11:53	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:53	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**174**	mg/L	1	10/13/2021 14:34	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.0**	mg/L	1	10/08/2021 23:50	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:26	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 22:28	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/14/2021 21:33	183830
Magnesium	NELAP	0.0500		**17.2**	mg/L	1	10/14/2021 21:33	183830
Potassium	NELAP	0.100		**2.55**	mg/L	1	10/14/2021 21:33	183830
Sodium	NELAP	0.0500		**11.2**	mg/L	1	10/14/2021 21:33	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.8**	mg/L	1	10/16/2021 21:23	183831
Magnesium	NELAP	0.0500		**18.8**	mg/L	1	10/16/2021 21:23	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 14:34	183831
Potassium	NELAP	0.100		**2.82**	mg/L	1	10/16/2021 21:23	183831
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/16/2021 21:23	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0041**	mg/L	5	10/18/2021 17:58	183830
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/16/2021 9:33	183830
Barium	NELAP	0.0010		**0.0535**	mg/L	5	10/16/2021 9:33	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:33	183830
Boron	NELAP	0.0250		**0.0509**	mg/L	5	10/16/2021 9:33	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:33	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 9:33	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:33	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 9:33	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-002 **Client Sample ID:** K-G-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 8:13

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:33	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 9:33	183830
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 17:58	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 9:33	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 9:33	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:39	183831
Arsenic	NELAP	0.0010		**0.0027**	mg/L	5	10/16/2021 0:39	183831
Barium	NELAP	0.0010		**0.0672**	mg/L	5	10/16/2021 0:39	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:13	183831
Boron	NELAP	0.0250		**0.0432**	mg/L	5	10/14/2021 4:13	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:39	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:13	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:13	183831
Iron	NELAP	0.0250		**0.220**	mg/L	5	10/14/2021 4:13	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:39	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:13	183831
Manganese	NELAP	0.0020		**0.0786**	mg/L	5	10/14/2021 4:13	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 0:39	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:39	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:05	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:03	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-003 **Client Sample ID:** K-G-2D

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 8:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 17:59	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 22:35	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**1.6**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.075**	mg/L	1	10/19/2021 10:12	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:08	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:29	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**115**	mg/L	1	10/08/2021 11:59	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 11:59	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**178**	mg/L	1	10/13/2021 14:34	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.2**	mg/L	1	10/08/2021 23:56	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:28	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 22:36	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.2**	mg/L	1	10/14/2021 21:37	183830
Magnesium	NELAP	0.0500		**17.2**	mg/L	1	10/14/2021 21:37	183830
Potassium	NELAP	0.100		**2.54**	mg/L	1	10/14/2021 21:37	183830
Sodium	NELAP	0.0500		**11.0**	mg/L	1	10/14/2021 21:37	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**33.9**	mg/L	1	10/16/2021 21:27	183831
Magnesium	NELAP	0.0500		**19.8**	mg/L	1	10/16/2021 21:27	183831
Phosphorus	NELAP	0.100		**0.148**	mg/L	1	10/19/2021 14:38	183831
Potassium	NELAP	0.100		**3.06**	mg/L	1	10/16/2021 21:27	183831
Sodium	NELAP	0.0500		**12.6**	mg/L	1	10/16/2021 21:27	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:31	183830
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/16/2021 10:26	183830
Barium	NELAP	0.0010		**0.0529**	mg/L	5	10/16/2021 10:26	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:26	183830
Boron	NELAP	0.0250		**0.0481**	mg/L	5	10/16/2021 10:26	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:26	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:26	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:26	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 10:26	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-003 **Client Sample ID:** K-G-2D

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 8:25

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:26	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 10:26	183830
Manganese	NELAP	0.0020		**0.0261**	mg/L	5	10/18/2021 18:23	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:26	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:26	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:46	183831
Arsenic	NELAP	0.0010		**0.0034**	mg/L	5	10/16/2021 0:46	183831
Barium	NELAP	0.0010		**0.0844**	mg/L	5	10/16/2021 0:46	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:20	183831
Boron	NELAP	0.0250		**0.0411**	mg/L	5	10/14/2021 4:20	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:46	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:20	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:20	183831
Iron	NELAP	0.0250		**1.64**	mg/L	5	10/14/2021 4:20	183831
Lead	NELAP	0.0010		**0.0011**	mg/L	5	10/16/2021 0:46	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:20	183831
Manganese	NELAP	0.0020		**0.225**	mg/L	5	10/14/2021 4:20	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 0:46	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:46	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:10	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:07	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-004 **Client Sample ID:** K-I-1

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 18:03	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 22:43	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.21**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 10:13	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:09	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:31	R301164
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**115**	mg/L	1	10/08/2021 12:04	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 12:04	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**162**	mg/L	1	10/13/2021 14:34	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/09/2021 0:02	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:30	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 22:44	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/14/2021 21:41	183830
Magnesium	NELAP	0.0500		**17.2**	mg/L	1	10/14/2021 21:41	183830
Potassium	NELAP	0.100		**2.55**	mg/L	1	10/14/2021 21:41	183830
Sodium	NELAP	0.0500		**11.1**	mg/L	1	10/14/2021 21:41	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**33.1**	mg/L	1	10/16/2021 21:30	183831
Magnesium	NELAP	0.0500		**19.6**	mg/L	1	10/16/2021 21:30	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 14:41	183831
Potassium	NELAP	0.100		**2.93**	mg/L	1	10/16/2021 21:30	183831
Sodium	NELAP	0.0500		**12.6**	mg/L	1	10/16/2021 21:30	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:35	183830
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/16/2021 10:34	183830
Barium	NELAP	0.0010		**0.0563**	mg/L	5	10/16/2021 10:34	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:34	183830
Boron	NELAP	0.0250		**0.0514**	mg/L	5	10/16/2021 10:34	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:34	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:34	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:34	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 10:34	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-004 **Client Sample ID:** K-I-1

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:10

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:34	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 10:34	183830
Manganese	NELAP	0.0020		**0.0131**	mg/L	5	10/18/2021 18:28	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:34	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:34	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:52	183831
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/16/2021 0:52	183831
Barium	NELAP	0.0010		**0.0692**	mg/L	5	10/16/2021 0:52	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:28	183831
Boron	NELAP	0.0250		**0.0386**	mg/L	5	10/14/2021 4:28	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:52	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:28	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:28	183831
Iron	NELAP	0.0250		**0.238**	mg/L	5	10/14/2021 4:28	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:52	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:28	183831
Manganese	NELAP	0.0020		**0.0887**	mg/L	5	10/14/2021 4:28	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 0:52	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:52	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:14	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:12	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-005 **Client Sample ID:** K-I-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:28

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**0.125**	mg/L	1	10/08/2021 18:05	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 23:04	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.22**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.046**	mg/L	1	10/19/2021 10:15	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:10	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:46	R301221
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**115**	mg/L	1	10/08/2021 12:09	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**4**	mg/L	1	10/08/2021 12:09	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**166**	mg/L	1	10/13/2021 14:35	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/09/2021 0:09	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:36	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 23:05	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.0**	mg/L	1	10/14/2021 21:44	183830
Magnesium	NELAP	0.0500		**17.4**	mg/L	1	10/14/2021 21:44	183830
Potassium	NELAP	0.100		**2.54**	mg/L	1	10/14/2021 21:44	183830
Sodium	NELAP	0.0500		**11.0**	mg/L	1	10/14/2021 21:44	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**32.1**	mg/L	1	10/16/2021 21:48	183831
Magnesium	NELAP	0.0500		**19.1**	mg/L	1	10/16/2021 21:48	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 15:33	183831
Potassium	NELAP	0.100		**2.80**	mg/L	1	10/16/2021 21:48	183831
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/16/2021 21:48	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:38	183830
Arsenic	NELAP	0.0010		**0.0022**	mg/L	5	10/16/2021 10:42	183830
Barium	NELAP	0.0010		**0.0534**	mg/L	5	10/16/2021 10:42	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:42	183830
Boron	NELAP	0.0250		**0.0450**	mg/L	5	10/16/2021 10:42	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:42	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:42	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:42	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 10:42	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-005 **Client Sample ID:** K-I-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:28

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:42	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 10:42	183830
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 18:32	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:42	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:42	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:59	183831
Arsenic	NELAP	0.0010		**0.0023**	mg/L	5	10/16/2021 0:59	183831
Barium	NELAP	0.0010		**0.0687**	mg/L	5	10/16/2021 0:59	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:36	183831
Boron	NELAP	0.0250		**0.0389**	mg/L	5	10/14/2021 4:36	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:59	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:36	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:36	183831
Iron	NELAP	0.0250		**0.261**	mg/L	5	10/14/2021 4:36	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:59	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:36	183831
Manganese	NELAP	0.0020		**0.0850**	mg/L	5	10/14/2021 4:36	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 0:59	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 0:59	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:19	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:16	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-006 **Client Sample ID:** K-I-2D

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:41

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 18:10	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 23:12	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.26**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.043**	mg/L	1	10/19/2021 10:16	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:12	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05		**< 0.05**	mg/L	1	10/13/2021 14:49	R301221
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**119**	mg/L	1	10/08/2021 12:15	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 12:15	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**164**	mg/L	1	10/13/2021 14:35	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.0**	mg/L	1	10/09/2021 0:15	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:37	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 23:13	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.2**	mg/L	1	10/14/2021 21:48	183830
Magnesium	NELAP	0.0500		**17.2**	mg/L	1	10/14/2021 21:48	183830
Potassium	NELAP	0.100		**2.53**	mg/L	1	10/14/2021 21:48	183830
Sodium	NELAP	0.0500		**11.0**	mg/L	1	10/14/2021 21:48	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**31.2**	mg/L	1	10/16/2021 21:52	183831
Magnesium	NELAP	0.0500		**18.8**	mg/L	1	10/16/2021 21:52	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 15:37	183831
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/16/2021 21:52	183831
Sodium	NELAP	0.0500		**12.1**	mg/L	1	10/16/2021 21:52	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:41	183830
Arsenic	NELAP	0.0010		**0.0020**	mg/L	5	10/16/2021 10:49	183830
Barium	NELAP	0.0010		**0.0534**	mg/L	5	10/16/2021 10:49	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:49	183830
Boron	NELAP	0.0250		**0.0484**	mg/L	5	10/16/2021 10:49	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:49	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:49	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:49	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 10:49	183830
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:49	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-006 **Client Sample ID:** K-I-2D

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 10:41

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 10:49	183830
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 18:37	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:49	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:49	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:05	183831
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/16/2021 1:05	183831
Barium	NELAP	0.0010		**0.0688**	mg/L	5	10/16/2021 1:05	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:43	183831
Boron	NELAP	0.0250		**0.0389**	mg/L	5	10/14/2021 4:43	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:05	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 4:43	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 4:43	183831
Iron	NELAP	0.0250		**0.306**	mg/L	5	10/14/2021 4:43	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:05	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 4:43	183831
Manganese	NELAP	0.0020		**0.0876**	mg/L	5	10/14/2021 4:43	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 1:05	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:05	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:28	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:21	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc | **Work Order:** 21100474

Client Project: Kincaid SW | **Report Date:** 12-Nov-21

Lab ID: 21100474-007 | **Client Sample ID:** K-H-1

Matrix: GROUNDWATER | **Collection Date:** 10/07/2021 11:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 18:12	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 23:20	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.23**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.043**	mg/L	1	10/19/2021 10:17	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:13	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:51	R301221
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**118**	mg/L	1	10/08/2021 12:21	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 12:21	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**172**	mg/L	1	10/13/2021 14:35	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/09/2021 0:22	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.35**	mg/L	1	10/08/2021 11:39	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 23:21	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**30.4**	mg/L	1	10/14/2021 22:10	183830
Magnesium	NELAP	0.0500		**18.2**	mg/L	1	10/14/2021 22:10	183830
Potassium	NELAP	0.100		**2.64**	mg/L	1	10/14/2021 22:10	183830
Sodium	NELAP	0.0500		**11.6**	mg/L	1	10/14/2021 22:10	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**32.6**	mg/L	1	10/16/2021 21:56	183831
Magnesium	NELAP	0.0500		**19.4**	mg/L	1	10/16/2021 21:56	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 15:41	183831
Potassium	NELAP	0.100		**2.86**	mg/L	1	10/16/2021 21:56	183831
Sodium	NELAP	0.0500		**12.5**	mg/L	1	10/16/2021 21:56	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:44	183830
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/16/2021 10:57	183830
Barium	NELAP	0.0010		**0.0539**	mg/L	5	10/16/2021 10:57	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:57	183830
Boron	NELAP	0.0250		**0.0481**	mg/L	5	10/16/2021 10:57	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:57	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:57	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:57	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 10:57	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-007 **Client Sample ID:** K-H-1

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 11:01

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:57	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 10:57	183830
Manganese	NELAP	0.0020		**0.0041**	mg/L	5	10/18/2021 18:42	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 10:57	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 10:57	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:12	183831
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/16/2021 1:12	183831
Barium	NELAP	0.0010		**0.0676**	mg/L	5	10/16/2021 1:12	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:29	183831
Boron	NELAP	0.0250		**0.0370**	mg/L	5	10/14/2021 5:29	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:12	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 5:29	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:29	183831
Iron	NELAP	0.0250		**0.275**	mg/L	5	10/14/2021 5:29	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:12	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 5:29	183831
Manganese	NELAP	0.0020		**0.0839**	mg/L	5	10/14/2021 5:29	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 1:12	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:12	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:32	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:30	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-008 **Client Sample ID:** K-H-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 11:22

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 18:14	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 23:28	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.25**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 10:18	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:15	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:54	R301221
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**111**	mg/L	1	10/08/2021 12:27	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**5**	mg/L	1	10/08/2021 12:27	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**176**	mg/L	1	10/13/2021 14:36	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.1**	mg/L	1	10/09/2021 0:28	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:41	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**21**	mg/L	1	10/18/2021 23:29	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100		**29.1**	mg/L	1	10/14/2021 22:14	183830
Magnesium	NELAP	0.0500		**17.2**	mg/L	1	10/14/2021 22:14	183830
Potassium	NELAP	0.100		**2.54**	mg/L	1	10/14/2021 22:14	183830
Sodium	NELAP	0.0500		**11.0**	mg/L	1	10/14/2021 22:14	183830
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100		**32.0**	mg/L	1	10/16/2021 21:59	183831
Magnesium	NELAP	0.0500		**19.0**	mg/L	1	10/16/2021 21:59	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/19/2021 15:44	183831
Potassium	NELAP	0.100		**2.81**	mg/L	1	10/16/2021 21:59	183831
Sodium	NELAP	0.0500		**12.3**	mg/L	1	10/16/2021 21:59	183831
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/19/2021 17:48	183830
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/16/2021 11:05	183830
Barium	NELAP	0.0010		**0.0538**	mg/L	5	10/16/2021 11:05	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:05	183830
Boron	NELAP	0.0250		**0.0432**	mg/L	5	10/16/2021 11:05	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:05	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 11:05	183830
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:05	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 11:05	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-008 **Client Sample ID:** K-H-2M

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 11:22

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:05	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 11:05	183830
Manganese	NELAP	0.0020		**< 0.0020**	mg/L	5	10/18/2021 18:47	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 11:05	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:05	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:18	183831
Arsenic	NELAP	0.0010		**0.0026**	mg/L	5	10/16/2021 1:18	183831
Barium	NELAP	0.0010		**0.0680**	mg/L	5	10/16/2021 1:18	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:37	183831
Boron	NELAP	0.0250		**0.0353**	mg/L	5	10/14/2021 5:37	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:18	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 5:37	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:37	183831
Iron	NELAP	0.0250		**0.284**	mg/L	5	10/14/2021 5:37	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:18	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 5:37	183831
Manganese	NELAP	0.0020		**0.0852**	mg/L	5	10/14/2021 5:37	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 1:18	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:18	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:37	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:35	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Client: Golder Associates, Inc **Work Order:** 21100474
Client Project: Kincaid SW **Report Date:** 12-Nov-21
Lab ID: 21100474-009 **Client Sample ID:** K-H-2D
Matrix: GROUNDWATER **Collection Date:** 10/07/2021 11:42

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
EPA 600 353.2 R2.0 (TOTAL)								
Nitrogen, Nitrate (as N)	NELAP	0.050		**< 0.050**	mg/L	1	10/08/2021 18:29	R301083
EPA 600 375.2 REV 2.0 1993 (TOTAL)								
Sulfate	NELAP	10		**31**	mg/L	1	10/18/2021 23:36	R301396
FERRIC IRON, BY CALCULATION								
Ferric Iron	*	0.020		**0.21**	mg/L	1	10/19/2021 9:28	R301429
SM-3500-FE D, LABORATORY ANALYZED								
Lab Ferrous Iron	*	0.020		**0.032**	mg/L	1	10/19/2021 10:21	R301429
SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)								
Lab Ferrous Iron	*	0.020		**< 0.020**	mg/L	1	10/08/2021 14:18	R301035
STANDARD METHODS 4500-S D (TOTAL) 2000								
Sulfide, Total - Colorimetric	NELAP	0.05	S	**< 0.05**	mg/L	1	10/13/2021 14:56	R301221
Matrix spike did not recover within control limits due to matrix interference.								
STANDARD METHODS 2320 B (TOTAL) 1997, 2011								
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0		**118**	mg/L	1	10/08/2021 12:33	R301043
STANDARD METHODS 2320 B 1997, 2011								
Alkalinity, Carbonate (as CaCO3)	NELAP	0		**0**	mg/L	1	10/08/2021 12:33	R301043
STANDARD METHODS 2540 C (TOTAL) 1997, 2011								
Total Dissolved Solids	NELAP	20		**176**	mg/L	1	10/13/2021 14:36	R301256
SW-846 9060								
Total Organic Carbon (TOC)	NELAP	1.0		**4.3**	mg/L	1	10/08/2021 16:04	R301074
SW-846 9214 (TOTAL)								
Fluoride	NELAP	0.10		**0.36**	mg/L	1	10/08/2021 11:43	R300986
SW-846 9251 (TOTAL)								
Chloride	NELAP	1		**20**	mg/L	1	10/18/2021 23:37	R301397
SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)								
Calcium	NELAP	0.100	S	**29.0**	mg/L	1	10/14/2021 22:17	183830
Magnesium	NELAP	0.0500		**17.4**	mg/L	1	10/14/2021 22:17	183830
Potassium	NELAP	0.100		**2.55**	mg/L	1	10/14/2021 22:17	183830
Sodium	NELAP	0.0500		**12.0**	mg/L	1	10/16/2021 20:13	183830
Matrix spike control limits for Ca are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)								
Calcium	NELAP	0.100	S	**31.6**	mg/L	1	10/16/2021 22:03	183831
Magnesium	NELAP	0.0500	S	**18.7**	mg/L	1	10/16/2021 22:03	183831
Phosphorus	NELAP	0.100		**< 0.100**	mg/L	1	10/20/2021 11:17	183831
Potassium	NELAP	0.100		**2.79**	mg/L	1	10/16/2021 22:03	183831
Sodium	NELAP	0.0500		**12.2**	mg/L	1	10/16/2021 22:03	183831
Matrix spike control limits for Ca and Mg are not applicable due to high sample/spike ratio.								
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Antimony	NELAP	0.0010		**0.0024**	mg/L	5	10/19/2021 18:14	183830
Arsenic	NELAP	0.0010		**0.0021**	mg/L	5	10/16/2021 11:12	183830
Barium	NELAP	0.0010		**0.0527**	mg/L	5	10/16/2021 11:12	183830
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:12	183830
Boron	NELAP	0.0250		**0.0511**	mg/L	5	10/16/2021 11:12	183830
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:12	183830
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 11:12	183830

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Lab ID: 21100474-009 **Client Sample ID:** K-H-2D

Matrix: GROUNDWATER **Collection Date:** 10/07/2021 11:42

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)								
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:12	183830
Iron	NELAP	0.0250		**< 0.0250**	mg/L	5	10/16/2021 11:12	183830
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:12	183830
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/16/2021 11:12	183830
Manganese	NELAP	0.0020		**0.0027**	mg/L	5	10/18/2021 18:52	183830
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 11:12	183830
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 11:12	183830
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)								
Antimony	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:25	183831
Arsenic	NELAP	0.0010		**0.0025**	mg/L	5	10/16/2021 1:25	183831
Barium	NELAP	0.0010		**0.0681**	mg/L	5	10/16/2021 1:25	183831
Beryllium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:44	183831
Boron	NELAP	0.0250		**0.0365**	mg/L	5	10/14/2021 5:44	183831
Cadmium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:25	183831
Chromium	NELAP	0.0015		**< 0.0015**	mg/L	5	10/14/2021 5:44	183831
Cobalt	NELAP	0.0010		**< 0.0010**	mg/L	5	10/14/2021 5:44	183831
Iron	NELAP	0.0250		**0.245**	mg/L	5	10/14/2021 5:44	183831
Lead	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:25	183831
Lithium	*	0.0030		**< 0.0030**	mg/L	5	10/14/2021 5:44	183831
Manganese	NELAP	0.0020		**0.0841**	mg/L	5	10/14/2021 5:44	183831
Molybdenum	NELAP	0.0015		**< 0.0015**	mg/L	5	10/16/2021 1:25	183831
Selenium	NELAP	0.0010		**< 0.0010**	mg/L	5	10/16/2021 1:25	183831
SW-846 7470A (DISSOLVED)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:46	183875
SW-846 7470A (TOTAL)								
Mercury	NELAP	0.00020		**< 0.00020**	mg/L	1	10/13/2021 13:39	183875
EPA 903.0/904.0, RADIUM 226/228								
Radium-226	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
Radium-228	*	0		**See Attached**	pci/L	1	10/29/2021 0:00	R302202
SEE ATTACHED FOR SUBCONTRACTING ANALYSIS								
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385
Subcontracted Analysis	*	0		**See Attached**		1	11/05/2021 0:00	R302385

Sample Summary

Client: Golder Associates, Inc
Client Project: Kincaid SW

Work Order: 21100474
Report Date: 12-Nov-21

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
21100474-001	K-G-1	Groundwater	9	10/07/2021 7:50
21100474-002	K-G-2M	Groundwater	9	10/07/2021 8:13
21100474-003	K-G-2D	Groundwater	9	10/07/2021 8:25
21100474-004	K-I-1	Groundwater	9	10/07/2021 10:10
21100474-005	K-I-2M	Groundwater	9	10/07/2021 10:28
21100474-006	K-I-2D	Groundwater	9	10/07/2021 10:41
21100474-007	K-H-1	Groundwater	9	10/07/2021 11:01
21100474-008	K-H-2M	Groundwater	9	10/07/2021 11:22
21100474-009	K-H-2D	Groundwater	9	10/07/2021 11:42

Teklab, Inc. Environmental Laboratory

Dates Report

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW

Work Order: 21100474
Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100474-001A	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:47
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:47
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:34
	SW-846 9214 (Total)				10/08/2021 11:25
21100474-001B	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 17:55
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 22:19
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:00
	SW-846 9251 (Total)				10/18/2021 22:20
21100474-001C	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-001D	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:19
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 14:30
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:05
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 0:07
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 12:54
21100474-001E	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:22
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/16/2021 19:48
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 9:10
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 17:44
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:01
21100474-001F	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:26
21100474-001G	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	SW-846 9060				10/08/2021 23:11
21100474-001H	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:09
21100474-001I	K-G-1	10/07/2021 7:50	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:05
21100474-002A	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:53
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:53
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:34
	SW-846 9214 (Total)				10/08/2021 11:26
21100474-002B	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 17:57
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 22:27
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:03
	SW-846 9251 (Total)				10/18/2021 22:28
21100474-002C	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-002D	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:23
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 14:34
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:13
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 0:39
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:03
21100474-002E	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 9:33
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 17:58
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:05
21100474-002F	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:28
21100474-002G	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	SW-846 9060				10/08/2021 23:50
21100474-002H	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:10
21100474-002I	K-G-2M	10/07/2021 8:13	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:06
21100474-003A	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 11:59
	Standard Methods 2320 B 1997, 2011				10/08/2021 11:59

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Golder Associates, Inc — **Work Order:** 21100474

Client Project: Kincaid SW — **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:34
	SW-846 9214 (Total)				10/08/2021 11:28
21100474-003B	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 17:59
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 22:35
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:03
	SW-846 9251 (Total)				10/18/2021 22:36
21100474-003C	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-003D	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:27
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 14:38
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:20
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 0:46
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:07
21100474-003E	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:37
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 10:26
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:23
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:31
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:10
21100474-003F	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:29
21100474-003G	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	SW-846 9060				10/08/2021 23:56
21100474-003H	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:12
21100474-003I	K-G-2D	10/07/2021 8:25	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:08
21100474-004A	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:04
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:04
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:34

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9214 (Total)				10/08/2021 11:30
21100474-004B	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:03
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 22:43
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:04
	SW-846 9251 (Total)				10/18/2021 22:44
21100474-004C	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-004D	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:30
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 14:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:28
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 0:52
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:12
21100474-004E	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:41
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 10:34
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:28
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:35
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:14
21100474-004F	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:31
21100474-004G	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	SW-846 9060				10/09/2021 0:02
21100474-004H	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:13
21100474-004I	K-I-1	10/07/2021 10:10	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:09
21100474-005A	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:09
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:09
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:35
	SW-846 9214 (Total)				10/08/2021 11:36

Dates Report

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW

Work Order: 21100474
Report Date: 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
21100474-005B	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:05
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 23:04
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:05
	SW-846 9251 (Total)				10/18/2021 23:05
21100474-005C	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-005D	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:48
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 15:33
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:36
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 0:59
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:16
21100474-005E	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:44
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 10:42
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:32
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:38
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:19
21100474-005F	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:46
21100474-005G	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	SW-846 9060				10/09/2021 0:09
21100474-005H	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:15
21100474-005I	K-I-2M	10/07/2021 10:28	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:10
21100474-006A	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:15
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:15
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:35
	SW-846 9214 (Total)				10/08/2021 11:37
21100474-006B	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:10
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 23:12
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:06
	SW-846 9251 (Total)				10/18/2021 23:13
21100474-006C	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-006D	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:52
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 15:37
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 4:43
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 1:05
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:21
21100474-006E	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 21:48
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 10:49
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:37
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:41
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:28
21100474-006F	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:49
21100474-006G	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	SW-846 9060				10/09/2021 0:15
21100474-006H	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:16
21100474-006I	K-I-2D	10/07/2021 10:41	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:12
21100474-007A	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:21
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:21
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:35
	SW-846 9214 (Total)				10/08/2021 11:39
21100474-007B	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:12

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 23:20
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:06
	SW-846 9251 (Total)				10/18/2021 23:21
21100474-007C	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-007D	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:56
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 15:41
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 5:29
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 1:12
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:30
21100474-007E	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 22:10
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 10:57
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:42
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:44
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:32
21100474-007F	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:51
21100474-007G	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	SW-846 9060				10/09/2021 0:22
21100474-007H	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:17
21100474-007I	K-H-1	10/07/2021 11:01	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:13
21100474-008A	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:27
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:27
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:36
	SW-846 9214 (Total)				10/08/2021 11:41
21100474-008B	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:14
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 23:28

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:06
	SW-846 9251 (Total)				10/18/2021 23:29
21100474-008C	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-008D	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 21:59
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/19/2021 15:44
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 5:37
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 1:18
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:35
21100474-008E	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 22:14
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 11:05
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:47
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 17:48
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:37
21100474-008F	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:54
21100474-008G	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	SW-846 9060				10/09/2021 0:28
21100474-008H	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:18
21100474-008I	K-H-2M	10/07/2021 11:22	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:15
21100474-009A	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	Standard Methods 2320 B (Total) 1997, 2011				10/08/2021 12:33
	Standard Methods 2320 B 1997, 2011				10/08/2021 12:33
	Standard Methods 2540 C (Total) 1997, 2011				10/13/2021 14:36
	SW-846 9214 (Total)				10/08/2021 11:43
21100474-009B	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	EPA 600 353.2 R2.0 (Total)				10/08/2021 18:29
	EPA 600 375.2 Rev 2.0 1993 (Total)				10/18/2021 23:36
	Standard Methods 4500-NO2 B (Total) 2000, 2011				10/08/2021 20:08

Sample ID	Client Sample ID / Test Name	Collection Date	Received Date	Prep Date/Time	Analysis Date/Time
	SW-846 9251 (Total)				10/18/2021 23:37
21100474-009C	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	EPA 903.0/904.0, Radium 226/228				10/29/2021 0:00
21100474-009D	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/16/2021 22:03
	SW-846 3005A, 6010B, Metals by ICP (Total)			10/12/2021 10:11	10/20/2021 11:17
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/14/2021 5:44
	SW-846 3005A, 6020A, Metals by ICPMS (Total)			10/12/2021 10:11	10/16/2021 1:25
	SW-846 7470A (Total)			10/12/2021 20:31	10/13/2021 13:39
21100474-009E	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	See Attached for Subcontracting Analysis				11/05/2021 0:00
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/14/2021 22:17
	SW-846 3005A, 6010B, Metals by ICP (Dissolved)			10/12/2021 10:10	10/16/2021 20:13
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/16/2021 11:12
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/18/2021 18:52
	SW-846 3005A, 6020A, Metals by ICPMS (Dissolved)			10/12/2021 10:10	10/19/2021 18:14
	SW-846 7470A (Dissolved)			10/12/2021 20:31	10/13/2021 13:46
21100474-009F	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	Standard Methods 4500-S D (Total) 2000				10/13/2021 14:56
21100474-009G	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	SW-846 9060				10/08/2021 16:04
21100474-009H	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	Ferric Iron, by calculation				10/19/2021 9:28
	SM-3500-Fe D, Laboratory Analyzed				10/19/2021 10:21
21100474-009I	K-H-2D	10/07/2021 11:42	10/07/2021 15:00		
	SM-3500-Fe D, Laboratory Analyzed (Dissolved)				10/08/2021 14:18

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

EPA 600 353.2 R2.0 (TOTAL)

Batch R301083 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	10/08/2021

Batch R301083 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.502**	0.5000	0	100.4	90	110	10/08/2021

Batch R301083 **SampType:** MS Units **mg/L**

SampID: 21100474-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.259**	0.2500	0.01170	98.8	90	110	10/08/2021

Batch R301083 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100474-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.271**	0.2500	0.01170	103.8	0.2588	4.68	10/08/2021

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R301396 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	10/18/2021

Batch R301396 **SampType:** MBLK Units **mg/L**

SampID: MBLK TCLP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate	*	10		**< 10**	7.620	0	0	-100	100	10/18/2021

Batch R301396 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**20**	20.00	0	100.5	90	110	10/18/2021

Client: Golder Associates, Inc

Client Project: Kincaid SW

Work Order: 21100474

Report Date: 12-Nov-21

EPA 600 375.2 REV 2.0 1993 (TOTAL)

Batch R301396 **SampType:** MS Units **mg/L**

SampID: 21100474-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**49**	20.00	30.64	93.4	90	110	10/18/2021

Batch R301396 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100474-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**50**	20.00	30.64	95.8	49.31	0.99	10/18/2021

SM-3500-FE D, LABORATORY ANALYZED

Batch R301429 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**< 0.020**	0.0080	0	0	-100	100	10/19/2021

Batch R301429 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.49**	0.5000	0	97.6	90	110	10/19/2021

Batch R301429 **SampType:** MS Units **mg/L**

SampID: 21100474-009HMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.28**	0.2500	0.03200	98.4	85	115	10/19/2021

Batch R301429 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100474-009HMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.29**	0.2500	0.03200	104.0	0.2780	4.91	10/19/2021

SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)

Batch R301035 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**< 0.020**	0.0080	0	0	-100	100	10/08/2021

Quality Control Results

http://www.teklabinc.com/

Client: Golder Associates, Inc | **Work Order:** 21100474
Client Project: Kincaid SW | **Report Date:** 12-Nov-21

SM-3500-FE D, LABORATORY ANALYZED (DISSOLVED)

Batch R301035 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.47**	0.5000	0	94.6	90	110	10/08/2021

Batch R301035 **SampType:** MS Units **mg/L**
SampID: 21100474-009IMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.26**	0.2500	0.01000	98.4	85	115	10/08/2021

Batch R301035 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 21100474-009IMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Lab Ferrous Iron	*	0.020		**0.27**	0.2500	0.01000	104.4	0.2560	5.69	10/08/2021

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301164 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**< 0.05**	0.0080	0	0	-100	100	10/12/2021

Batch R301164 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.06**	0.0670	0	92.5	90	110	10/12/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100474-001FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01600	83.6	85	115	10/13/2021

Batch R301164 **SampType:** MS Units **mg/L**
SampID: 21100474-002FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01600	83.6	85	115	10/13/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301164 **SampType:** MS Units mg/L

SampID: 21100474-003FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.05**	0.0670	0.02200	44.8	85	115	10/13/2021

Batch R301164 **SampType:** MS Units mg/L

SampID: 21100474-004FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01600	77.6	85	115	10/13/2021

Batch R301221 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**< 0.05**	0.0080	0	0	-100	100	10/13/2021

Batch R301221 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.07**	0.0670	0	100.0	90	110	10/13/2021

Batch R301221 **SampType:** MS Units mg/L

SampID: 21100474-005FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02100	74.6	85	115	10/13/2021

Batch R301221 **SampType:** MS Units mg/L

SampID: 21100474-006FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05		**0.08**	0.0670	0.01900	89.6	85	115	10/13/2021

Batch R301221 **SampType:** MS Units mg/L

SampID: 21100474-007FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01900	77.6	85	115	10/13/2021

Batch R301221 **SampType:** MS Units mg/L

SampID: 21100474-008FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.02100	71.6	85	115	10/13/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

STANDARD METHODS 4500-S D (TOTAL) 2000

Batch R301221 **SampType:** MS **Units** mg/L

SampID: 21100474-009FMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01900	77.6	85	115	10/13/2021

Batch R301221 **SampType:** MSD **Units** mg/L **RPD Limit** 15

SampID: 21100474-009FMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfide, Total - Colorimetric		0.05	S	**0.07**	0.0670	0.01900	74.6	0.07100	2.86	10/13/2021

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R301256 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/13/2021
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/13/2021
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	10/13/2021

Batch R301256 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**912**	1000	0	91.2	90	110	10/13/2021
Total Dissolved Solids		20		**964**	1000	0	96.4	90	110	10/13/2021
Total Dissolved Solids		20		**1010**	1000	0	100.8	90	110	10/13/2021

Batch R301256 **SampType:** DUP **Units** mg/L **RPD Limit** 5

SampID: 21100474-009ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**168**				176.0	4.65	10/13/2021

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R301049 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	10/08/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R301049 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.25		**1.52**	1.520	0	100.3	90	110	10/08/2021

Batch R301049 **SampType:** MS Units **mg/L**

SampID: 21100474-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.52**	0.5000	0	105.0	85	115	10/08/2021

Batch R301049 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100474-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0	99.6	0.5250	5.28	10/08/2021

SW-846 9060

Batch R301074 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**< 1.0**	0.4500	0	0	-100	100	10/08/2021

Batch R301074 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		4.0		**16.6**	16.50	0	100.8	90	110	10/08/2021

Batch R301074 **SampType:** MS Units **mg/L**

SampID: 21100474-009GMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.0**	5.000	4.260	95.8	85	115	10/08/2021

Batch R301074 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 21100474-009GMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Organic Carbon (TOC)		1.0		**9.2**	5.000	4.260	98.0	9.050	1.21	10/08/2021

SW-846 9214 (TOTAL)

Batch R300986 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0370	0	0	-100	100	10/07/2021

Batch R300986 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.99**	1.000	0	98.8	90	110	10/07/2021

Batch R300986 **SampType:** MS Units **mg/L**

SampID: 21100474-009AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.49**	2.000	0.3570	106.8	75	125	10/08/2021

Batch R300986 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100474-009AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.48**	2.000	0.3570	106.2	2.494	0.52	10/08/2021

SW-846 9251 (TOTAL)

Batch R301397 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**< 1**	0.5000	0	0	-100	100	10/18/2021

Batch R301397 **SampType:** MBLK Units **mg/L**

SampID: MBLK TCLP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride	*	1		**< 1**	0.5000	0	0	-100	100	10/18/2021

Batch R301397 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**20**	20.00	0	101.9	90	110	10/18/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 9251 (TOTAL)

Batch R301397 **SampType:** MS Units mg/L

SampID: 21100474-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		1		**39**	20.00	20.35	92.6	85	115	10/18/2021

Batch R301397 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 21100474-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		1		**38**	20.00	20.35	90.7	38.87	0.98	10/18/2021

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183830 **SampType:** MBLK Units mg/L

SampID: MBLK-183830

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/14/2021
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	10/14/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/14/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/14/2021

Batch 183830 **SampType:** LCS Units mg/L

SampID: LCS-183830

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.31**	2.500	0	92.4	85	115	10/14/2021
Magnesium		0.0500		**2.36**	2.500	0	94.4	85	115	10/14/2021
Potassium		0.100		**2.25**	2.500	0	90.0	85	115	10/14/2021
Sodium		0.0500		**2.16**	2.500	0	86.6	85	115	10/14/2021

Batch 183830 **SampType:** MS Units mg/L

SampID: 21100474-001EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**30.9**	2.500	30.88	-0.4	75	125	10/14/2021
Magnesium		0.0500	S	**19.3**	2.500	18.43	36.0	75	125	10/14/2021
Potassium		0.100		**4.78**	2.500	2.665	84.6	75	125	10/14/2021
Sodium		0.0500		**14.0**	2.500	11.72	92.8	75	125	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (DISSOLVED)

Batch 183830 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100474-001EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**30.6**	2.500	30.88	-10.8	30.87	0.85	10/14/2021
Magnesium		0.0500	S	**19.2**	2.500	18.43	31.2	19.33	0.62	10/14/2021
Potassium		0.100		**4.78**	2.500	2.665	84.8	4.781	0.06	10/14/2021
Sodium		0.0500		**14.0**	2.500	11.72	92.0	14.04	0.14	10/16/2021

Batch 183830 **SampType:** MS Units **mg/L**

SampID: 21100474-009EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**30.8**	2.500	29.05	70.8	75	125	10/14/2021
Magnesium		0.0500		**19.3**	2.500	17.35	79.6	75	125	10/14/2021
Potassium		0.100		**4.78**	2.500	2.548	89.4	75	125	10/14/2021
Sodium		0.0500		**13.9**	2.500	11.97	76.4	75	125	10/16/2021

Batch 183830 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100474-009EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**30.6**	2.500	29.05	62.0	30.82	0.72	10/14/2021
Magnesium		0.0500		**19.3**	2.500	17.35	79.2	19.34	0.05	10/14/2021
Potassium		0.100		**4.76**	2.500	2.548	88.4	4.782	0.52	10/14/2021
Sodium		0.0500		**14.1**	2.500	11.97	84.0	13.88	1.36	10/16/2021

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 183831 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183831

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	10/16/2021
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	10/16/2021
Phosphorus		0.100		**< 0.100**	0.0259	0	0	-100	100	10/19/2021
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	10/16/2021
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 183831 **SampType:** LCS Units **mg/L**

SampID: LCS-183831

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.63**	2.500	0	105.2	85	115	10/16/2021
Magnesium		0.0500		**2.72**	2.500	0	108.8	85	115	10/16/2021
Phosphorus		0.100		**0.987**	1.000	0	98.7	85	115	10/19/2021
Potassium		0.100		**2.51**	2.500	0	100.4	85	115	10/16/2021
Sodium		0.0500		**2.42**	2.500	0	96.8	85	115	10/16/2021

Batch 183831 **SampType:** MS Units **mg/L**

SampID: 21100474-009DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**35.4**	2.500	31.57	153.2	75	125	10/16/2021
Magnesium		0.0500	S	**22.0**	2.500	18.66	135.6	75	125	10/16/2021
Phosphorus		0.100		**1.10**	1.000	0.03670	105.9	75	125	10/20/2021
Potassium		0.100		**5.47**	2.500	2.787	107.4	75	125	10/16/2021
Sodium		0.0500		**15.0**	2.500	12.17	111.2	75	125	10/16/2021

Batch 183831 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100474-009DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**35.0**	2.500	31.57	139.2	35.40	0.99	10/16/2021
Magnesium		0.0500	S	**21.9**	2.500	18.66	131.2	22.05	0.50	10/16/2021
Phosphorus		0.100		**1.04**	1.000	0.03670	100.3	1.096	5.24	10/20/2021
Potassium		0.100		**5.46**	2.500	2.787	106.7	5.471	0.29	10/16/2021
Sodium		0.0500		**14.8**	2.500	12.17	106.0	14.95	0.87	10/16/2021

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183830 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183830

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/18/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/16/2021
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	10/16/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/16/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/16/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/16/2021
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	10/16/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/16/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/16/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/16/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/16/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/18/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/16/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/16/2021

Batch 183830 **SampType:** LCS Units **mg/L**

SampID: LCS-183830

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.480**	0.5000	0	95.9	80	120	10/18/2021
Arsenic		0.0010		**0.477**	0.5000	0	95.4	80	120	10/16/2021
Barium		0.0010		**1.98**	2.000	0	99.2	80	120	10/16/2021
Beryllium		0.0010		**0.0476**	0.0500	0	95.2	80	120	10/16/2021
Boron		0.0250		**0.480**	0.5000	0	96.1	80	120	10/16/2021
Cadmium		0.0010		**0.0457**	0.0500	0	91.5	80	120	10/16/2021
Chromium		0.0015		**0.187**	0.2000	0	93.4	80	120	10/16/2021
Cobalt		0.0010		**0.479**	0.5000	0	95.8	80	120	10/16/2021
Iron		0.0250		**1.79**	2.000	0	89.7	80	120	10/16/2021
Lead		0.0010		**0.459**	0.5000	0	91.7	80	120	10/16/2021
Lithium	*	0.0030		**0.496**	0.5000	0	99.1	80	120	10/16/2021
Manganese		0.0020		**0.496**	0.5000	0	99.2	80	120	10/18/2021
Molybdenum		0.0015		**0.478**	0.5000	0	95.6	80	120	10/16/2021
Selenium		0.0010		**0.440**	0.5000	0	88.1	80	120	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183830 **SampType:** MS Units mg/L

SampID: 21100474-001EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.482**	0.5000	0	96.3	75	125	10/18/2021
Arsenic		0.0010		**0.486**	0.5000	0.002140	96.8	75	125	10/16/2021
Barium		0.0010		**2.05**	2.000	0.05376	99.8	75	125	10/16/2021
Beryllium		0.0010		**0.0486**	0.0500	0	97.1	75	125	10/16/2021
Boron		0.0250		**0.533**	0.5000	0.04819	96.9	75	125	10/16/2021
Cadmium		0.0010		**0.0458**	0.0500	0	91.6	75	125	10/16/2021
Chromium		0.0015		**0.187**	0.2000	0	93.4	75	125	10/16/2021
Cobalt		0.0010		**0.477**	0.5000	0	95.3	75	125	10/16/2021
Iron		0.0250		**1.82**	2.000	0	91.1	75	125	10/16/2021
Lead		0.0010		**0.477**	0.5000	0	95.4	75	125	10/16/2021
Lithium	*	0.0030		**0.495**	0.5000	0	98.9	75	125	10/16/2021
Manganese		0.0020		**0.499**	0.5000	0.007737	98.3	75	125	10/18/2021
Molybdenum		0.0015		**0.476**	0.5000	0.0008432	95.0	75	125	10/16/2021
Selenium		0.0010		**0.447**	0.5000	0	89.4	75	125	10/16/2021

Batch 183830 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 21100474-001EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.482**	0.5000	0	96.5	0.4815	0.17	10/18/2021
Arsenic		0.0010		**0.480**	0.5000	0.002140	95.5	0.4859	1.30	10/16/2021
Barium		0.0010		**2.00**	2.000	0.05376	97.5	2.051	2.35	10/16/2021
Beryllium		0.0010		**0.0469**	0.0500	0	93.8	0.04857	3.55	10/16/2021
Boron		0.0250		**0.544**	0.5000	0.04819	99.2	0.5329	2.09	10/16/2021
Cadmium		0.0010		**0.0445**	0.0500	0	88.9	0.04582	2.99	10/16/2021
Chromium		0.0015		**0.181**	0.2000	0	90.7	0.1869	3.00	10/16/2021
Cobalt		0.0010		**0.464**	0.5000	0	92.8	0.4765	2.67	10/16/2021
Iron		0.0250		**1.89**	2.000	0	94.3	1.821	3.47	10/16/2021
Lead		0.0010		**0.466**	0.5000	0	93.2	0.4772	2.35	10/16/2021
Lithium	*	0.0030		**0.487**	0.5000	0	97.5	0.4946	1.46	10/16/2021
Manganese		0.0020		**0.493**	0.5000	0.007737	97.1	0.4991	1.23	10/18/2021
Molybdenum		0.0015		**0.472**	0.5000	0.0008432	94.3	0.4760	0.80	10/16/2021
Selenium		0.0010		**0.441**	0.5000	0	88.3	0.4469	1.27	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 183830 **SampType:** MS Units **mg/L**

SampID: 21100474-009EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.478**	0.5000	0.002429	95.2	75	125	10/19/2021
Arsenic		0.0010		**0.482**	0.5000	0.002084	96.0	75	125	10/16/2021
Barium		0.0010		**2.02**	2.000	0.05275	98.2	75	125	10/16/2021
Beryllium		0.0010		**0.0467**	0.0500	0	93.4	75	125	10/16/2021
Boron		0.0250		**0.527**	0.5000	0.05108	95.1	75	125	10/16/2021
Cadmium		0.0010		**0.0444**	0.0500	0	88.7	75	125	10/16/2021
Chromium		0.0015		**0.183**	0.2000	0	91.4	75	125	10/16/2021
Cobalt		0.0010		**0.468**	0.5000	0	93.7	75	125	10/16/2021
Iron		0.0250		**1.82**	2.000	0	91.0	75	125	10/16/2021
Lead		0.0010		**0.473**	0.5000	0	94.6	75	125	10/16/2021
Lithium	*	0.0030		**0.481**	0.5000	0	96.2	75	125	10/16/2021
Manganese		0.0020		**0.490**	0.5000	0.002708	97.5	75	125	10/18/2021
Molybdenum		0.0015		**0.476**	0.5000	0	95.2	75	125	10/16/2021
Selenium		0.0010		**0.448**	0.5000	0	89.7	75	125	10/16/2021

Batch 183830 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100474-009EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.479**	0.5000	0.002429	95.2	0.4782	0.09	10/19/2021
Arsenic		0.0010		**0.480**	0.5000	0.002084	95.6	0.4821	0.43	10/16/2021
Barium		0.0010		**2.04**	2.000	0.05275	99.2	2.016	1.05	10/16/2021
Beryllium		0.0010		**0.0469**	0.0500	0	93.7	0.04668	0.38	10/16/2021
Boron		0.0250		**0.516**	0.5000	0.05108	92.9	0.5267	2.12	10/16/2021
Cadmium		0.0010		**0.0447**	0.0500	0	89.4	0.04436	0.82	10/16/2021
Chromium		0.0015		**0.183**	0.2000	0	91.7	0.1828	0.28	10/16/2021
Cobalt		0.0010		**0.469**	0.5000	0	93.8	0.4685	0.16	10/16/2021
Iron		0.0250		**1.95**	2.000	0	97.7	1.819	7.17	10/16/2021
Lead		0.0010		**0.472**	0.5000	0	94.3	0.4728	0.25	10/16/2021
Lithium	*	0.0030		**0.479**	0.5000	0	95.7	0.4810	0.52	10/16/2021
Manganese		0.0020		**0.492**	0.5000	0.002708	97.8	0.4901	0.29	10/18/2021
Molybdenum		0.0015		**0.475**	0.5000	0	94.9	0.4759	0.26	10/16/2021
Selenium		0.0010		**0.447**	0.5000	0	89.3	0.4485	0.41	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183831 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183831

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/14/2021
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	10/14/2021
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	10/14/2021
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	10/14/2021
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	10/14/2021
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/14/2021
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	10/14/2021
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	10/14/2021
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	10/14/2021
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/15/2021
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	10/14/2021
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	10/14/2021
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	10/14/2021
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	10/14/2021

Batch 183831 **SampType:** LCS Units **mg/L**

SampID: LCS-183831

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.513**	0.5000	0	102.5	80	120	10/15/2021
Arsenic		0.0010		**0.517**	0.5000	0	103.3	80	120	10/15/2021
Barium		0.0010		**2.16**	2.000	0	108.1	80	120	10/15/2021
Beryllium		0.0010		**0.0458**	0.0500	0	91.5	80	120	10/14/2021
Boron		0.0250		**0.456**	0.5000	0	91.2	80	120	10/14/2021
Cadmium		0.0010		**0.0490**	0.0500	0	98.1	80	120	10/15/2021
Chromium		0.0015		**0.192**	0.2000	0	95.9	80	120	10/14/2021
Cobalt		0.0010		**0.487**	0.5000	0	97.4	80	120	10/14/2021
Iron		0.0250		**1.83**	2.000	0	91.3	80	120	10/14/2021
Lead		0.0010		**0.513**	0.5000	0	102.6	80	120	10/15/2021
Lithium	*	0.0030		**0.470**	0.5000	0	94.0	80	120	10/14/2021
Manganese		0.0020		**0.494**	0.5000	0	98.8	80	120	10/14/2021
Molybdenum		0.0015		**0.490**	0.5000	0	97.9	80	120	10/15/2021
Selenium		0.0010		**0.502**	0.5000	0	100.4	80	120	10/15/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 183831 **SampType:** MS Units **mg/L**

SampID: 21100474-009DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.518**	0.5000	0	103.6	75	125	10/16/2021
Arsenic		0.0010		**0.525**	0.5000	0.002523	104.6	75	125	10/16/2021
Barium		0.0010		**2.23**	2.000	0.06808	108.3	75	125	10/16/2021
Beryllium		0.0010		**0.0459**	0.0500	0	91.7	75	125	10/14/2021
Boron		0.0250		**0.484**	0.5000	0.03650	89.5	75	125	10/14/2021
Cadmium		0.0010		**0.0490**	0.0500	0	97.9	75	125	10/16/2021
Chromium		0.0015		**0.195**	0.2000	0	97.4	75	125	10/14/2021
Cobalt		0.0010		**0.484**	0.5000	0.0001342	96.8	75	125	10/14/2021
Iron		0.0250		**2.25**	2.000	0.2450	100.4	75	125	10/14/2021
Lead		0.0010		**0.524**	0.5000	0	104.8	75	125	10/16/2021
Lithium	*	0.0030		**0.463**	0.5000	0	92.5	75	125	10/14/2021
Manganese		0.0020		**0.580**	0.5000	0.08407	99.1	75	125	10/14/2021
Molybdenum		0.0015		**0.503**	0.5000	0.0006163	100.5	75	125	10/16/2021
Selenium		0.0010		**0.504**	0.5000	0	100.8	75	125	10/16/2021

Batch 183831 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 21100474-009DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.525**	0.5000	0	105.0	0.5181	1.27	10/16/2021
Arsenic		0.0010		**0.525**	0.5000	0.002523	104.4	0.5253	0.15	10/16/2021
Barium		0.0010		**2.25**	2.000	0.06808	109.2	2.235	0.78	10/16/2021
Beryllium		0.0010		**0.0451**	0.0500	0	90.2	0.04587	1.68	10/14/2021
Boron		0.0250		**0.486**	0.5000	0.03650	89.9	0.4839	0.43	10/14/2021
Cadmium		0.0010		**0.0495**	0.0500	0	99.0	0.04897	1.12	10/16/2021
Chromium		0.0015		**0.190**	0.2000	0	95.2	0.1948	2.27	10/14/2021
Cobalt		0.0010		**0.482**	0.5000	0.0001342	96.4	0.4841	0.44	10/14/2021
Iron		0.0250		**2.19**	2.000	0.2450	97.2	2.252	2.90	10/14/2021
Lead		0.0010		**0.520**	0.5000	0	104.0	0.5240	0.76	10/16/2021
Lithium	*	0.0030		**0.457**	0.5000	0	91.5	0.4626	1.15	10/14/2021
Manganese		0.0020		**0.574**	0.5000	0.08407	97.9	0.5795	1.00	10/14/2021
Molybdenum		0.0015		**0.511**	0.5000	0.0006163	102.0	0.5032	1.44	10/16/2021
Selenium		0.0010		**0.502**	0.5000	0	100.4	0.5042	0.41	10/16/2021

Client: Golder Associates, Inc **Work Order:** 21100474

Client Project: Kincaid SW **Report Date:** 12-Nov-21

SW-846 7470A (DISSOLVED)

Batch 183875 **SampType:** MS Units **mg/L**

SampID: 21100474-009EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00519**	0.0050	0	103.8	75	125	10/13/2021

Batch 183875 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100474-009EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00512**	0.0050	0	102.4	0.005192	1.36	10/13/2021

SW-846 7470A (TOTAL)

Batch 183875 **SampType:** MBLK Units **mg/L**

SampID: MBLK-183875

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	10/13/2021

Batch 183875 **SampType:** LCS Units **mg/L**

SampID: LCS-183875

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00513**	0.0050	0	102.7	85	115	10/13/2021

Batch 183875 **SampType:** MS Units **mg/L**

SampID: 21100474-009DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00503**	0.0050	0	100.5	75	125	10/13/2021

Batch 183875 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 21100474-009DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00508**	0.0050	0	101.6	0.005025	1.13	10/13/2021

Receiving Check List

Teklab Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Golder Associates, Inc
Client Project: Kincaid SW

Work Order: 21100474
Report Date: 12-Nov-21

Carrier: Employee

Received By: PWR

Completed by: Mary E. Kemp
On: 08-Oct-21

Mary E. Kemp

Reviewed by: Marvin L. Darling II
On: 08-Oct-21

Marvin L. Darling

Pages to follow: Chain of custody 2 Extra pages included 35

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 7.4		
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐		
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐				

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☑	No ☐	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

pH strip #77492/75846. - PR/MKemp - 10/8/2021 9:11:11 AM

CHAIN OF CUSTODY

pg. 1 of 2 Work order # 21100474

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Golder Associates, Inc
Address: 13515 Barrett Parkway Drive, Suite 260
City / State / Zip Ballwin, MO 63021
Contact: Jeffrey Ingram **Phone:** (314) 984-8800
E-Mail: Jeffrey_Ingram@golder.com **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 7.4 °C LTG# 1
Preserved in: ☐ LAB ☒ FIELD 77492 75846 PR 10/8/21 **FOR LAB USE ONLY**
Lab Notes
Per Jeffrey Ingram, ~~K-MS~~ K-MS-1, K-MSD-1 are ms/msd fo K-H-2D MEK 10/8/21

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Client Comments: TE MEK 10/8/21
Total Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo P K Se Na Tl
Dissolved Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo K Se Na Tl
Field: pH, DO, ORP, Conductivity, Temp, and Turbidity

Project Name/Number: Kincaid SW
Sample Collector's Name: Eric Schneider

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)
Billing Instructions

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Bicarbonate	Carbonate	Chloride	Dissolved Metals	Ferric Iron	Ferrous Iron	Fluoride	Nitrate	SUB Ra226/228	Sulfate	Sulfide	TDS	TDC	Total Metals
21100474-001	K-G-1	10/7/2021 0750	2	4		1	2		1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
002	K-G-2M	0813	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
003	K-G-2D	0825	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
004	K-I-1	1010	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
005	K-I-2M	1028	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
006	K-I-2D	1041	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
007	K-H-1	1101	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
008	K-H-2M	1122	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
009	K-H-2D	1142	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”
~~009~~010	K-MS-1	1142	”	”		”	”		”							”	”	”	”	”	”	”	”	”	”	”	”	”	”	”

TE MEK 10/8/21

Relinquished By	Date/Time	Received By	Date/Time
[signature]	10/7/21 1500	[signature]	10/7/21 1500

The individual signing this agreement on behalf of the client, acknowledges that he/she has read and understands the terms and conditions of this agreement, and that he/she has the authority to sign on behalf of the client. See www.teklabinc.com for terms and conditions.

BottleOrder: 67929

CHAIN OF CUSTODY

 Work order # 2100474

TEKLAB, INC. 5445 Horseshoe Lake Road - Collinsville, IL 62234 - Phone: (618) 344-1004 - Fax: (618) 344-1005

Client: Golder Associates, Inc
Address: 13515 Barrett Parkway Drive, Suite 260
City / State / Zip Ballwin, MO 63021
Contact: Jeffrey Ingram **Phone:** (314) 984-8800
E-Mail: Jeffrey_Ingram@golder.com **Fax:**

Samples on: ☒ ICE ☐ BLUE ICE ☐ NO ICE 7.4 °C LTG# 1
Preserved in: ☐ LAB ☐ FIELD 77492 **FOR LAB USE ONLY**
Lab Notes 75846 PR 10-8-21

Client Comments:
Total Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo P K Se Na Tl
Dissolved Metals: Sb As Ba Be Bo Cd Ca Cr Co Fe Pb Li Mg Mn Hg Mo K Se Na Tl
Field: pH, DO, ORP, Conductivity, Temp. and Turbidity

Are these samples known to be involved in litigation? If yes, a surcharge will apply ☐ Yes ☐ No
Are these samples known to be hazardous? ☐ Yes ☐ No
Are there any required reporting limits to be met on the requested analysis?. If yes, please provide limits in the comment section. ☐ Yes ☐ No

Project Name/Number: Kincaid SW
Sample Collector's Name:

Results Requested: ☐ Standard ☐ 1-2 Day (100% Surcharge) ☐ Other ____ ☐ 3 Day (50% Surcharge)
Billing Instructions:

Lab Use Only	Sample Identification	Date/Time Sampled	UNPRES	HNO3	NaOH	H2SO4	HCL	MeOH	NaHSO4	OTHER	Aqueous	Drinking Water	Soil	Sludge	Special Waste	Groundwater	Bicarbonate	Carbonate	Chloride	Dissolved Metals	Ferric Iron	Ferrous Iron	Fluoride	Nitrate	SUB Ra226/228	Sulfate	Sulfide	TDS	TOC	Total Metals
2100474 ~~-011~~ 009	K-MSD-1 TE MEC 10/8/21	10/7/21 1142	2	2		1	1		1							X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Relinquished By	Date/Time	Received By	Date/Time
[signature]	10/7/2021 1500	[signature]	10/7/21 1500

BottleOrder: 67929

LELAP CERTIFICATE NUMBER: 01955
DOD-ELAP ACCREDITATION NUMBER: 74960

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 11/08/2021

Report # 221102389

Project 21100474

Samples Collected 10/7/21

Deliver To	***Additional Recipients***
Elizabeth Hurley Teklab, Inc 5445 Horseshoe Lake Road Collinsville, IL 62234 618-344-1004	NONE

PJLA Testing DoD ELAP

ISO 17025

NELAP ACCREDITED TNI LABORATORY

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics **-** The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 221102389

Certifications

Certification	Certification Number
DOD ELAP	74960
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: Teklab Inc **Report:** 221102389

Pace Analytical Gulf Coast received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

PROJECT MANAGER COMMENTS

Project Manager Comments - There was insufficient volume available to perform MS/MSD analyses for sample 21100474-009 (Ruth Welsh(Do Not 11/04/2021 13:19)

Sample Summary

Lab ID	Client ID	Matrix	Collect Date	Receive Date
22110238901	21100474-001	Water	10/07/21 07:50	10/20/21 10:05
22110238902	21100474-002	Water	10/07/21 08:13	10/20/21 10:05
22110238903	21100474-003	Water	10/07/21 08:25	10/20/21 10:05
22110238904	21100474-004	Water	10/07/21 10:10	10/20/21 10:05
22110238905	21100474-005	Water	10/07/21 10:28	10/20/21 10:05
22110238906	21100474-006	Water	10/07/21 10:41	10/20/21 10:05
22110238907	21100474-007	Water	10/07/21 11:01	10/20/21 10:05
22110238908	21100474-008	Water	10/07/21 11:22	10/20/21 10:05
22110238909	21100474-009	Water	10/07/21 11:42	10/20/21 10:05

Detect Summary

No analytes were detected for analyses performed by Pace Gulf Coast.

Sample Results

21100474-001	Collect Date	10/07/2021 07:50	Lab ID	22110238901
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 19:59	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 20:48	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100474-002	Collect Date	10/07/2021 08:13	Lab ID	22110238902
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:03	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 20:52	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100474-003	Collect Date	10/07/2021 08:25	Lab ID	22110238903
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:06	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 20:55	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100474-004	Collect Date	10/07/2021 10:10	Lab ID	22110238904
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:10	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 20:59	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100474-005	Collect Date	10/07/2021 10:28	Lab ID	22110238905
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:13	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 21:02	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100474-006	Collect Date	10/07/2021 10:41	Lab ID	22110238906
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:24	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 21:06	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100474-007	Collect Date	10/07/2021 11:01	Lab ID	22110238907
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:27	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 21:16	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

21100474-008	Collect Date	10/07/2021 11:22	Lab ID	22110238908
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:31	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 21:20	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Sample Results

21100474-009	Collect Date	10/07/2021 11:42	Lab ID	22110238909
	Receive Date	10/20/2021 10:05	Matrix	Water

EPA 6020B

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/05/21 05:15	724638	EPA 3010A	1	11/05/21 20:34	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

EPA 6020B Dissolved

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/04/21 17:35	724646	EPA 3005A Dissolved	1	11/05/21 21:23	725918	LWZ	

CAS#	Parameter	Result	LOQ	Units
7440-28-0	Thallium	ND	1.00	ug/L

Inorganics QC Summary

Analytical Batch 725918 **Prep Batch** 724638 **Prep Method** EPA 3010A	Client ID / Lab ID / Sample Type / Prep Date / Analysis Date / Matrix	MB724638 / 2260422 / MB / 11/05/21 05:15 / 11/05/21 19:35 / Water		LCS724638 / 2260423 / LCS / 11/05/21 05:15 / 11/05/21 19:38 / Water				LCSD724638 / 2267716 / LCSD / 11/05/21 05:15 / 11/05/21 19:42 / Water				
EPA 6020B		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	49.9	100	80 - 120	50.0	49.5	99	1	20

Analytical Batch 725918 **Prep Batch** 724646 **Prep Method** EPA 3005A Dissolved	Client ID / Lab ID / Sample Type / Prep Date / Analysis Date / Matrix	MB724646 / 2260441 / MB / 11/04/21 17:35 / 11/05/21 20:38 / Water		LCS724646 / 2260442 / LCS / 11/04/21 17:35 / 11/05/21 20:41 / Water				LCSD724646 / 2266914 / LCSD / 11/04/21 17:35 / 11/05/21 20:45 / Water				
EPA 6020B Dissolved		Units Result	ug/L LOQ	Spike Added	Result	%R	Control Limits%R	Spike Added	Result	%R	RPD	RPD Limit
Thallium	7440-28-0	ND	1.00	50.0	49.6	99	80 - 120	50.0	48.7	97	2	20

Pg ___ of ___

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (618) 344-1005

Are the samples chilled? YES ☐ NO ☐ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: ___ Sampler: Client QC Level: 3

Comments: **Please Issue reports and invoices via email only**
Please analyze for Tl by SW-846 3005A, 6020A, Metals by ICPMS on your standard turn around time. Dissolved fraction marked with "D" on label.
Batch QC is required for all analyses requested.

Project# 21100474

Contact: Elizabeth A. Hurley Email: ehurley@teklabinc.com
Requested Due Date: STD TAT Billing/PO: 32007 Phone: (618) 344-1004 ext 33

PLEASE NOTE:

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Tl	Dissolved Tl	MS/MSD									
	21100474-001	10/7/2021 7:50:00 AM	HNO3	Groundwater	✓	✓										1
	21100474-002	10/7/2021 8:13:00 AM	HNO3	Groundwater	✓	✓										2
	21100474-003	10/7/2021 8:25:00 AM	HNO3	Groundwater	✓	✓										3
	21100474-004	10/7/2021 10:10:00 AM	HNO3	Groundwater	✓	✓										4
	21100474-005	10/7/2021 10:28:00 AM	HNO3	Groundwater	✓	✓										5
	21100474-006	10/7/2021 10:41:00 AM	HNO3	Groundwater	✓	✓										6
	21100474-007	10/7/2021 11:01:00 AM	HNO3	Groundwater	✓	✓										7
	21100474-008	10/7/2021 11:22:00 AM	HNO3	Groundwater	✓	✓										8
	21100474-009	10/7/2021 11:42:00 AM	HNO3	Groundwater	✓	✓	✓									9,10,11
			HNO3	Groundwater												
			HNO3	Groundwater												

*Relinquished By	Date/Time	Received By	Date/Time
Mary Kamp	10/19/21 1800		
FedEx	10/20/21 1005	[signature]	10/20/21 1005

21.5 E38
5300 5201 6610

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper autho
Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TN

Client ID: 5233 - Teklab Inc
SDG: 221102389
PM: RWe

SAMPLE RECEIVING CHECKLIST

221102389

SAMPLE DELIVERY GROUP	221102389
Client 5233 - Teklab Inc; **PM** RWe	**Transport Method** FEDEX
Profile Number 290458	**Received By** McCune, Dodie N.
Line Item(s) 15 - Tl - 6020, total & Diss	**Receive Date(s)** 10/20/21

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill (Thermometer ID: E34)	Temp °C
530052016610	21.5

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

November 03, 2021

Ms. Elizabeth Hurley
Teklab Inc.
5445 Horseshoe Lake Road
Collinsville, IL 62234

RE: Project: 21100474
Pace Project No.: 30446071

Dear Ms. Hurley:

Enclosed are the analytical results for sample(s) received by the laboratory on October 14, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Greensburg

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

David A. Pichette
david.pichette@pacelabs.com
(724)850-5617
Project Manager

Enclosures

CERTIFICATIONS

Project: 21100474
Pace Project No.: 30446071

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: 21100474
Pace Project No.: 30446071

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30446071001	**21100474-001**	Water	10/07/21 07:50	10/14/21 09:30
30446071002	**21100474-002**	Water	10/07/21 08:13	10/14/21 09:30
30446071003	**21100474-003**	Water	10/07/21 08:25	10/14/21 09:30
30446071004	**21100474-004**	Water	10/07/21 10:10	10/14/21 09:30
30446071005	**21100474-005**	Water	10/07/21 10:28	10/14/21 09:30
30446071006	**21100474-006**	Water	10/07/21 10:41	10/14/21 09:30
30446071007	**21100474-007**	Water	10/07/21 11:01	10/14/21 09:30
30446071008	**21100474-008**	Water	10/07/21 11:22	10/14/21 09:30
30446071009	**21100474-009**	Water	10/07/21 11:42	10/14/21 09:30

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: 21100474
Pace Project No.: 30446071

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30446071001	**21100474-001**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071002	**21100474-002**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071003	**21100474-003**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071004	**21100474-004**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071005	**21100474-005**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071006	**21100474-006**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071007	**21100474-007**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071008	**21100474-008**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA
30446071009	**21100474-009**	EPA 903.1	SLC	1	PASI-PA
		EPA 904.0	JC2	1	PASI-PA

PASI-PA = Pace Analytical Services - Greensburg

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 21100474
Pace Project No.: 30446071

Method: **EPA 903.1**
Description: 903.1 Radium 226
Client: Teklab Inc.
Date: November 03, 2021

General Information:
9 samples were analyzed for EPA 903.1 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

PROJECT NARRATIVE

Project: 21100474
Pace Project No.: 30446071

Method: **EPA 904.0**
Description: 904.0 Radium 228
Client: Teklab Inc.
Date: November 03, 2021

General Information:
9 samples were analyzed for EPA 904.0 by Pace Analytical Services Greensburg. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-001 **Lab ID: 30446071001** Collected: 10/07/21 07:50 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.247 ± 0.454 (1.03) C:NA T:91%**	pCi/L	11/03/21 14:36	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.326 ± 0.610 (1.34) C:68% T:80%**	pCi/L	10/29/21 17:34	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-002 **Lab ID: 30446071002** Collected: 10/07/21 08:13 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.275 (0.444) C:NA T:89%**	pCi/L	11/03/21 14:36	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.651 ± 0.550 (1.10) C:70% T:85%**	pCi/L	10/29/21 17:34	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-003 **Lab ID: 30446071003** Collected: 10/07/21 08:25 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.0651 ± 0.460 (0.917) C:NA T:97%**	pCi/L	11/03/21 14:36	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**1.16 ± 0.705 (1.29) C:69% T:70%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-004 **Lab ID: 30446071004** Collected: 10/07/21 10:10 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.286 ± 0.338 (0.532) C:NA T:92%**	pCi/L	11/03/21 14:48	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.432 ± 0.532 (1.13) C:69% T:83%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-005 **Lab ID: 30446071005** Collected: 10/07/21 10:28 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.0641 ± 0.487 (1.02) C:NA T:86%**	pCi/L	11/03/21 14:36	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**-0.243 ± 0.600 (1.43) C:71% T:81%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-006 **Lab ID: 30446071006** Collected: 10/07/21 10:41 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.337 ± 0.314 (0.413) C:NA T:96%**	pCi/L	11/03/21 14:59	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.183 ± 0.544 (1.22) C:71% T:86%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-007 **Lab ID: 30446071007** Collected: 10/07/21 11:01 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.108 ± 0.261 (0.503) C:NA T:99%**	pCi/L	11/03/21 14:59	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.656 ± 0.752 (1.59) C:67% T:76%**	pCi/L	10/29/21 17:34	15262-20-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical®
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-008 **Lab ID: 30446071008** Collected: 10/07/21 11:22 Received: 10/14/21 09:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**-0.129 ± 0.309 (0.773) C:NA T:82%**	pCi/L	11/03/21 14:59	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.192 ± 0.539 (1.21) C:70% T:80%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

Sample: 21100474-009 | **Lab ID: 30446071009** | Collected: 10/07/21 11:42 | Received: 10/14/21 09:30 | Matrix: Water
PWS: | Site ID: | Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
	Pace Analytical Services - Greensburg					
Radium-226	EPA 903.1	**0.000 ± 0.410 (0.889) C:NA T:86%**	pCi/L	11/03/21 14:59	13982-63-3	
	Pace Analytical Services - Greensburg					
Radium-228	EPA 904.0	**0.392 ± 0.542 (1.16) C:68% T:81%**	pCi/L	10/29/21 17:34	15262-20-1	

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

QC Batch: 469205
QC Batch Method: EPA 903.1
Analysis Method: EPA 903.1
Analysis Description: 903.1 Radium-226
Laboratory: Pace Analytical Services - Greensburg
Associated Lab Samples: 30446071001, 30446071002, 30446071003, 30446071004, 30446071005, 30446071006, 30446071007, 30446071008, 30446071009

METHOD BLANK: 2265820 Matrix: Water
Associated Lab Samples: 30446071001, 30446071002, 30446071003, 30446071004, 30446071005, 30446071006, 30446071007, 30446071008, 30446071009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0847 ± 0.311 (0.597) C:NA T:97%	pCi/L	11/03/21 14:10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL - RADIOCHEMISTRY

Project: 21100474
Pace Project No.: 30446071

QC Batch:	469206	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
		Laboratory:	Pace Analytical Services - Greensburg

Associated Lab Samples: 30446071001, 30446071002, 30446071003, 30446071004, 30446071005, 30446071006, 30446071007, 30446071008, 30446071009

METHOD BLANK: 2265822 Matrix: Water

Associated Lab Samples: 30446071001, 30446071002, 30446071003, 30446071004, 30446071005, 30446071006, 30446071007, 30446071008, 30446071009

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.181 ± 0.276 (0.597) C:71% T:94%	pCi/L	10/29/21 14:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: 21100474
Pace Project No.: 30446071

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. Is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WO#: 30446071

Pg

30446071

TEKLAB, INC. Chain of Custody

5445 Horseshoe Lake Road, Collinsville, IL 62234 Phone (618) 344-1004 Fax (6

Are the samples chilled? YES ☐ NO ☑ With: ☐ Ice ☐ Blue Ice Preserved in: ☐ Lab ☐ Field

Teklab Inc
5445 Horseshoe Lake Road
Collinsville, IL 62234

Cooler Temp: Sampler: Client QC Level: 3

Project# 21100474

Contact: Emily E. Hayer
Requested Due Date: 10-15 day TAT

Email: ehayer@teklabinc.com
Billing/PO: 31938

Comments: **Please Issue reports and invoices via email only**
Please analyze for Radium 22/228 per method EPA 903.0/904.0 on your standard turn around time.
Batch QC is required for all analyses requested.

Any changes to analysis/methods must be approved by Teklab, Inc.
Phone: (618) 344-1004 ext 44

PLEASE NOTE

NELAP accreditation is required on the requested analytes and must be documented as such on the final report. If your laboratory does not currently hold a NELAP accreditation for the requested method and/or analytes, please contact Teklab immediately. If your laboratory loses accreditation or is suspended for any analyte/method during the life of the contract, you must contact Teklab immediately.

Lab Use	Sample ID	Sample Date/Time	Preservative	Matrix	Ra226/228	MS/MSD										
001	21100474-001	10/7/21 0750	HNO3	Groundwater	✓											
002	21100474-002	10/7/21 0813	HNO3	Groundwater	✓											
003	21100474-003	10/7/21 0825	HNO3	Groundwater	✓											
004	21100474-004	10/7/21 1010	HNO3	Groundwater	✓											
	21100474-005	10/7/21 1028	HNO3	Groundwater	✓											
	21100474-006	10/7/21 1041	HNO3	Groundwater	✓											
	21100474-007	10/7/21 1101	HNO3	Groundwater	✓											
	21100474-008	10/7/21 1122	HNO3	Groundwater	✓											
	21100474-009	10/7/21 1142	HNO3	Groundwater	✓	✓										
			HNO3	Groundwater												
			HNO3	Groundwater												

*Relinquished By	Date/Time	Received By	Date/Time
		[signature]	10/11/21 0900

Teklab maintains a strict policy of client confidentiality and as such does not provide client/sampler information without proper authorization. and proprietary rights. Teklab, Inc. protects clients' confidential information as directed by local, state or federal laws. (Teklab QAM Section 9.1, TNI V1 M2 Section 4.1.5 c)

SubCocRevA
3/2/2016

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical   Client Name: Teklab   Project # 30446071

WO#: 30446071
PM: DAP   Due Date: 11/04/21
CLIENT: TEKLAB

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other ______

Label
LIMS Login

Tracking #: 5300 5201 5739/5717/5706

Custody Seal on Cooler/Box Present: ☐ yes ☑ no   Seals intact: ☐ yes ☐ no

Thermometer Used —   Type of Ice: Wet Blue (None)

Cooler Temperature   Observed Temp — °C   Correction Factor: — °C   Final Temp: — °C

Temp should be above freezing to 6°C

pH paper Lot# 1000411   Date and Initials of person examining contents: AL 10/15/21

Comments:	Yes	No	N/A	
Chain of Custody Present:	X			1.
Chain of Custody Filled Out:	X			2.
Chain of Custody Relinquished:		X		3.
Sampler Name & Signature on COC:		X		4.
Sample Labels match COC:		X		5. Volume not received for -005 through -009
-Includes date/time/ID Matrix: WT				
Samples Arrived within Hold Time:	X			6.
Short Hold Time Analysis (<72hr remaining):		X		7.
Rush Turn Around Time Requested:		X		8.
Sufficient Volume:	X			9.
Correct Containers Used:	X			10.
-Pace Containers Used:		X		
Containers Intact:	X			11.
Orthophosphate field filtered			X	12.
Hex Cr Aqueous sample field filtered			X	13.
Organic Samples checked for dechlorination:			X	14.
Filtered volume received for Dissolved tests			X	15.
All containers have been checked for preservation.	X			16.
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix				
All containers meet method preservation requirements.	X			Initial when completed: AL — Date/time of preservation:
				Lot # of added preservative
Headspace in VOA Vials (>6mm):			X	17.
Trip Blank Present:			X	18.
Trip Blank Custody Seals Present			X	
Rad Samples Screened < 0.5 mrem/hr	X			Initial when completed: AL — Date: 10/15/21 — Survey Meter SN: 1523

Client Notification/ Resolution:

Person Contacted: ______ Date/Time: ______ Contacted By: ______

Comments/ Resolution: ______

☐ **A check in this box indicates that additional information has been stored in ereports.**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

J:\QAQC\17_Master\Document Management\Sample Mgt\Mastercontrol\ENV-FRM-GBUR-0088 00 Sample Condition Upon Receipt-Pittsburgh

30446071

David Pichette

From: Elizabeth A. Hurley <EHurley@TekLabInc.com>
Sent: Friday, October 15, 2021 1:54 PM
To: David Pichette
Subject: Teklab CoCs
Attachments: 21100448SUBCOC.pdf; 21100474SUBCOC.pdf

CAUTION: This email originated from outside Pace Analytical. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi, David,

Thanks, again, for calling about the missing CoCs. Copies are attached for your review/use.

Have a great day!

Elizabeth Hurley
Director of Customer Service

Teklab, Inc.
5445 Horseshoe Lake Road
Collinsville, IL 62234
Phone: (618) 344-1004
Ext. 33
Cell: (618) 791-8119
Fax: (618) 344-1005
E-mail: ehurley@teklabinc.com
www.teklabinc.com

APPENDIX F
Geochemical Conceptual Site Model

GEOCHEMICAL CONCEPTUAL SITE MODEL

KINCAID ASH POND

Submitted to:

RAMBOLL

Ramboll Americas Engineering Solutions, Inc.
234 W. Florida Street
Fifth floor
Milwaukee, WI 53204

Submitted by:

LIFECYCLEGEO

Life Cycle Geo, LLC
729 Main Street
Longmont, Colorado 80501

23RAM01-1
May 8, 2024

TABLE OF CONTENTS

FIGURES

TABLES

ATTACHMENTS

1.0 EXECUTIVE SUMMARY

This report documents the geochemical conceptual site model (GCSM) describing the conditions of the groundwater in the vicinity of the Kincaid (KIN) Ash Pond (AP). A GCSM describes the geochemical processes that contribute to mobilization and attenuation of constituents in the environment. This report describes the GCSM for parameters that have exceeded the GWPS in AP groundwater and which will be addressed in the corrective action plan. The exceedances observed at the AP occur in the upper aquifer (UA) and potential migration pathway (PMP) and include boron, sulfate, and total dissolved solids (TDS).

The CCR materials are the primary source of constituent loading to the CCR porewater. Over an extended period (e.g., months to years), the CCR porewater (i.e., water contained within the interstitial pore spaces of the CCR that can be sampled by low-flow groundwater sampling methods) reaches equilibrium with the CCR materials. The porewater is therefore representative of the mobile phase constituents capable of migrating into the underlying materials and potentially downgradient in groundwater. The AP CCR porewater is therefore the primary vector of sulfate and boron *available* to the shallow groundwater and is considered as the primary source term for environmental investigation.

Boron and sulfate are assessed as indicators of influence from the CCR materials. Where observed in shallow groundwater at concentrations above the groundwater protection standard, concentrations of boron and sulfate are indicative of impacts by CCR porewater. The uneven distribution of sulfate in the shallow UA/PMP groundwater is attributed to the observed chemical heterogeneity in the AP porewater and physical or chemical heterogeneity along the groundwater flow path.

Geochemical attenuation of constituents in groundwater is a function of groundwater pH, redox potential, availability of adsorbent, and presence of competing ions, among other factors. Groundwater pH exerts a major control on constituent mobility and reflects a neutral and generally stable condition in the range of 6 to 7.5 S.U. independent of location, lithology, or exceedance status. The stability of pH in groundwater is an indication that groundwater is well buffered, likely due to the widespread presence of carbonate minerals in the aquifer solids which buffer pH within this range. Neutral groundwater pH is generally favorable to attenuation of constituents in groundwater, such that it promotes the precipitation of the mineral phases that adsorb constituents from the aqueous phase. Groundwater pH additionally controls the tendency of various constituents to adsorb to the mineral surface. CCR porewater pH is generally similar to groundwater pH.

The oxidation and reduction potential (redox potential) of groundwater exerts another major control on constituent mobility in groundwater. Specifically, in the context of CCR, the iron hydroxide minerals that facilitate attenuation of many constituents, including boron and sulfate, tend towards dissolution under anoxic conditions (also known as reducing, or low oxygen). These same iron hydroxide minerals tend towards precipitation under oxic conditions. Porewater ORP is generally reducing, while background groundwater ORP is more oxidized. Exceedance wells oscillate between reducing and oxidizing conditions. It appears that the groundwater measured at the exceedance wells is under some influence of the reducing condition from the CCR porewater, which may in turn have implications for the stability of attenuating mineral phases under the pre-closure condition.

Characterization data from the aquifer solids is considered to understand the reactive mineral fractions present in the aquifer solids and the binding mechanisms that control the partitioning of constituents between the solid and aqueous phases. The key finding from the aquifer solids assessment is that adsorptive minerals are present in the aquifer solids and have currently bound both boron and sulfate within the reactive fraction of the solid matrix. The inference follows that some degree of attenuation of the exceedance constituents by the aquifer solids has occurred in the past, most notably through adsorption to both iron and aluminum hydroxide minerals. The future condition of related attenuation is reserved for subsequent assessment and predictions related to the closure condition and corrective action.

2.0 INTRODUCTION

This report documents the development of a geochemical conceptual site model (GCSM) to describe conditions at the Kincaid (KIN) Ash Pond (AP), which is part of the Kincaid Power Plant (KPP). The GCSM was prepared in support of an evaluation of the nature and extent (N&E) of exceedances of constituents of concern (COCs) above the groundwater protection standards (GWPS) at the AP. This document has been prepared as an attachment to the KIN AP N&E Report (Ramboll, 2024). Boron, sulfate, and total dissolved solids (TDS) are the constituents with exceedances above the GWPS at the KIN AP. Exceedances were observed at compliance monitoring wells MW-12, MW-20S, MW-28, and MW-32 during the second quarter 2023 sampling event completed under 35 IAC §845.

The following exceedances were identified in the uppermost aquifer (UA) hydrostratigraphic unit (HSU):

- Boron (MW-12 and MW-28)
- Sulfate (MW-28 and MW-32)
- TDS (MW-28)

The following additional exceedances were identified in the potential migration pathway (PMP):

- Sulfate (MW-7S, MW-20S)
- Boron (MW-7S)

2.1 SITE OVERVIEW

A thorough overview of site characteristics are presented in KIN AP N&E Report (Ramboll, 2024). Briefly, the KPP is located in Christan County, Illinois. The KIN AP is bordered to the northwest by Sangchris Lake, to the west by an intake flume, to the south by the KPP and the discharge flume, and to the north and east by Sangchris Lake State Park. The AP is an unlined 172-acre surface impoundment that began operations in 1964 and primarily contains bottom ash, boiler slag, and minor quantities of other materials. The AP primarily contains bottom ash and boiler slag, and other minor materials, including water and wastewater treatment solids, excavation spoils, and dredge spoils.

Full descriptions of site geology and hydrogeology are available in the Hydrogeologic Site Characterization Report (Ramboll, 2021a). In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units

(HSUs), including: the upper semi-confining unit (USCU), the UA, the lower confining unit (LCU) and the bedrock confining unit (BCU). The USCU consists of low permeability clays with some silt and minor sand. Discontinuous sand lenses within the USCU are considered the PMP. The UA is a thin, moderately permeable sand, silty sand, and clayey gravel. The LCU is a dense gray till, and the BCU is interbedded shale and limestone. Exceedance wells MW-28, MW-12, and MW-32 are screened in the UA, while MW-7S and MW-20S are screened in the PMP.

A groundwater monitoring network was proposed in accordance with I.A.C Title 35 Section 845.630 to monitor groundwater quality that passes the waste boundary as part of the Operating Permit Application to Illinois Environmental Protection Agency (IEPA) for the AP. The proposed groundwater monitoring network is described in the Groundwater Monitoring Plan (Ramboll 2021a). Groundwater flow in the UA is radial away from the pond (Figure 2-1). A detailed discussion of the hydrogeology of the Site is presented in KIN AP N&E Report (Ramboll, 2024).

3.0 CONSTITUENT TRANSPORT AND FATE

The three exceedance parameters at KIN AP are sulfate, TDS, and boron. Sulfate is the dominant form of oxidized sulfur (S(VI)) in the environment and is present as a divalent oxyanion at pH values greater than 2 S.U (Stumm and Morgan, 1996). Under reducing conditions, sulfate in groundwater can be reduced to elemental sulfur (S(0)) or sulfide (S(-II)). Sulfur species in groundwater may sorb onto positively charged sites on solid metal oxide phases, most commonly iron and manganese oxides (Brown et al., 1999). The extent and strength of sorption to metal oxide surfaces depends on pH, ionic strength, size, and charge of the dissolved constituent, and available sorbing surface area. Sulfate can also form insoluble to low solubility complexes such as barite ($BaSO_4$) and gypsum ($CaCO_4$), while reduced sulfur readily precipitates as metal sulfide. Generally, reduced sulfur is less mobile in groundwater than sulfate.

TDS represents the sum of the dissolved constituent mass in the water. The majority of individual constituent contributions to TDS typically include the major ions (calcium, sodium, magnesium, potassium, chloride, sulfate, and carbonate). Sulfate is found to be the major component of the measured TDS at MW-28 (i.e., sulfate represents approximately 50% of the total dissolved mass measured from MW-28) and is the primary driver of the TDS exceedance. As such, sulfate is used as a proxy for TDS in this analysis.

Boron is primarily present in groundwater as boric acid (H_3BO_3) or borate ($B[OH]_4^-$) (Bolan et al. 2023). Boron speciation is pH dependent, with the charged $B(OH)_4^-$ being more dominant at higher pH. This species is more likely to sorb onto positively charged sites on solid metal oxide phases, most commonly aluminum and iron oxides (Bolan et al. 2023). Boron sorbs best to amorphous aluminum or iron phases (Goldberg and Glaubig, 1985). Boron adsorption is pH dependent, with maximum sorption occurring between pH 7 and 8 S.U. and dropping off at progressively higher or lower pH (Goldberg and Glaubig, 1985). Boron is not subject to oxidation-reduction reactions (Lemarchand et al. 2015; Bolan et al. 2023).

4.0 SOLIDS CHARACTERIZATION

4.1 METHODS

Aquifer solids were collected in 2021 to support development of the GCSM. Attachment 1 details CCR and aquifer solids boring locations and collection methodology. Both CCR and aquifer solid borings were located adjacent to monitoring wells at depths corresponding to screened intervals. Table 4-1 summarizes boring identifiers, collection depth, associated monitoring well names, and methods of analysis. Two samples were collected at up-gradient location MW-2, both within the UA (Figure 4-1), and are assessed as the background endmembers. Aquifer solids were collected from the UA, USCU, and PMP from exceedance locations and non-exceedance locations. Aquifer solids were sampled at exceedance locations MW-7S, MW-12, MW-28, and MW-32 and generally coincide with the screened intervals.

Bulk solid characterization included cation exchange capacity (CEC) and X-ray fluorescence (XRF). The CEC describes the capacity of a soil to exchange positively charged ions, aiding in understanding aquifer capacity for undergoing ion exchange reactions. The CEC is dependent on organic matter, types and quantity of clay materials, and metal oxides. Twelve samples were analyzed for CEC by SiREM in Guelph, Ontario in 2021, including one sample of CCR. XRF analysis is a test that measures the fluorescent X-rays emitted from a sample excited by a primary X-ray source to quantify the relative proportions of major elements in a sample. Results from XRF analysis are reported as oxides due to the borate fusion preparation method used. This data is presented as weight percent of individual elements based on electron properties.

Mineralogy was determined through X-ray diffraction (XRD) and TESCAN Integrated Mineral Analysis (TIMA). The XRD results quantify crystalline minerals phases with Rietveld refinement offering increased precision in quantification calculations. Identifying mineral phases aids in understanding attenuation mechanisms and aquifer capacity. TIMA identifies amorphous and crystalline mineral phases using a combination of energy dispersive X-ray silicon drift detectors and backscattered electron and secondary electron detectors.

Organic carbon is measured directly with total organic carbon (TOC) analysis and inferred indirectly through loss-on-ignition (LOI). LOI was quantified in conjunction with XRD and describes the combustible portion of the solid material and is interpreted to represent the proportion of organic matter in the solids. This test involves heating a sample at a high temperature, combusting volatile compounds. TOC was measured alongside total metals and was measured via persulfate-ultraviolet oxidation after an acid digestion step. TOC is an important component of aquifer solids. It has the capacity to undergo ion exchange and plays an important role in microbially mediated oxidation-reduction (redox) reactions, which is known to influence mobilization or immobilization of contaminants.

Total metals are a measure of bulk concentration and are useful as a measure of metal content within a solid sample. It does not, however, provide meaningful information on the extent to which a metal may or may not be released from the solid. Total metal results for boron and sulfate are presented to aid understanding of bulk condition. Refer to the SEP results for understanding of metal binding mechanisms and to infer conditions that may lead to the mobilization of a given fraction of the total metal from the solid phase.

For the sequential extraction procedure (SEP) test, a fraction of the total metal content is isolated from a solid sample based on the metal association with different operationally defined fractions of the solid. Initial extractions target loosely bound metals, representing the proportion that is more likely to become mobile under near-surface environmental conditions. Subsequent steps progressively extract metals associated with more recalcitrant fractions of the soil. This method allows for a nuanced understanding of metal partitioning with various phases in the soils, aiding interpretation of conditions that may contribute to metal attenuation or release.

The SEP analyses conducted in 2021 and 2023 followed two different methodologies. The 2021 samples were analyzed by Eurofins Test America (Eurofins; Knoxville, Tennessee), whereas the 2023 samples were analyzed by SGS (Burnaby, British Columbia, Canada). Eurofins uses a seven-step extraction procedure (Attachment **1**), while SGS uses a six-step procedure (Attachment **2**). The extractions performed for the two test methods generally target a similar set of soil fractions, though variations in extraction conditions and reagents may lead to differences in absolute values. Other differences can result from sample heterogeneity and alterations due to sample storage conditions, particularly for the samples analyzed in 2023. Despite these differences, the trends and relative distribution patterns from both tests can still be informative. Results are presented for extracted iron (2021 and 2023), manganese (2021 and 2023), aluminum (2021 and 2023), boron (2023), and sulfur (2023). Boron and sulfur are included as the constituents of interest. Iron, manganese, and aluminum are presented due to their relevance for interpreting geochemical conditions and because they form the basis of the dominant adsorbent minerals in the aquifer matrix (iron, manganese, and aluminum hydroxides).

4.2 RESULTS

This section describes results of bulk characterization (CEC, Table 4-2; XRF, Table 4-3), mineralogical analysis (XRD, Table 4-4; TIMA, Table 4-5), organic carbon (TOC and LOI, Table 4-6), and SEP analysis and total metals (Table 4-7, Table 4-8, and Figure 4-2) for CCR (Section 4.2.1) and aquifer solids (Section 4.2.2).

4.2.1 CCR

The CCR sample collected in August 2021 from XPW03 was subjected to the analytical testing previously described (Section 4.1). The CCR sample had a CEC of 3.76 meg/100g (Table 4-2), a LOI of 1.04%, and a TOC of 0.99% (Table 4-6). Both LOI and CEC are lower than observed in aquifer solids. Total iron (82,000 to 130,000 mg/kg) and aluminum (80,000 to 110,000 mg/kg) concentrations are higher than those observed within the aquifer solids while total manganese (330 to 620 mg/kg) is similar to manganese found within the aquifer solids (Table 4-7). Total metals analyzed by SGS are generally higher than those analyzed by Eurofins.

The mineralogical analysis (Table 4-4a) revealed the CCR material reflects high proportions of diopside (23%), hematite (15%), albite (19%), and magnetite (19%) and relatively low percentage of quartz (5.8%). No carbonates were identified in the CCR material sampled.

Results of the SEP analysis are presented in Table 4-7. Most of the iron, manganese, and aluminum was detected in the residual fraction, followed by the acid sulfide fraction, indicating iron is not likely to become mobilized from the CCR solids.

4.2.2 Aquifer Solids

Results of the aquifer solids characterization are described below in order of bulk characterization, mineralogy, and SEP.

4.2.2.1 Bulk Characterization

Results of the CEC and XRF bulk characterization are presented in Table 4-2 and Table 4-3 and are summarized as follows:

- CEC: Aquifer solid CEC ranges from 16.9 meq/100g in K-SB-07 (10.0-15.0) to 127 meq/100g K-SB-03 (19.0-20.0). Samples with lower CEC tend to have higher proportions of quartz, while samples with higher CEC tend to have higher proportions of carbonate minerals.

- XRF: The dominant species in the XRF analysis was silicon (SiO_2) with aluminum (Al_2O_3) as the next most abundant species. In addition, calcium (CaO) and magnesium (MgO), common carbonate components, are present in all samples. Similarly, iron (Fe_2O_3) is present in all samples indicating the presence of iron-bearing minerals in the aquifer solids.

4.2.2.2 Mineralogical Analysis

Results of the XRD and TIMA analyses are presented in Tables 4-4 and 4-5, respectively, and summarized as follows:

- XRD: Quartz is the predominant mineral in all samples (44.4 to 64.2%) with the next most abundant minerals being albite (6.5 to 14.6%) and muscovite (5.7-11.6%). Carbonate minerals are present in high abundance on site, though the distribution varies spatially. Overall carbonate abundance ranges from 20.6 to 31% in samples to the north and northwest of the KIN AP (i.e., location XX), while carbonates to the southwest range from 0 to 3% (i.e., location YY). Carbonate abundance in upgradient location K-SB-02 ranges from 9 to 13%. For most locations, dolomite is the predominant carbonate mineral present, with other phases including calcite, ankerite, rhodochrosite, and siderite. Carbonate minerals buffer groundwater pH through dissolution and precipitation around an equilibrium point between approximately 6.5 and 8.0 S.U. (depending on the carbonate mineral), except for siderite, which additionally contains iron and does not contribute to pH buffering. Dissolution of siderite may, however, contribute additional iron to the system for adsorption reactions. Trace amounts of the crystalline iron minerals pyrite and magnetite were additionally identified by XRD. Pyrite is a reduced iron sulfide mineral that contributes acidity to groundwater as it oxidizes, and magnetite is an iron oxide mineral that may contribute to adsorption and attenuation of dissolved constituents (though to much less extent than ferrihydrite). The presence of both pyrite (FeS_2) and magnetite (Fe_3O_4) in the aquifer matrix is evidence of a dynamic iron equilibrium, whereby iron is cycling between the oxidized (magnetite) and reduced (pyrite) forms. Ferrihydrite ($Fe[OH]_3$) is an amorphous precursor to magnetite that forms when dissolved iron first precipitates. Ferrihydrite is not able to be identified by XRD because it is not a crystalline mineral. It is, however, inferred to be present based on the dynamic iron equilibrium and the SEP results, discussed further in Section 4.2.2.4. Ferrihydrite is a particularly effective adsorbent due to its electrochemical properties and the disordered nature of the elemental arrangement, which leads to a high reactive surface area available for interaction with dissolved constituents in groundwater.

- TIMA: TIMA analysis indicate that quartz is the dominant mineral (53 to 66%) with moderate amounts of mixed clay/mica species (6 to 32%) and plagioclase (7 to 9%). Carbonate proportions ranged from below detectable limits to 23.6%, depending on sample location. These results are generally consistent with the XRD results.

4.2.2.3 Organic Carbon

Results of the LOI and TOC are presented in Table 4-6 and summarized as follows:

- TOC: The TOC content ranges from non-detect (<0.025) in K-SB-08 and K-SB-02 to 1.4% in K-SB-08, indicating low concentrations of organic carbon within the aquifer solids.

- LOI: The LOI values range from 4.3% to 16% in the aquifer solids. High LOI values relative to TOC indicate that another phase is being picked up in the LOI results that is not attributed to organic carbon. This additional mass may be attributed to water loss from within the sample structure, water loss from hydrated minerals, or loss of carbon dioxide from carbonate.

4.2.2.4 SEP Analysis

Figure 4-2 shows the concentrations of iron, manganese, aluminum, sulfate, and boron in each SEP fraction as well as the proportion each fraction represents out of the summed SEP results for samples analyzed in 2021 (Figure 4-2a) and 2023 (Figure 4-2b) (results tabulated in Table 4-7). As noted, the 2023 SEP method was different than that used in 2021 (Table 4-8). However, the extractions generally represent similar fractions between the two methods, with the exception of the sulfide fraction, which is not represented with the methodology followed in 2023 and is considered to be reflected in the residual fraction.

The mass of iron associated with the metal hydroxide and non-crystalline minerals fractions is measured as a representation of the molar mass of crystalline or amorphous iron hydroxide mineralization that is a key contributor to aquifer sorption capacity (further discussed in Section 5.0). Constituent mass associated with those same fractions is often considered as being sorbed to or coprecipitated with the hydroxide fraction. The acid/sulfide, organic, and residual fractions are the most recalcitrant fractions of the solid sample and generally indicate constituent mass that is not likely to be mobilized from the aquifer under typical environmental conditions.

Major findings are summarized as follows:

- Iron: The highest total mass of iron (36,000 mg/kg) is found to be associated with background UA sample K-SB-02 located to the south of the AP. In all samples, the majority of iron (>50%) is bound into the more recalcitrant fractions (acid/sulfide and residual). Iron bound into these fractions is generally unavailable for attenuation via sorption. However, the metal hydroxide fraction measured in 2021 contains approximately 20-40% of the remaining iron, which would be available for sorption reactions. Only a small portion was identified with iron and manganese oxide fraction (approximately 7 to 21%) in 2023. This apparent shift in iron from the oxide fraction into the residual fraction over time may be attributed to aging of the soils during the archive period or sample variability.

- Manganese: The distribution of manganese within the SEP extractions is interpreted similarly to iron. The highest total mass of manganese is found in association with background UA sample K-SB-02. Manganese is distributed primarily among the carbonate fraction (1 to 71%), iron and manganese oxide fraction (8 to 68%), and the residual fraction (7 to 45%) with proportions varying across samples. The association of manganese with the more reactive phases suggests it is largely available to participate in redox and sorption reactions, contributing to overall attenuation capacity.

- Aluminum: Aluminum is associated predominantly with the acid/sulfide and residual fractions (89 to 99%) with small proportions in the metal hydroxide fraction (0.8 to 11%). This distribution indicates aluminum is only partially available to participate in redox and sorption reactions.

- Boron: Boron was only measured in 2023 and was generally detected in all fractions in each of the samples. The highest total boron concentration was observed at K-SB-07S, an area with high aqueous boron. Proportions of boron in the sediments vary depending on location. Boron in background location K-SB-02 is primarily in the residual fraction (52 to 76%), with the remaining distributed across all other fractions. The other samples all have significant proportions of boron in the iron and manganese oxide fraction (24 to 38%) and residual fractions (16 to 36%). K-SB-28 also has a high proportion (23%) bound into the carbonate fraction. These data indicate that boron is associated with fractions that are closely related to redox conditions on site and constituents associated with these phases may be mobilized through mineral dissolution or other changes in the redox regime. Boron is also associated with the water-soluble fraction, exchangeable metals, and organic fractions in most samples, suggesting attenuation by these phases is possible.

- Total sulfur: Sulfur was only analyzed in 2023. Understanding sulfur distribution is valuable for understanding sulfate speciation and attenuation by the solid phase. In most samples, sulfur is found in every fraction except the organics fraction, with the majority of sulfur detected with the exchangeable fraction (31 to 85%). The exchangeable metals fraction is one of the least recalcitrant solid fractions, indicating this proportion of sulfur is likely loosely bound and relatively mobile, likely in the form of sulfate. The exception to this is K-SB-28, which has the majority of sulfur in the organics fraction (50%).

4.3 SORPTION BATCH STUDIES

In August 2021, select aquifer solids and groundwater samples were submitted by WSP to SiREM laboratory to test the sorption behavior of boron and sulfate (Attachment **3**). Sorption studies pair groundwater with parameters above the GWPS with soils from upgradient background locations to evaluate both attenuation mechanisms and capacity of aquifer solids for sorption of contaminants. Groundwaters from MW-12S (PMP) and MW-28 (UA) were selected based on statistical evaluation of potential exceedances in 2021. While MW-12S does not have boron or sulfate exceedances as of the fourth quarter of 2023, this data is valuable for assessing attenuation in the PMP. Each groundwater-soil sample was spiked to achieve a target concentration of boron and sulfate. Samples were equilibrated over a 7-day period, with concentrations of target constituents analyzed on day zero and day seven. This was repeated for different soil-water ratios. Sorption was estimated by calculating the difference between initial (day 0) concentrations and final (day 7) concentrations. For both samples, there was no appreciable difference between initial concentrations of boron and final concentrations, regardless of the soil-water ratio. Sulfate results were more variable and demonstrated sorption to solids for some of the water samples evaluated. Calculated partition coefficients are reported in Attachment **3**.

While the batch studies largely confirm the conservative nature of both boron and sulfate, the SEP results presented in Section 4.2.2.4 demonstrate that boron and sulfate are sorbed to solids collected from downgradient of the AP, indicating some degree of attenuation by the aquifer solids has occurred. Subsequent evaluation associated with a Corrective Action Plan will assess the sorption behavior of both boron and sulfate under return to background conditions, where it is anticipated that geochemical conditions will shift from the present condition, thereby influencing adsorption behavior under dynamic conditions not reflected by the sorption batch studies.

5.0 AQUEOUS GEOCHEMISTRY

The KIN porewater and groundwater data discussed in this section are presented in Table 5-1. Data were collected from 2013 to 2023. Over time, different parameters have been collected at different frequencies at various wells due to the regulatory history of the unit. This geochemical characterization focuses on background wells, exceedance wells, wells nested with or in the immediate vicinity of exceedance wells, and porewater wells.

5.1 EXCEEDANCE PARAMETERS AND CCR CONSTITUENTS

Boron, sulfate, and TDS are the exceedance parameters for the KIN AP. Figure 5-1 shows timeseries of boron, sulfate, and TDS collected from porewater and groundwater locations. Boron concentrations in the porewater range from 0.5 to 4.2 mg/L and background groundwater concentrations range from 0.05 to 0.35 mg/L. Boron exceedances are found in groundwater wells to the northwest of the AP (MW-7S, MW-12, and

MW-28; Figure 2-1). Boron concentrations in MW-7S and MW-28 are generally higher than porewater concentrations, with the highest boron concentrations in compliance well groundwater found in MW-28. Compliance wells MW-6, MW-29, and MW-12S are also northwest of the AP and have boron concentrations elevated above background, though these wells do not have statistical exceedances. Boron concentrations are also elevated above background in MW-20S and MW-32, both of which have sulfate exceedances. Boron in MW-32 is relatively stable with time, and concentrations in MW-20S exhibit an increasing trend from 2021 through 2023 (0.06 to 2.19 mg/L).

Sulfate concentrations in the porewater range from 29 to 1,110 mg/L with the highest concentrations found in XPW03. Sulfate in background wells range from 80 to 178 mg/L. Sulfate is elevated in exceedance wells MW-7S, MW-20S, MW-28, and MW-32, with highest concentrations observed in MW-28. Similar to boron, sulfate concentrations are increasing over time in MW-20S (243 to 519 mg/L). Sulfate is also elevated above background in exceedance well MW-12, though concentrations are not statistical exceedances of the sulfate GWPS.

Groundwater well MW-28 is the only location with a TDS exceedance, with concentrations similar to those found in XPW03 (Table 5-1). Background groundwater has a TDS concentration of 292 to 596 mg/L. Groundwater wells MW-7S, MW-12, MW-32, and MW-20S also have elevated TDS concentrations, though concentrations are not statistical exceedances of the TDS GWPS. Groundwater well MW-20S also exhibits increasing concentrations of TDS from 2021 through 2023. Sulfate is the primary driver of TDS and is thus used as a proxy for TDS in the following analysis (Figure 5-2).

5.2 MAJOR ION DISTRIBUTION

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 do not account for actual concentrations nor trace element chemistry. Figure 5-3 shows the Piper diagram for the AP with data from June 2013 through November 2023. The Piper diagram for the AP reveals the groundwater to have consistent cation proportions with almost equal distributions of calcium and magnesium. Porewater is more variable with XPW01 and XPW04 showing similar cation proportions to the groundwater, while XPW02 is more calcium dominated and XPW03 has a higher proportion of potassium (Figure 5-3). The anion concentrations show consistently low chloride proportions for all samples, though there is more variability in bicarbonate and sulfate proportions. The majority of groundwater shows bicarbonate as the dominant anion. Exceedance wells and porewater reflect higher proportions of sulfate.

5.3 PH AND REDOX CONDITIONS

Groundwater pH and the oxidation-reduction (redox) potential of the groundwater exert dominant controls on the solubility, fate, and transport of many constituents in the groundwater. These so-called master variables govern the chemical interaction of dissolved phase constituents (mobile phase) with the solid matrix (immobile phase) and mineral precipitation/dissolution. This section provides a description of the measured pH and redox conditions for both groundwater and CCR porewater. The geochemical controls on constituent release and attenuation of boron and sulfate are discussed further in Section 6.0.

Groundwater pH is neutral and generally stable within the range of 6 to 7.5 S.U. independent of location, lithology, or exceedance status. This stable and neutral pH indicates groundwater is well buffered against change in pH, likely due to the widespread presence of carbonate minerals in the aquifer solids which buffer pH within this range (Section 4.2.2). Porewater pH in XPW02, XPW03, and XPW04 is similar to groundwater, though pH in XPW01 is somewhat higher than groundwater pH. The pond water sample (AP1) has a more alkaline pH between 8.0 and 8.5 S.U.

Groundwater redox conditions are evaluated based on field measured oxidation-reduction potential (ORP) (Figure 5-4) as well as laboratory analytical measurements of redox-sensitive constituents such as dissolved and total manganese. Groundwater ORP represents the average electrical potential of an aqueous solution and is relied upon as a field measure of redox condition. Porewater ORP is generally more reducing, while background groundwater ORP is generally more oxidizing. Exceedance wells oscillate between reducing and oxidizing conditions, with no clear temporal pattern. While there is a large amount of variability in the ORP dataset, in general, it appears that the groundwater measured at the exceedance wells is under some influence of the reducing condition from the CCR porewater, which may in turn have implications for the stability of attenuating mineral phases (discussed further in Section 6.2).

Evaluation of redox sensitive parameters and redox couples such as dissolved manganese and total manganese in combination with ORP provide a more complete understanding of redox conditions within the aquifer. Dissolved manganese will generally be in the form of Mn(II) in natural groundwaters, a reduced form of manganese. Total manganese is a measure of all the manganese in solution, including dissolved manganese. At the KIN AP, total manganese and dissolved manganese are generally the same concentration throughout the aquifer, suggesting the majority of manganese is present in the dissolved form (Table 5-1). This indicates mildly reducing conditions either locally or some distance upgradient within the aquifer.

5.4 POURBAIX DIAGRAM

Pourbaix diagrams show possible thermodynamically stable phases at equilibrium conditions across pH values and redox potentials. Figure 5-5 shows samples collected in 2023 plotted on a Pourbaix diagram for iron phases. This diagram focuses on the equilibrium iron phases, rather than crystalline phases, that control active iron cycling in the system. The ORP was converted to Eh by adding a correction factor of 200 mV to measured field data. The groundwater samples plot around the equilibrium line of dissolved iron (Fe^{++}) and solid-phase iron hydroxide ($Fe[OH]_3$), indicating dynamic redox conditions and iron cycling across the site. In general, locations in the upgradient and unimpacted areas of the site plot within the $Fe(OH)_3$ field that indicates stability of solid-phase iron (background samples plot in the $Fe[OH]_3$ stability field), whereas the downgradient locations reflecting exceedances of sulfate and/or boron plot largely within the Fe^{++} field that indicates iron is likely present in the dissolved phase. This is supported by measured total iron concentrations that are generally higher downgradient of the unit than upgradient. Total iron concentrations are largely below detectable levels at MW-1, and concentrations are more variable at MW-

2. Total iron is much more elevated at MW-12, for example (ranging from 1.87 to 6.95 mg/L), which is consistent with plotting of the MW-12 samples within the Fe^{++} field in Figure 5-5. This suggests that over time, as conditions return to background, solid phase iron will become more dominant (similar to that observed for background), which will result in increased adsorption capacity through ferrihydrite precipitation.

5.5 SUPPORTING STATISTICAL ANALYSIS AND CORRELATIONS

5.5.1 Principal Components analysis

Groundwater chemistry data are multivariate datasets by nature given the high number of parameters observed per sampling location and within a given timeframe. With such a large number of variables, advanced statistical analysis of multivariate groundwater data can provide important insights into spatial, temporal, and chemical relationships influencing constituent distribution and compliance in groundwater. The multivariate technique Principal Component Analysis (PCA) is used to interrogate the groundwater chemistry around the exceedance wells. 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 and reduce the multivariate data dimensionality to reduce this redundant information. This reveals inner structures in the data that might otherwise be obscured by these dependencies. In the case of groundwater data, these structures might include groups of related variables, chemical evolution through time, or spatial locations with similar chemical signatures.

The PCA includes both compliance wells and other monitoring wells and spans sampling events from 2017 through 2023. All samples and analytes with a high percentage (≥40%) of missing data or data below a method detection limit (MDL) were removed from the analysis, except for lithium and molybdenum. These parameters were included as detected concentrations exhibited multiple orders of magnitude variance, which was deemed meaningful. Any data reported as below the MDL were converted to half the MDL. This allows for assessment of analytes that are typically non-detect in background groundwater but are elevated in porewater and impacted groundwaters). This preserves variance of important parameters, such as boron, across the site and allows for improved interpretation of the site geochemistry. Eight samples with turbidity >100 NTU (nephelometric turbidity unit) were removed from the dataset to mitigate the influence of suspended solids. The removal of such a low number of samples compared to the overall dataset is unlikely to bias the final result. The final dataset contains 12 measured analytes (including the hydrogen ion (H+), which represents acidity in groundwater and is proportional to pH), 1,620 measurements from 135 individual samples at 15 wells (4 CCR, 9 UA, 2 PMP) and a pond location. All data were standardized by mean centering and scaling to standard deviation prior to performing PCA analysis. PCA results are presented on a biplot in Figure 5-6, which depicts 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. Principal component 1 (PC1) and principal component 2 (PC2) are represented on the x and y axis and explain 31% and 30% of the statistical variance in the water quality dataset, respectively. Constituent variables are expressed as vectors. The grouping of samples relative to the component vectors is useful for providing immediate insight into geochemical relationships among groups of variables and samples. The biplot exhibits the following key features:

- The PCA shows chemical distinctions between the porewater, background locations, and the exceedance locations. Porewater dominates the upper half of the plot and is closely associated with fluoride, potassium, molybdenum, and lithium. Individual porewater locations plot in close proximity with only minor overlap between locations.
- Background wells plot at the lower left edge of the plot between the barium and chloride vectors. Background well MW-2 plots near some porewater samples due to somewhat elevated fluoride concentrations at this location (0.42 to 0.55). Fluoride concentrations in MW-2 are similar to porewater fluoride (0.31 to 0.84).
- Non-exceedance groundwater data is generally between background and exceedance data with a strong association with background data.
- Exceedance locations are strongly associated with the calcium, magnesium, and alkalinity vectors.
- All exceedance locations are distinctly separate from most non-exceedance groundwater locations and all plot relatively close to one another with the exception of exceedance well MW-28, which plots in a distinct cluster between the calcium and boron vectors.

Observations from the PCA support and align with observed chemical signatures and site interpretation.

6.0 GEOCHEMICAL CONCEPTUAL SITE MODEL

6.1 SOURCE AND MOBILIZATION MECHANISMS

The CCR materials are the primary source of constituent loading to the CCR porewater. Over an extended period (e.g., months to years), the porewater reaches equilibrium with the CCR materials, signifying the constituents within the porewater are representative of the mobile phase capable of migrating to downgradient groundwater. This conclusion is drawn from the prolonged interaction between the CCR solids and the porewater, allowing for the transfer of soluble constituents like sulfate and boron into the porewater. The AP CCR porewater is therefore the primary vector of sulfate and boron *available* to the shallow groundwater and is considered as the primary source term for environmental investigation.

Both boron and sulfate are common CCR indicator parameters and are observed in shallow groundwater at some locations at concentrations indicative of impacts by porewater. The uneven distribution of boron and sulfate in the groundwater is attributed to be a function of the observed chemical heterogeneity in the AP porewater and physical heterogeneity along the groundwater flow path. The mobilization mechanism is advective transport from the CCR porewater source into the underlying groundwater.

6.2 POTENTIAL/LIKELY ATTENUATION MECHANISMS

Boron and sulfate are generally regarded as conservative CCR constituents under most environmental conditions; however, downgradient of the KIN AP, several attenuation mechanisms are inferred to be active or influential within the groundwater based on the available data and observed geochemical conditions. The specific attenuation mechanisms for the exceedance parameters are as follows:

Sulfate/TDS[1]

- Adsorption - Sulfate is known to sorb to iron and manganese oxide mineralization in the solid phase (Kitadai, 2018; He, 1996; Geelhoed, 1997). A relatively small amount of sulfur is observed from the 2023 SEP results in association with the iron and manganese oxide phases and is interpreted to represent adsorbed sulfate on the mineral surfaces. This mechanism is likely to be limited under current conditions, given the mildly reducing conditions within the aquifer resulting from influence from porewater, which tends to limit the stability of the hydroxide phases such as ferrihydrite. The batch studies largely confirmed the conservative nature of sulfate, whereas the SEP results demonstrate that sulfate is sorbed to solids collected from downgradient of the AP, indicating some degree of attenuation by the aquifer solids has occurred. It is anticipated that geochemical conditions will shift from the present condition in response to source control and unit closure, thereby influencing adsorption behavior under dynamic conditions not reflected by the sorption batch studies. Evaluation of longer-term changes in adsorption behavior under a “return to background” scenario will be addressed in subsequent evaluation associated with a Corrective Action Plan.

- Ion exchange - Ion exchange is the weakest attenuation mechanism of those observed for sulfate and while it is not regarded to be sufficient for long-term attenuation, it is included as one of several geochemical mechanisms that influences sulfate distribution in the groundwater. This inclusion is based on the sulfur concentrations measured in substantial proportion in association with the exchangeable fractions from the 2023 SEP analysis.

Boron

- Adsorption - Boron is known to sorb to aluminum and iron hydroxide mineralization in the solid phase (Goldberg, S. and Glaubig R., 1985). Roughly 30% of the solid phase boron measured from the 2023 SEP results is found to be associated with the iron and manganese oxide phases and is therefore interpreted to represent adsorbed boron on the mineral surfaces. This mechanism is likely to be the dominant attenuation mechanism for boron in at the KIN AP based on the available data and overall limited reactivity of the borate molecule. The batch studies largely confirmed the conservative nature of boron, whereas the SEP results demonstrate that boron is sorbed to solids collected from downgradient of the AP, indicating some degree of attenuation by the aquifer solids has occurred. It is anticipated that geochemical conditions will shift from the present condition in response to source control and unit closure, thereby influencing adsorption behavior under dynamic conditions not reflected by the sorption batch studies. Evaluation of longer-term changes in adsorption behavior under a “return to background” scenario will be addressed in subsequent evaluation associated with a Corrective Action Plan.

[1] TDS is dominated by sulfate, thus any mechanism that deceases sulfate concentration will also lower TDS.

7.0 REFERENCES

Aitchison, J. 1986. The Statistical Analysis of Compositional Data. Chapman and Hall. London

Bolan, S., Wijesekara, H., Amarasiri, D., Zhang, T., Ragályi, P., Brdar-Jokanović, M., Rékási, M., Lin, J., Padhye, L., Zhao, H., Wang, L., Rinklebe, J., Wang, H., Siddique, K., Kirkhamn, M., Bolan, N. (2023). Boron contamination and its risk management in terrestrial and aquatic environmental settings. Science of the total Environment. 164744.

Brown, G., Henrich, V., Casey, W., Clark, D., Eggleston, C., Felmy, A., Goodman, D., Gratzel, M., Maciel, G., McCarthy, M., Nealson, K., Sverjensky, D., Toney M., and Zachara, J. (1999). Metal Oxide Surfaces and Their Interactions with Aqueous Solutions and Microbial Organisms. Chemical Reviews, vol. 99, pp. 77-174.

Burns & McDonnell, 2021. Initial Operating Permit Edwards Power Plant Ash Pond.

Egozcue J.J. and V. Pawlowsky-Glahn. 2011. Basic concepts and procedures.In: Pawlowsky-Glahn V, Buccianti A, editors. Compositional data analysis: theory and applications. Chichester: Wiley; 2011. pp. 12-28.

Goldberg, S. and Glaubig R. (1985). Boron adsorption on aluminum and iron oxide minerals. Division S-2 Soil Chemistry. 1374-1379.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021a. Hydrogeologic Site Characterization Report. Ash Pond. Kincaid Power Plant. Kincaid, Illinois.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021b. Groundwater Monitoring Plan. Ash Pond. Kincaid Power Plant. Kincaid, Illinois.

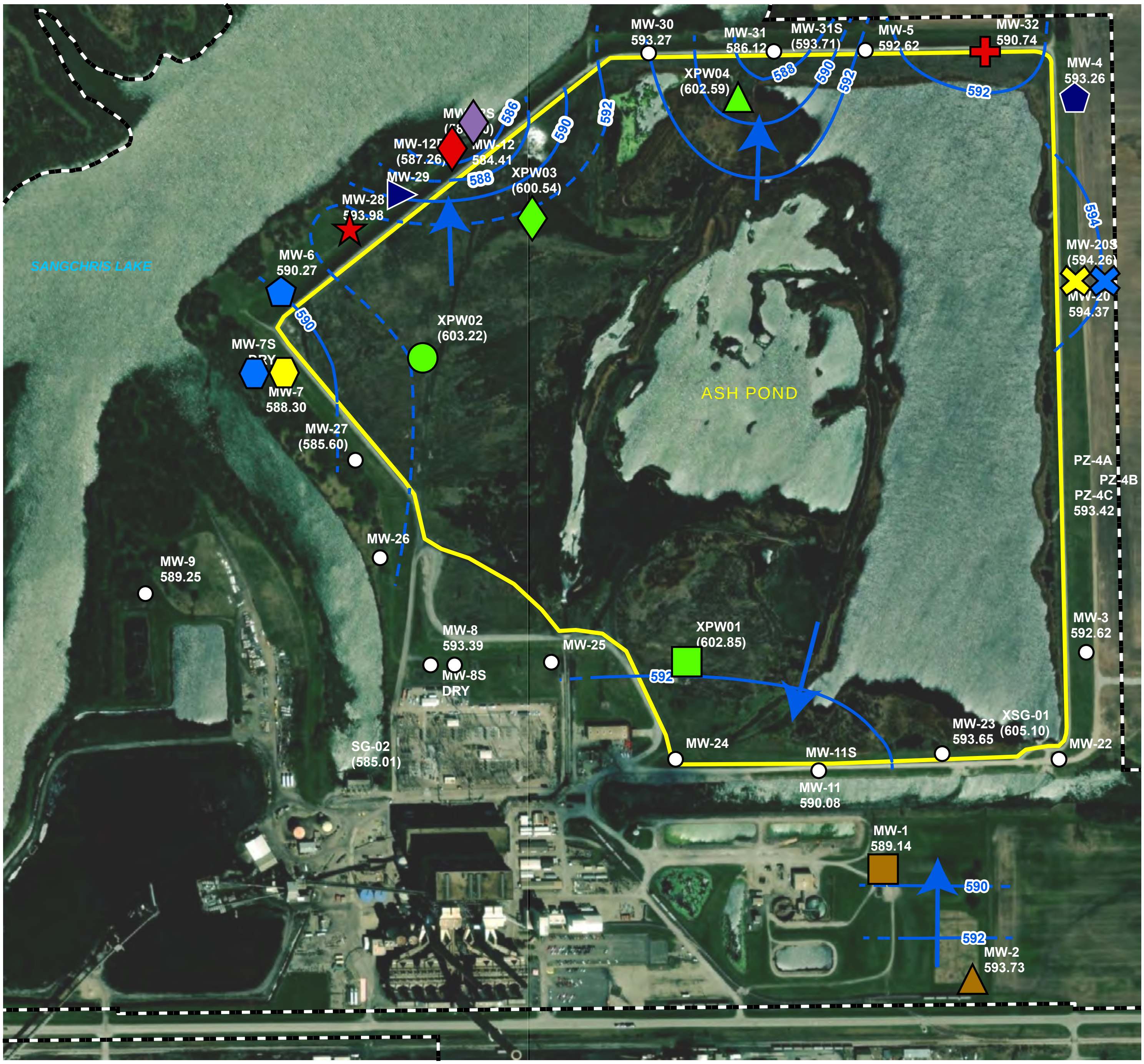
Stumm, W. and Morgan, J.J. (1996) Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters, 3rd ed., Wiley-Interscience.

8.0 ACRONYMS AND ABBREVIATIONS

Alk	Total Alkalinity
Al	Aluminum
amsl	above mean sea level
AP	Ash Pond
As	Arsenic
B	Boron
Ba	Barium
BCU	Bedrock confining unit
Ca	Calcium
CCR	Coal combustion residual
CEC	Cation exchange capacity
CH4	Methane
Cl	Chloride
Fe	Iron
ft	feet
g	grams
GCSM	Geochemical conceptual site model
GWPS	Groundwater Protection Standard
H+	Hydrogen ion, represents acidity in groundwater
K	Potassium
KIN	Kincaid
KPP	Kincaid Power Plant
Li	Lithium
LOI	Loss-on-ignition
meq	milliequivalents
Mg	Magnesium
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
Mn	Manganese
Mo	Molybdenum
mV	millivolts
Na	Sodium
NTU	Nephelometric turbidity unit
ORP	Oxidation reduction potential
PCA	Principal components analysis
pCi/L	picocuries per liter
PMP	Potential Migration Pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
Redox	Oxidation-Reduction
SEP	Sequential extraction procedure

Si	Silica
SO4	Sulfate
TDS	Total Dissolved Solids
TIMA	Tescan Integrated Mineral Analyzer
TOC	Total organic carbon

FIGURES



GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

MONITORING WELL

Well ID

MW-1	MW-32
MW-6	MW-12S
MW-7	MW-29
MW-2	MW-20S
MW-4	MW-20
MW-11	XPW01
MW-12	XPW02
AP1	XPW03
MW-28	XPW04
MW-7S	

0 250 500 Feet

- Background
- UA Compliance
- UA Supplemental
- USCU Supplemental
- Exceedance
- Porewater
- Pond

Notes:
-Contours from June 12, 2023.
-Parenthesis indicates well not used in contouring
-Elevation contours shown in feet, North American Vertical Datum of 1988
-Figure adapted from Ramboll 2021

LIFECYCLEGEO

Title
Kincaid Ash Pond Well Location and Hydrology

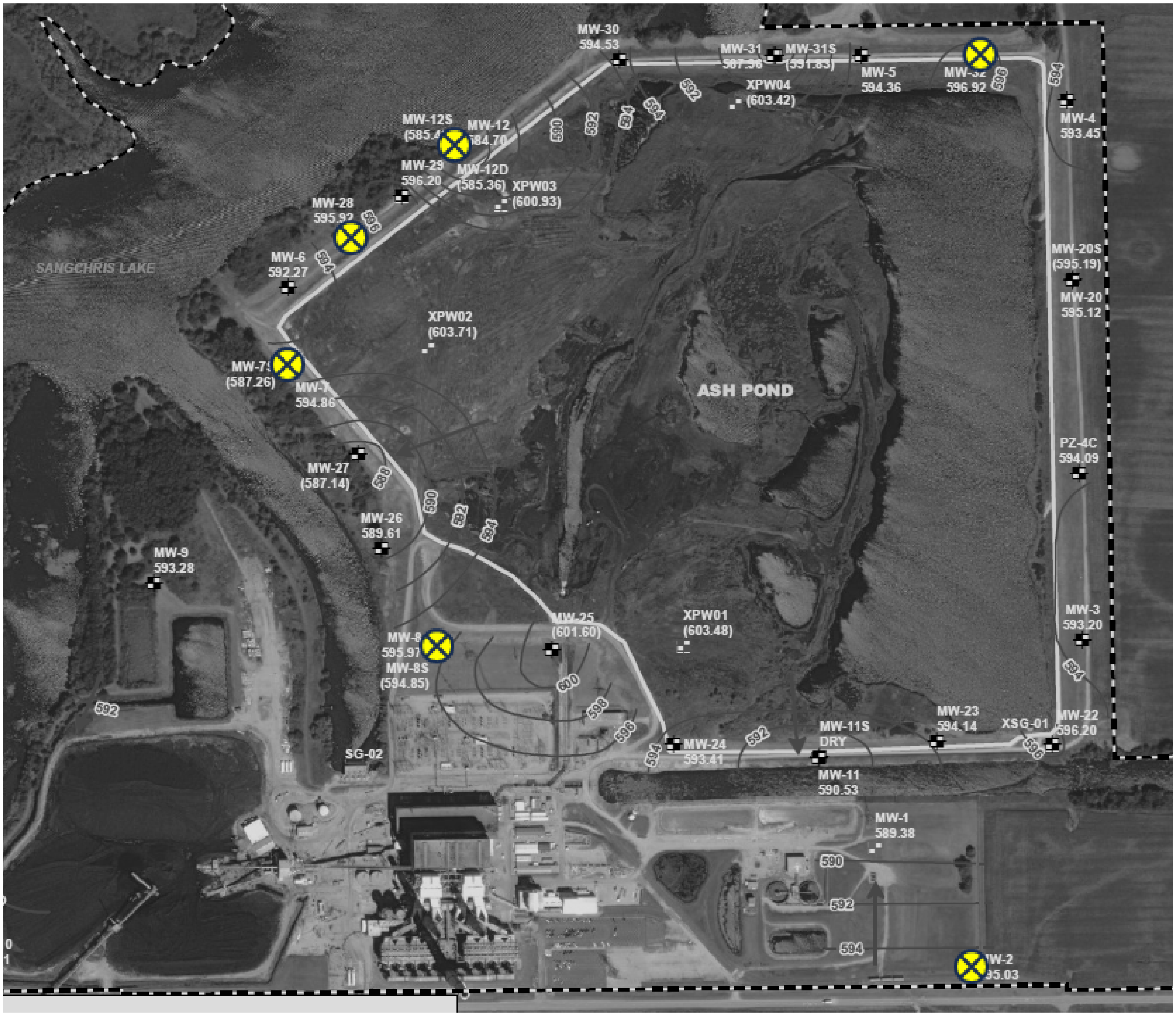
Project Name
Kincaid- Ash Pond Evaluation

Project Number
[23RAM01-1] Vistra CCR

Figure
2-1

Client Name
Ramboll Americas Engineering Solutions, Inc.

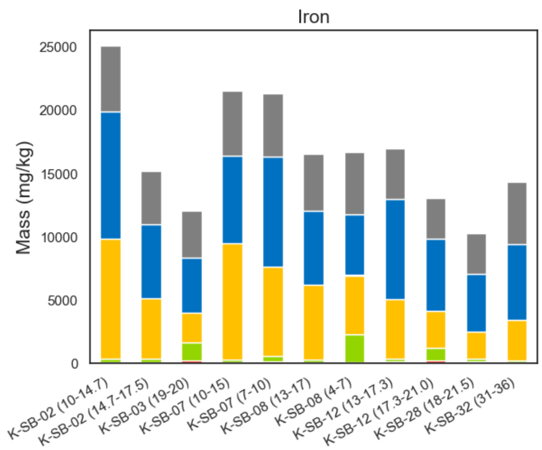
Date
04/29/2024

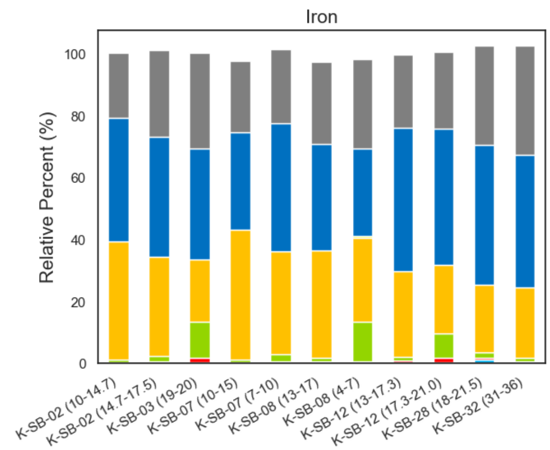


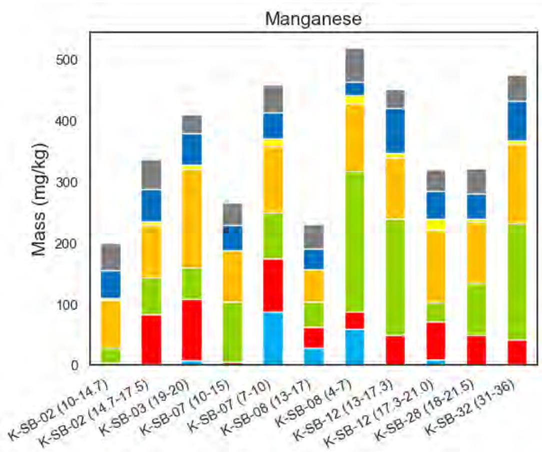
Notes:
-Contours are from March 2021.

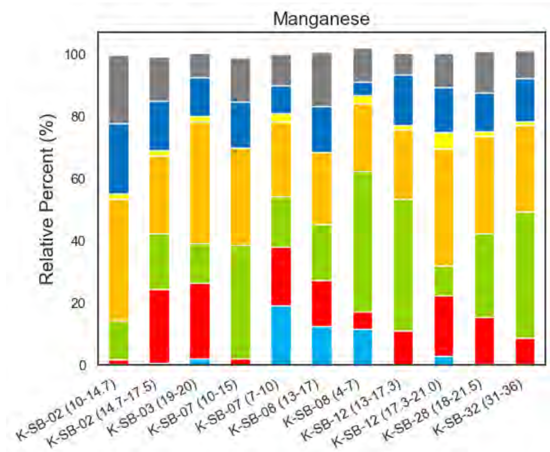
Soil boring locations

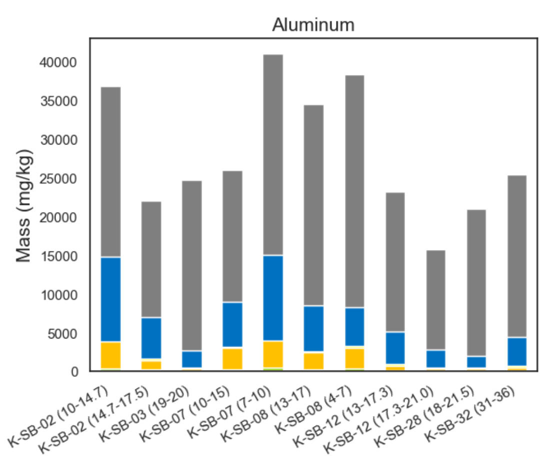
LIFECYCLEGEO	Title Kincaid Ash Pond Soil Boring Locations		
	Project Name Kincaid- Ash Pond Evaluation	Project Number [23RAM01-1] Vistra CCR	Figure 4-1
	Client Name Ramboll Americas Engineering Solutions, Inc.	Date 12/04/2023	

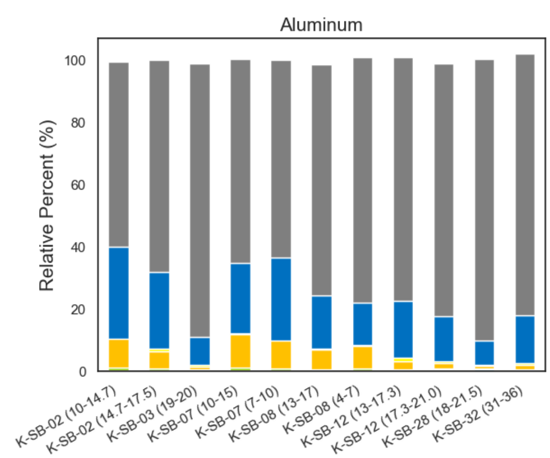










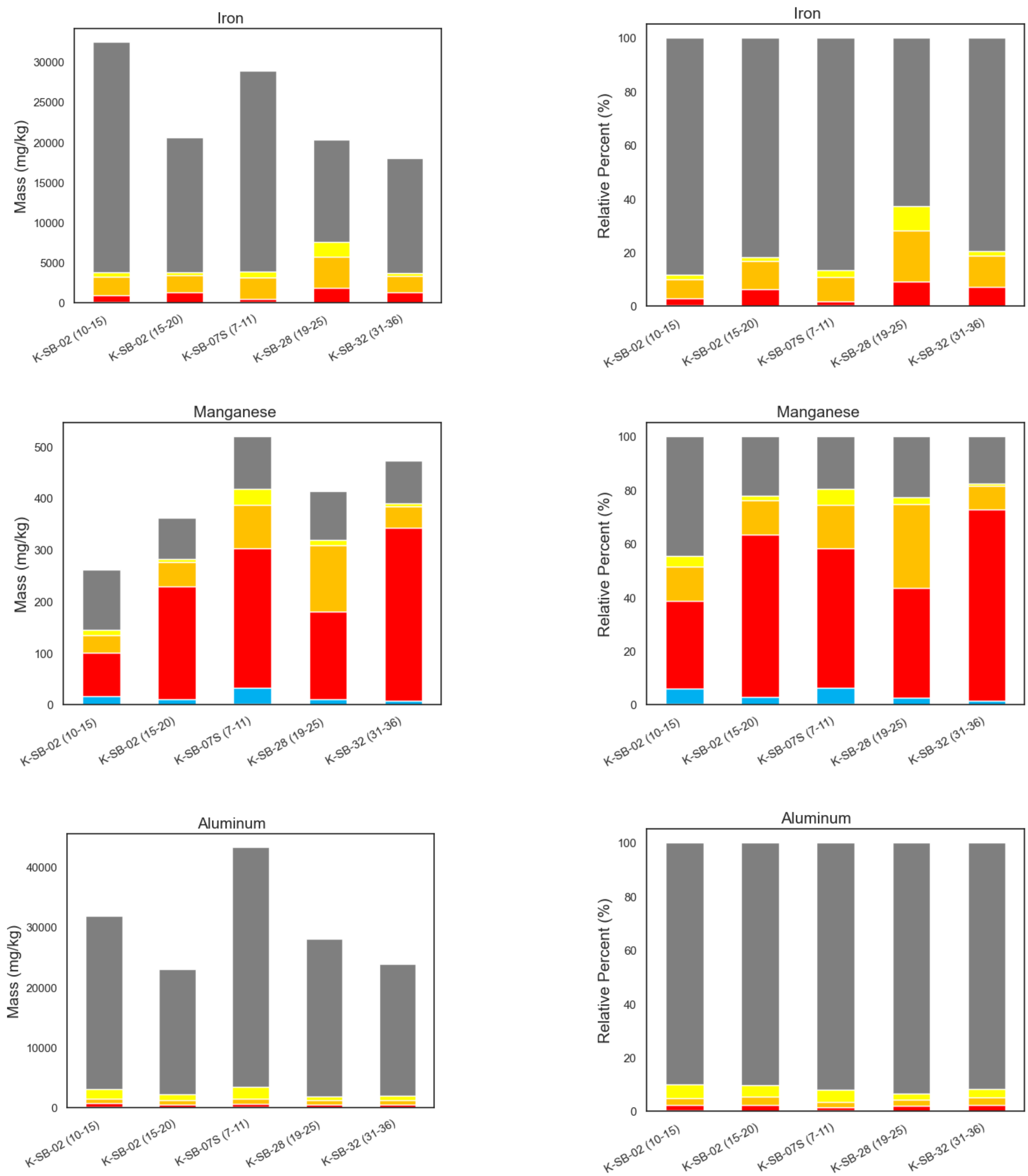


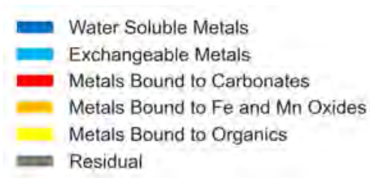
Exchangeable Fraction
Carbonate Fraction
Non-Crystalline Minerals Fraction
Metal Hydroxide Fraction
Organic Fraction
Acid/Sulfide Fraction
Residual Fraction

Notes:
-SEP results from Eurofins (2021) analysis.
-Non-detects are removed from the analysis.
-The percentages for each individual fraction may not sum to 100 due to results below the reporting limit and rounding.

LIFECYCLEGEO

Title		
Kincaid Ash Pond 2021 SEP Results		
Project Name: Edwards - Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 4-2a
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 12/4/2023	

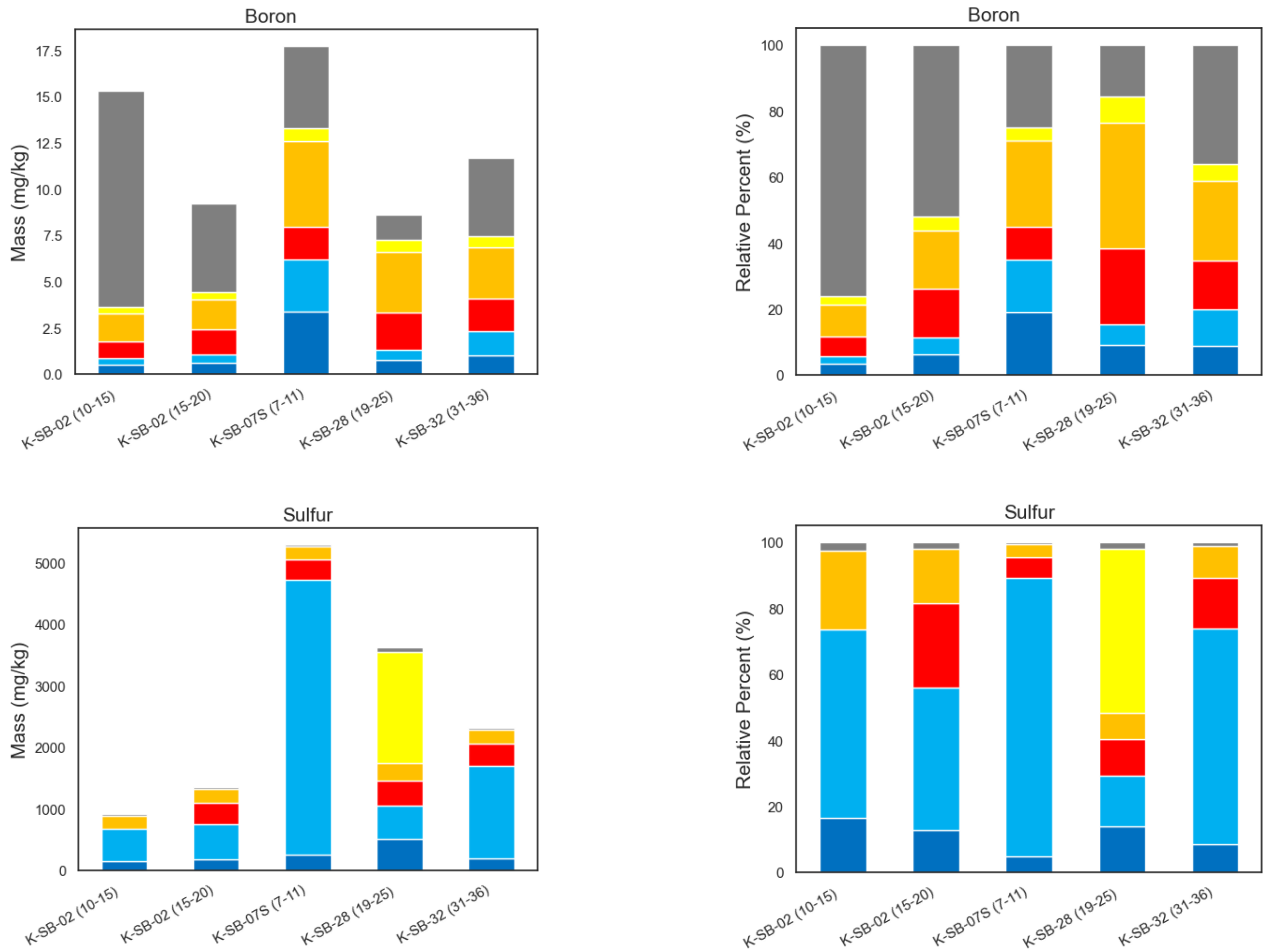




Notes:
-SEP results from SGS (2023) analysis.
-Non-detects are removed from the analysis.
-The percentages for each individual fraction may not sum to 100 due to results below the reporting limit and rounding.

LIFECYCLEGEO

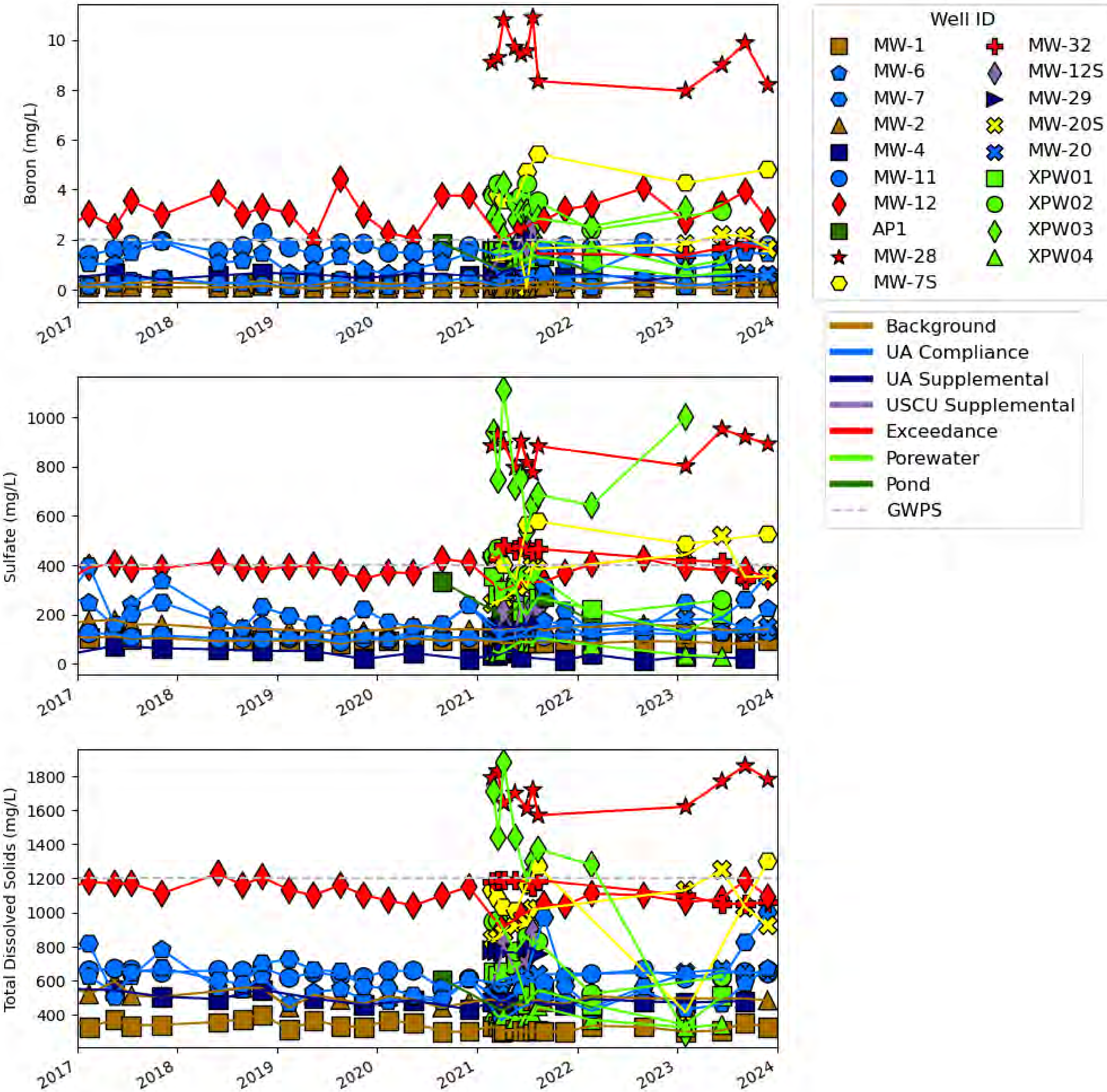
Title		
Kincaid Ash Pond 2023 SEP Results		
Project Name: Kincaid- Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 4-2b
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 12/05/2023	



Notes:
-SEP results from SGS (2023) analysis.
-Non-detects are removed from the analysis.
-The percentages for each individual fraction may not sum to 100 due to results below the reporting limit and rounding.

LIFECYCLEGEO

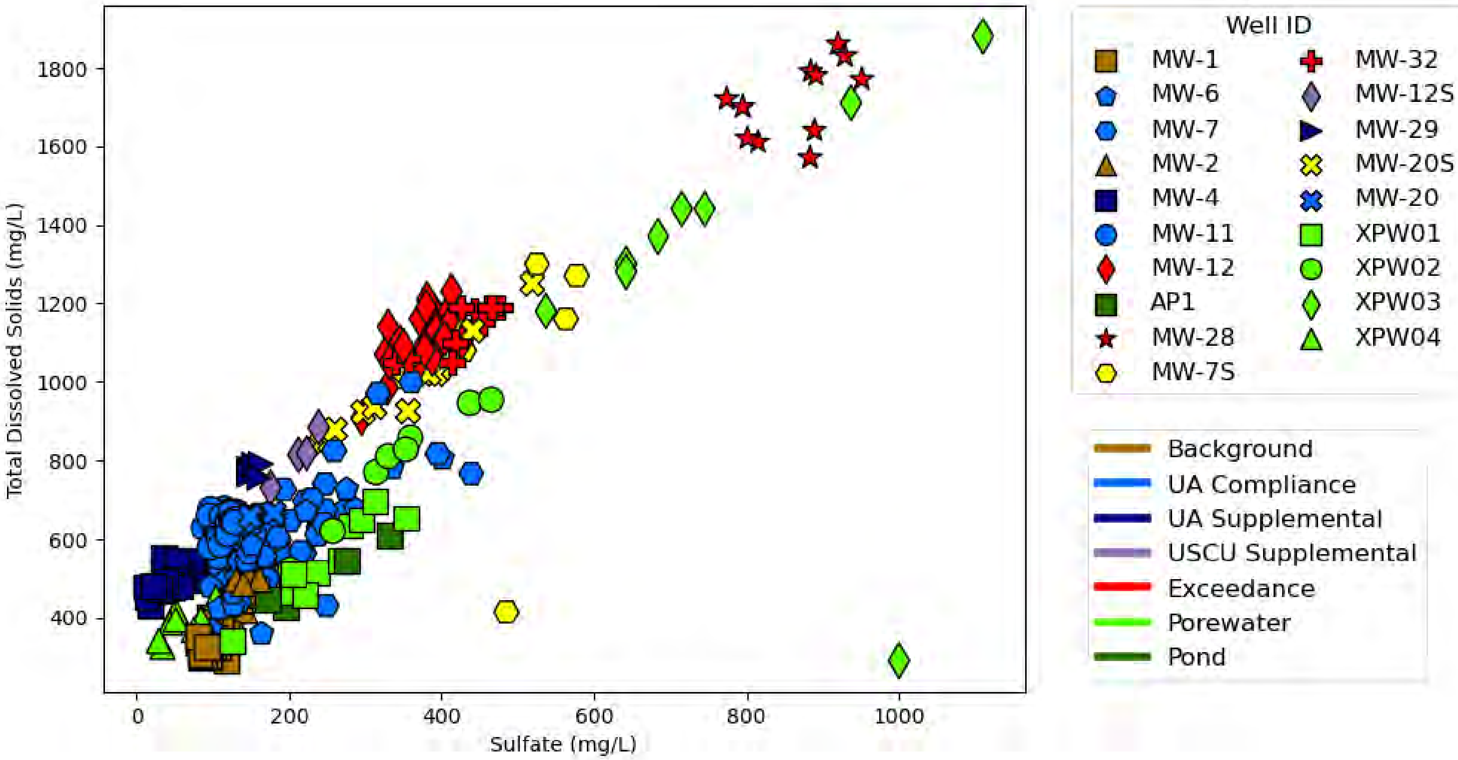
Title: Kincaid Ash Pond 2023 SEP Results		
Project Name: Kincaid- Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 4-2b
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 12/05/2023	



Notes:
-GWPS: Groundwater protection standard

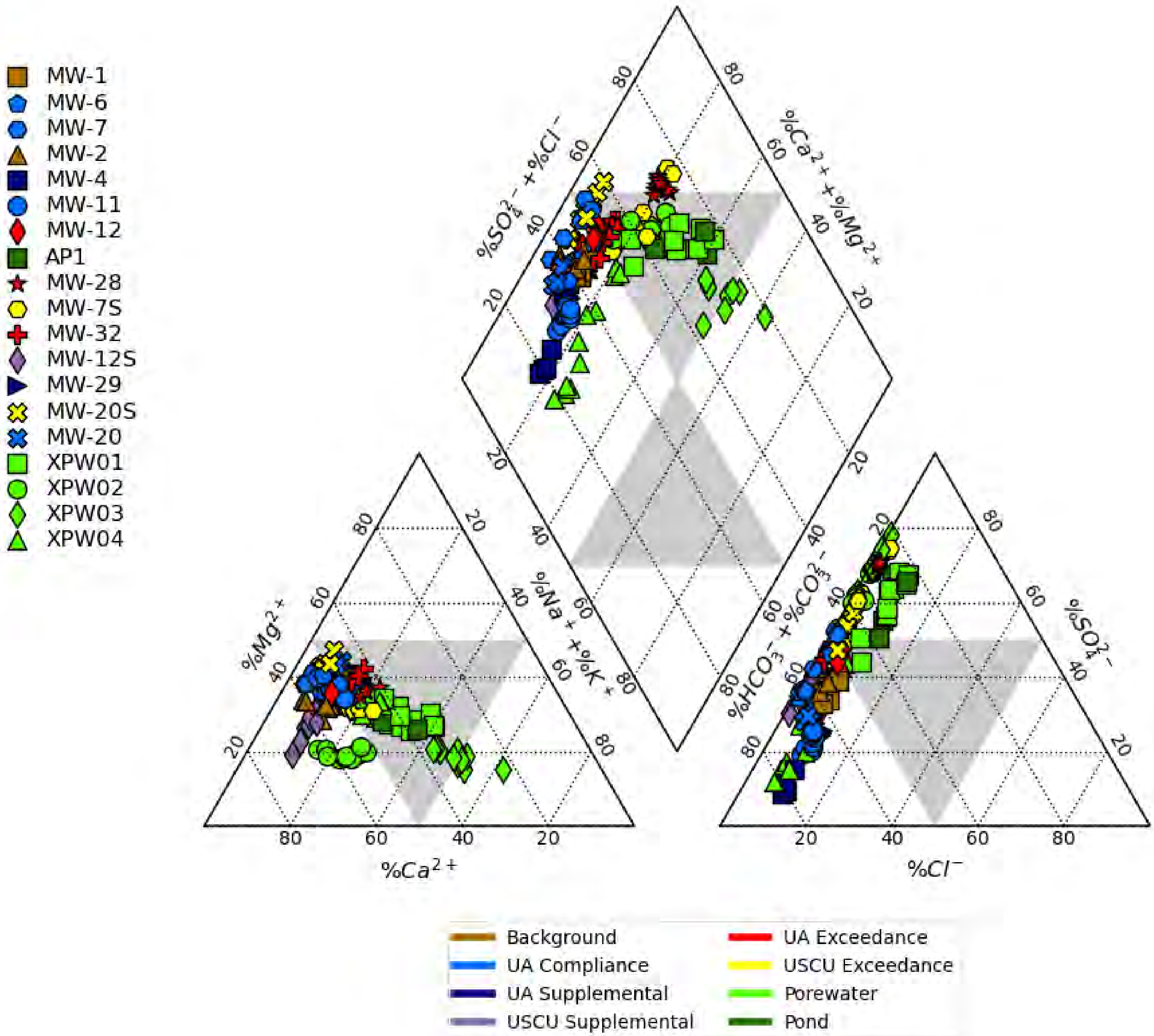
LIFECYCLEGEO

Title	Kincaid Ash Pond Boron, Sulfate, and TDS Time Series
Project Name	Kincaid- Ash Pond Evaluation
Project Number	[23RAM01-1] Vistra CCR
Client Name	Ramboll Americas Engineering Solutions, Inc.
Date	04/24/2024
Figure	5-1



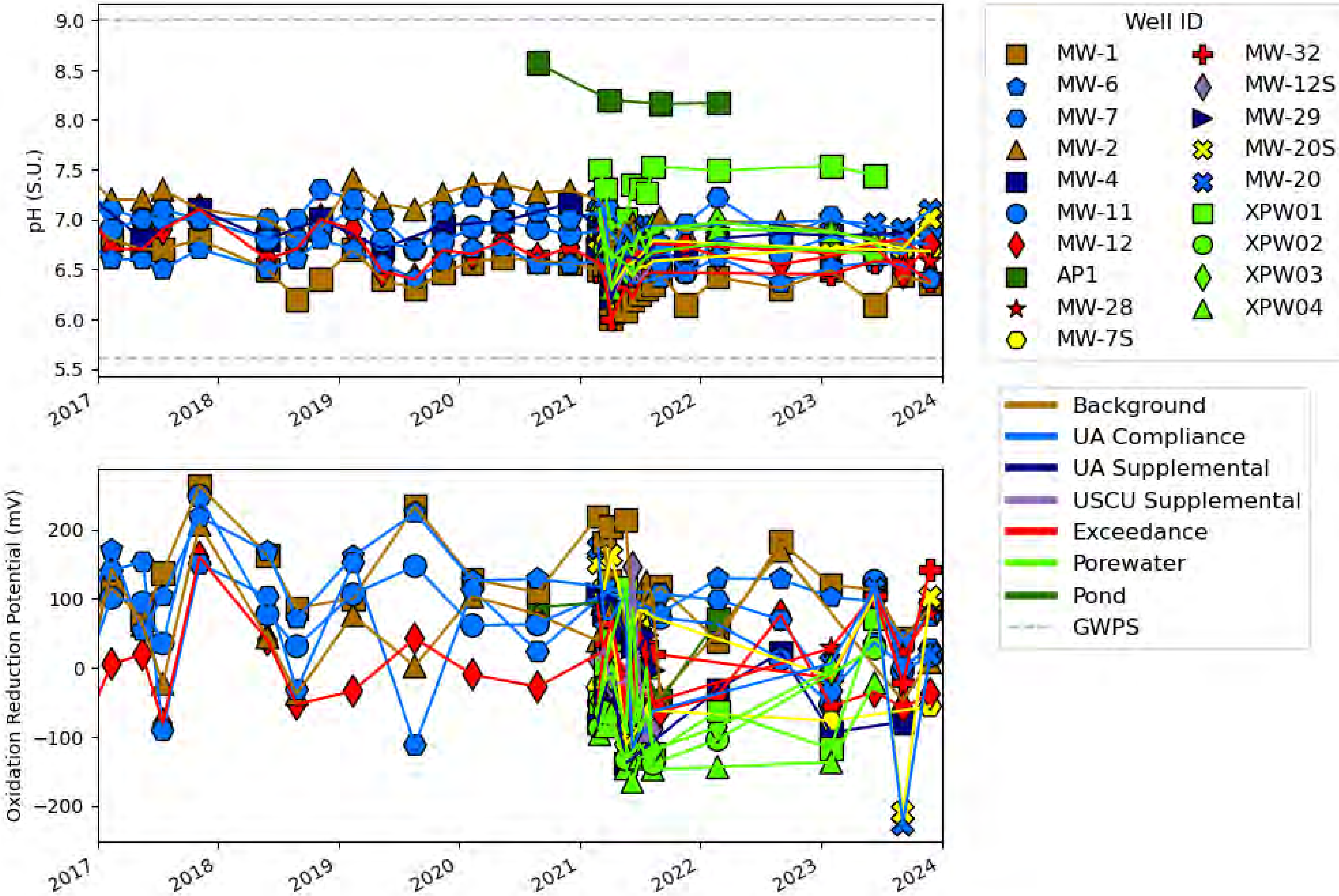
LIFECYCLEGEO

Title		
Kincaid Ash Pond Total Dissolved Solids and Sulfate		
Project Name: Kincaid- Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 5-2
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 04/24/2024	



LIFECYCLEGEO

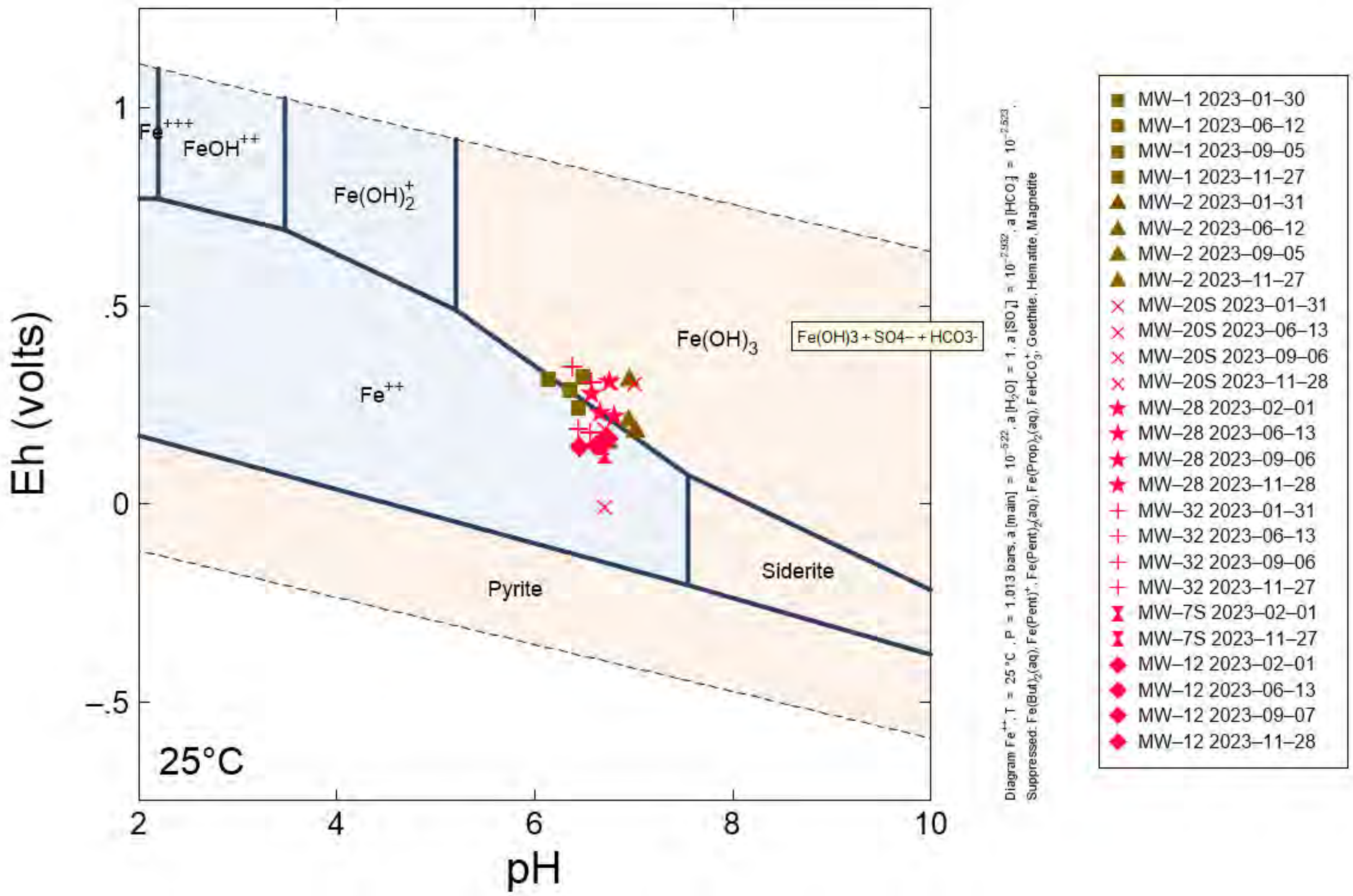
Title Kincaid Ash Pond Piper Diagram		
Project Name Kincaid- Ash Pond Evaluation	Project Number [23RAM01-1] Vistra CCR	Figure 5-3
Client Name Ramboll Americas Engineering Solutions, Inc.	Date 02/08/2024	



Notes:
-GWPS: Groundwater protection standard

LIFECYCLEGEO

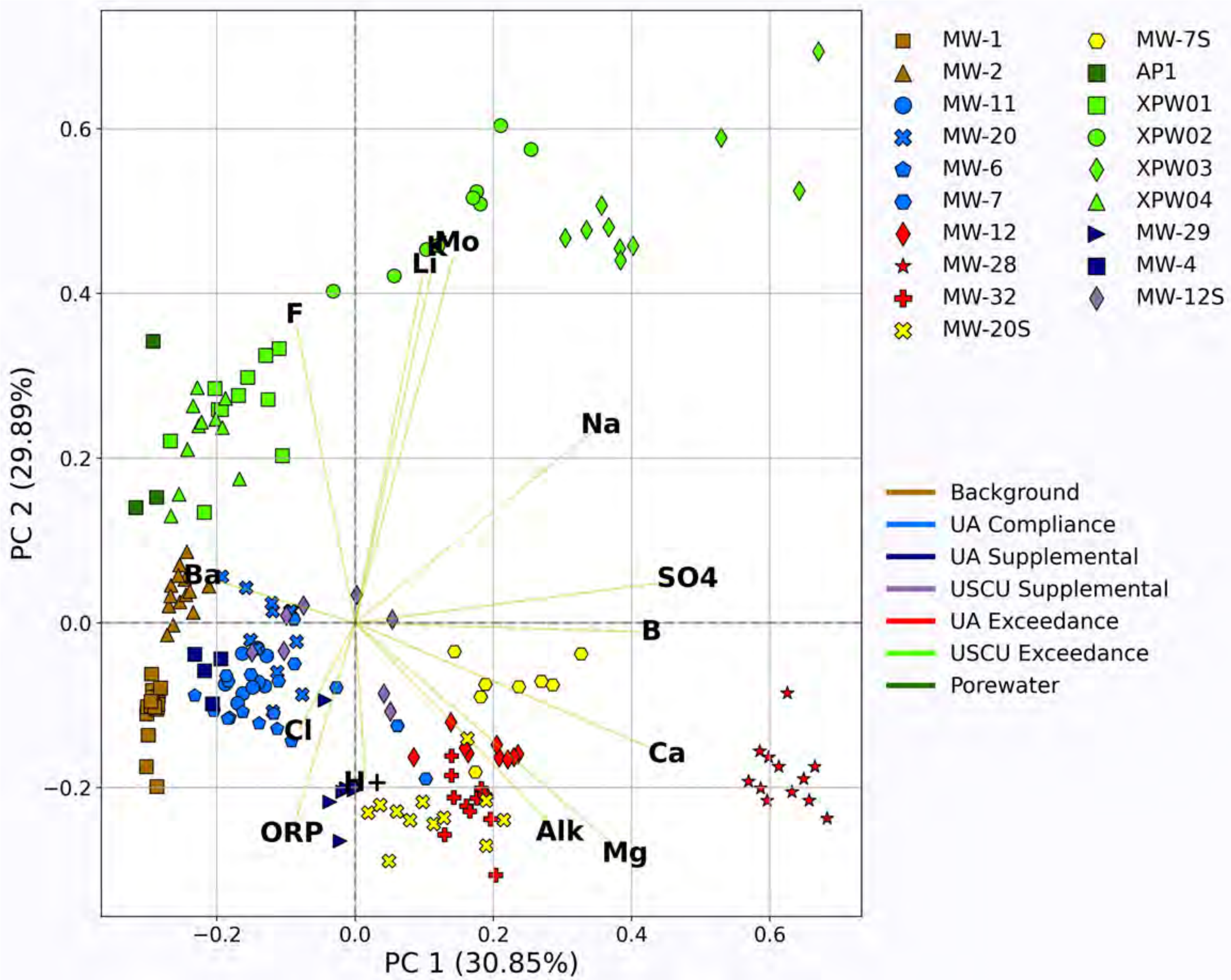
Title: Kincaid Ash Pond Oxidation Reduction Potential and pH Time Series		
Project Name: Kincaid- Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 5-4
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 02/08/2024	



Notes:
-Data from 2023
-Temperature and activities calculated from site-specific conditions
-Brown indicate background wells, red indicate exceedance locations

LIFECYCLEGEO

Title Kincaid Ash Pond Pourbaix Diagram			
Project Name Kincaid- Ash Pond Evaluation	Project Number [23RAM01-1] Vistra CCR	Figure 5-5	
Client Name Ramboll Americas Engineering Solutions, Inc.	Date 12/13/2023		



Notes:
-See abbreviation list for full analyte names.

LIFECYCLEGEO

Title		
Kincaid Ash Pond Principal Component Analysis		
Project Name: Kincaid- Ash Pond Evaluation	Project Number: [23RAM01-1] Vistra CCR	Figure: 5-6
Client Name: Ramboll Americas Engineering Solutions, Inc.	Date: 04/24/2024	

TABLES

Table 4-1. Summary of Solid Samples

HSU	Location	Monitoring Well Name	Depth Range (ft bgs)	CEC	LOI	TOC	SEP	XRD	XRF	TIMA	Total Metals
UA	K-SB-02	MW-2	(10-14.7)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
USUC	K-SB-08	MW-8S	(4-7)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-08	MW-8S	(13-17)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
CCR	K-SB-XPW03	XPW03	(10-20)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-02	MW-2	(14.7-17.5)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-12	MW-12	(13-17.3)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-12	MW-12	(17.3-21.0)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-28	MW-28	(18-21.5)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
USCU	K-SB-07	MW-7S	(7-10)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-07	MW-7	(10-15)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-32	MW-32	(31-36)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-03	MW-32	(19-20)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-02	MW-2	(10-15)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	2023 (SGS)	--
UA	K-SB-02	MW-2	(15-20)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	--	--
USCU	K-SB-07S	MW-7S	(7-11)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	2023 (SGS)	--
UA	K-SB-28	MW-28	(19-25)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	2023 (SGS)	--
UA	K-SB-32	MW-32	(31-36)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	--	--

Notes:

ft bgs = feet below ground surface

CEC = cation exchange capacity

LOI = loss on ignition

TOC = total organic carbon

SEP = sequential extraction procedure

XRD = X-ray diffraction

XRF = X-ray fluorescence

TIMA = TESCAN integrated mineral analysis

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

-- = no data

SGS, Eurofins = labs where analyses was performed

LIFECYCLEGEO

Table 4-2. CEC Results

Sample ID	HSU	CEC Actual (meq/100g)
K-SB-02 (10.0-14.7)	UA	32.7
K-SB-02 (14.7-17.5)	UA	25.9
K-SB-12 (13.0-17.3)	UA	75.6
K-SB-12 (17.3-21.0)	UA	95.1
K-SB-28 (18.0-21.5)	UA	91.8
K-SB-07 (7.0-10.0)	USCU	25.4
K-SB-07 (10.0-15.0)	UA	16.9
K-SB-32 (31.0-36.0)	UA	104
K-SB-03 (19.0-20.0)	UA	127
K-SB-08 (4.0-7.0)	USCU	26.0
K-SB-08 (13.0-17.0)	UA	14.9
K-SB-XPW03 (10.0-20.0)	CCR	3.76

Notes:

CEC = cation exchange capacity

meq = milliequivalents

g = grams

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-3. XRF Results

Mineral/Compound	K-SB-02 (10-15) (wt %) UA	K-SB-02 (15-20) (wt %) UA	K-SB-07S (7-11) (wt %) USCU	K-SB-28 (19-25) (wt %) UA	K-SB-32 (31-36) (wt %) UA
S	0.05	0.02	0.05	0.23	0.02
Cl	0.01	<0.01	<0.01	<0.01	0.01
Al2O3	8.62	6.46	11.15	6.65	5.96
CaO	2.02	5.93	0.79	10.03	7.96
Cr2O3	0.03	0.03	0.03	0.02	0.03
Fe2O3	3.63	2.69	3.85	2.80	2.40
K2O	2.00	1.68	1.91	1.94	1.88
MgO	1.68	3.02	0.95	5.22	3.77
Mn3O4	0.03	0.05	0.07	0.06	0.06
Na2O	0.69	0.70	0.78	0.67	0.59
P2O5	0.08	0.07	0.06	0.07	0.05
SiO2	74.24	68.85	73.63	56.98	65.38
TiO2	0.51	0.36	0.67	0.37	0.30
V2O5	<0.01	<0.01	0.02	0.01	0.01
Sum	93.64	89.93	93.98	85.43	88.51

Notes:

wt % = weight percent

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-4a. XRD results from 2021 Analysis

Well ID Depth (ft bgs)			K-SB-02 (10.0-14.7)	K-SB-02 (14.7-17.5)	K-SB-12 (13.0-17.3)	K-SB-12 (17.3-21.0)	K-SB-28 (18.0-21.5)	K-SB-07 (7.0-10.0)	K-SB-07 (10.0-15.0)
Sampled Aquifer Unit			UA	UA	UA	UA	UA	USCU	UA
Mineral/Compound	Formula	Mineral Type							
Quartz	SiO_2	Silicate	54.2	56.6	46.4	44.4	46.4	53.7	62.5
Orthoclase	$KAlSi_3O_8$	Silicate	7.9	5.8	5.6	5.5	6.2	6.6	7
Albite	$NaAlSi_3O_8$	Feldspar	8.8	10.8	8.1	7.3	6.6	13.2	9.6
Calcite	$CaCO_3$	Carbonate	2.6	1.3	3.8	5.9	4.9	0.4	0.4
Ankerite	$CaFe(CO_3)_2$	Carbonate	1.1	2.9	6.7	7	6	0.3	1.1
Dolomite	$CaMg(CO_3)_2$	Carbonate	8	4.7	12.7	13.7	16.3	0.2	0.8
Rhodochrosite	$MnCO_3$	Carbonate	0	0.1	0.2	0.1	0.1	0.2	0.1
Siderite	$FeCO_3$	Carbonate	0	0	0	0.3	0.1	0.2	0.1
Kaolinite	$Al_2Si_2O_5(OH)_4$	Clay	2.9	2.8	2.7	1.8	1.7	5.1	2.9
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Phyllosilicate	4.1	3.5	2.9	2.3	2.3	6.2	4.8
Nontronite	$Fe_2(Al,Si)_4O_{10}(OH)_2Na_{0.3}(H_2O)_4$	Phyllosilicate	0.4	0.9	0	0	0	0	0
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Mica	7.4	8.7	9	9	7.6	11.6	9.3
Pyrite	FeS_2	Sulfide	0.2	0.1	0	0.2	0	0.1	0.1
Magnetite	Fe_3O_4	Oxide	0.2	0.2	0.4	0.1	0.2	1	0.2
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	Amphibole	1.2	0.8	0.7	1.3	0.7	0.6	0.4
Diopside	$CaMgSi_2O_6$	Silicate	0.9	0.9	1	1.1	1	0.8	0.6
Hematite	Fe_2O_3	Oxide	--	--	--	--	--	--	--
Maghemite	γ-Fe_2O_3	Oxide	--	--	--	--	--	--	--
Total			100	100	100	100	100	100	100

Notes:

All results presented as weight percent (wt. %)

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

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.

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-4a. XRD results from 2021 Analysis

Well ID Depth (ft bgs)			K-SB-32 (31.0-36.0)	K-SB-03 (19.0-20.0)	K-SB-08 (4.0-7.0)	K-SB-08 (13.0-17.0)	K-SB-XPW03 (10.0-20.0)
Sampled Aquifer Unit			UA	UA	USUC	UA	CCR
Mineral/Compound	Formula	Mineral Type					
Quartz	SiO_2	Silicate	50.3	48.4	53.9	62.6	5.8
Orthoclase	$KAlSi_3O_8$	Silicate	5.1	4.2	7.4	6.9	6.6
Albite	$NaAlSi_3O_8$	Feldspar	7	6.5	14.6	10.3	19.1
Calcite	$CaCO_3$	Carbonate	6.1	8.7	0.5	0.2	--
Ankerite	$CaFe(CO_3)_2$	Carbonate	3.4	4.5	1	0.9	--
Dolomite	$CaMg(CO_3)_2$	Carbonate	16	16.8	0.9	0.5	--
Rhodochrosite	$MnCO_3$	Carbonate	0.1	0.2	0.1	0.1	--
Siderite	$FeCO_3$	Carbonate	0.1	0.3	0	0.1	--
Kaolinite	$Al_2Si_2O_5(OH)_4$	Clay	1.7	1	4.2	3.3	--
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	Phyllosilicate	1.6	1.5	4.9	4.6	10.5
Nontronite	$Fe_2(Al,Si)_4O_{10}(OH)_2Na_{0.3}(H_2O)_4$	Phyllosilicate	0	0	0	0	--
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Mica	6.4	6.3	10.8	8.7	--
Pyrite	FeS_2	Sulfide	0.1	0	0.3	0.3	--
Magnetite	Fe_3O_4	Oxide	0.3	0.1	0.3	0.2	0.6
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	Amphibole	0.7	0.7	0.3	0.3	--
Diopside	$CaMgSi_2O_6$	Silicate	1.1	0.9	0.7	1	23.4
Hematite	Fe_2O_3	Oxide	--	--	--	--	15.1
Maghemite	γ-Fe_2O_3	Oxide	--	--	--	--	19
Total			100	100	100	100	100

Notes:

All results presented as weight percent (wt. %)

Zero values indicate that the mineral was included in the refinement, but the calculated concent

Dashes indicate that the mineral was not identified by the analyst and not included in the refine

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity o

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-4b. XRD Results from 2023 Analysis

Well ID Depth (ft bgs)			K-SB-02 (10-15)	K-SB-02 (15-20)	K-SB-07 S (7-11)	K-SB-28 (19-25)	K-SB-32 (31-36)
Sampled Aquifer Unit			UA	UA	USCU	UA	UA
Mineral/Compound	Formula	Mineral Type					
Quartz	SiO_2	Silicate	65.3	64.2	57.2	51.1	54.9
Albite	$NaAlSi_3O_8$	Feldspar	8.08	7.27	11.6	7.38	7.89
Orthoclase	$KAlSi_3O_8$	Silicate	7.79	5.48	7.6	3.71	4.01
Dolomite	$CaMg(CO_3)_2$	Carbonate	1.76	8.34	-	21.1	13.3
Ankerite	$CaFe(CO_3)_2$	Carbonate	0.940	2.44	-	1.82	2.61
Calcite	$CaCO_3$	Carbonate	-	2.26	-	4.71	4.75
Magnetite	Fe_3O_4	Oxide	0.53	0.76	0.56	0.32	0.21
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Mica	-	-	-	5.65	7.27
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	Mica	-	-	-	0.88	0.52
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$	Phyllosilicates	8.2	6.44	7.6	3.37	4.59
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot 10H_2O$	Phyllosilicates	7.43	2.78	15.4	-	-
Total			100	100	100	100	100

Notes:

All results presented as weight percent (wt. %)

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

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.

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-5. TIMA Results

Mineral	K-SB-02 (10.0-15.0) UA	K-SB-07S (7.0-11.0) USCU	K-SB-28 (19.0-25.0) UA
Quartz	66.1	52.7	53.6
Plagioclase	7.22	8.76	7.03
K-Feldspar	5.90	4.57	5.70
Mixed Clays/Micas	15.2	31.7	6.25
Chlorites	0.518	0.752	0.498
Other Silicates	1.00	0.735	1.38
Iron Oxides	0.103	0.058	0.712
Ti Fe Oxide	0.307	0.539	0.444
Other Oxides	0.045	0.079	0.041
Calcite	0.256	0.003	5.43
Dolomite	3.26	0.002	17.6
Ankerite	0.047	0.010	0.553
Sulphides	0.003	0.002	0.431
Sulphates/Phosphates	0.048	0.083	0.220
Other	0.038	0.034	0.158
Total	100	100	100

NOTES:

High-Resolution Mapping (THRM), was the selected scan mode. The THRM collects a Backscattered Electron signal and an X-ray spectrum at a set resolution (3 micrometer) to map the particles. It collects modal and textural information, such as liberation or exposure analysis of grains of interest

Due to the chemical properties of the iron carbonate mineral siderite, it will be indistinguishable from iron oxide using TIMA and, therefore, would be classified along with the iron oxides.

UA = uppermost aquifer

USCU = upper semi-confining unit

Table 4-6. TOC and LOI Results

HSU	Location	Depth Range (ft bgs)	TOC (%)	LOI (%)
UA	K-SB-02	10.0-14.7	0.516	8.96
UA	K-SB-02	14.7-17.5	<0.025	8.35
UA	K-SB-12	13.0-17.3	0.234	13.3
UA	K-SB-12	17.3-21.0	0.975	14.4
UA	K-SB-28	18.0-21.5	0.587	14.5
USCU	K-SB-07	7.0-10.0	0.17	6.67
UA	K-SB-07	10.0-15.0	0.216	4.93
UA	K-SB-32	31.0-36.0	0.217	13.4
UA	K-SB-03	19.0-20.0	0.333	15.6
USUC	K-SB-08	4.0-7.0	1.42	8.46
UA	K-SB-08	13.0-17.0	<0.025	4.25
CCR	K-SB-XPW03	10.0-20.0	0.993	1.04

Notes:

%= percent

ft bgs = feet below ground surface

TOC = Total organic carbon

LOI = loss on ignition

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

< = less than detection limit

Table 4-7. SEP Results from 2021 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Iron		Manganese		Aluminum	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
UA	K-SB-02	(10-14.7)	Eurofins	2021	Exchangeable Fraction	49	0.2	1	0.3	45	0.1
UA	K-SB-02	(10-14.7)	Eurofins	2021	Carbonate Fraction	52	0.2	3	1.6	62	0.17
UA	K-SB-02	(10-14.7)	Eurofins	2021	Non-Crystalline Minerals Fraction	250	1.0	25	12.5	340	0.9
UA	K-SB-02	(10-14.7)	Eurofins	2021	Metal Hydroxide Fraction	9500	38.0	78	39.0	3400	9.2
UA	K-SB-02	(10-14.7)	Eurofins	2021	Organic Fraction	<55	NA	3.6	1.8	<29	NA
UA	K-SB-02	(10-14.7)	Eurofins	2021	Acid/Sulfide Fraction	10000	40.0	45	22.5	11000	29.7
UA	K-SB-02	(10-14.7)	Eurofins	2021	Residual Fraction	5200	20.8	44	22.0	22000	59.5
UA	K-SB-02	(10-14.7)	Eurofins	2021	Sum	25000	NA	200	NA	37000	NA
UA	K-SB-02	(10-14.7)	Eurofins	2021	Total/NA	36000	NA	480	NA	46000	NA
UA	K-SB-02	(10-14.7)	SGS	2021	Total	23000	NA	360	NA	47000	NA
USCU	K-SB-08	(4-7)	Eurofins	2021	Exchangeable Fraction	48	0.3	60	12	41	0.1
USCU	K-SB-08	(4-7)	Eurofins	2021	Carbonate Fraction	58	0.3	28	5.5	59	0.2
USCU	K-SB-08	(4-7)	Eurofins	2021	Non-Crystalline Minerals Fraction	2200	12.9	230	45.1	290	0.8
USCU	K-SB-08	(4-7)	Eurofins	2021	Metal Hydroxide Fraction	4600	27.1	110	21.6	2700	7.1
USCU	K-SB-08	(4-7)	Eurofins	2021	Organic Fraction	88.00	0.5	13	2.5	170	0.4
USCU	K-SB-08	(4-7)	Eurofins	2021	Acid/Sulfide Fraction	4800	28.2	23	4.5	5100	13.4
USCU	K-SB-08	(4-7)	Eurofins	2021	Residual Fraction	4900	28.8	55	10.8	30000	78.9
USCU	K-SB-08	(4-7)	Eurofins	2021	Sum	17000	NA	510	NA	38000	NA
USCU	K-SB-08	(4-7)	Eurofins	2021	Total/NA	16000	NA	400	NA	48000	NA
USCU	K-SB-08	(4-7)	SGS	2021	Total	25000	NA	630	NA	61000	NA
UA	K-SB-08	(13-17)	Eurofins	2021	Exchangeable Fraction	48	0.3	29.0	12.6	51.0	0.1
UA	K-SB-08	(13-17)	Eurofins	2021	Carbonate Fraction	62	0.4	34.0	14.8	70.0	0.2
UA	K-SB-08	(13-17)	Eurofins	2021	Non-Crystalline Minerals Fraction	220	1.3	41	17.8	160	0.5
UA	K-SB-08	(13-17)	Eurofins	2021	Metal Hydroxide Fraction	5900	34.7	53	23.0	2200	6.3
UA	K-SB-08	(13-17)	Eurofins	2021	Organic Fraction	<54	NA	<2.3	NA	140	0.4
UA	K-SB-08	(13-17)	Eurofins	2021	Acid/Sulfide Fraction	5800	34.1	34	14.8	5900	16.9
UA	K-SB-08	(13-17)	Eurofins	2021	Residual Fraction	4500	26.5	40	17.4	26000	74.3
UA	K-SB-08	(13-17)	Eurofins	2021	Sum	17000	NA	230	NA	35000	NA
UA	K-SB-08	(13-17)	Eurofins	2021	Total/NA	14000	NA	210	NA	40000	NA
UA	K-SB-08	(13-17)	SGS	2021	Total	23000	NA	290	NA	52000	NA

Table 4-7. SEP Results from 2021 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Iron		Manganese		Aluminum	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Exchangeable Fraction	46	0.1	0.4	0.1	41.0	0.1
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Carbonate Fraction	76	0.1	1	0.3	88	0.15
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Non-Crystalline Minerals Fraction	1700	2.1	8	2.1	1900	3.2
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Metal Hydroxide Fraction	3600	4.4	24	6.2	3200	5.4
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Organic Fraction	<50	NA	<2.1	NA	70	0.1
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Acid/Sulfide Fraction	21000	25.9	110	28.2	27000	45.8
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Residual Fraction	55000	67.9	250	64.1	27000	45.8
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Sum	81000	NA	390	NA	59000	NA
CCR	K-SB-XPW03	(10-20)	Eurofins	2021	Total/NA	82000	NA	330	NA	80000	NA
CCR	K-SB-XPW03	(10-20)	SGS	2021	Total	130000	NA	620	NA	110000	NA
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Exchangeable Fraction	56	0.4	2.4	0.7	53.0	0.24
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Carbonate Fraction	53	0.4	81	23.8	61	0.3
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Non-Crystalline Minerals Fraction	270	1.8	60	17.6	120	0.5
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Metal Hydroxide Fraction	4800	32.0	85	25.0	1200	5.5
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Organic Fraction	<51	NA	6	1.9	200	0.9
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Acid/Sulfide Fraction	5800	38.7	54	15.9	5400	24.5
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Residual Fraction	4200	28.0	48	14.1	15000	68.2
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Sum	15000	NA	340	NA	22000	NA
UA	K-SB-02	(14.7-17.5)	Eurofins	2021	Total/NA	12000	NA	280	NA	24000	NA
UA	K-SB-02	(14.7-17.5)	SGS	2021	Total	22000	NA	340	NA	28000	NA
UA	K-SB-12	(13-17.3)	Eurofins	2021	Exchangeable Fraction	54	0.3	1	0.1	40	0.2
UA	K-SB-12	(13-17.3)	Eurofins	2021	Carbonate Fraction	92	0.5	49	10.9	64	0.3
UA	K-SB-12	(13-17.3)	Eurofins	2021	Non-Crystalline Minerals Fraction	210	1.2	190	42.2	62	0.3
UA	K-SB-12	(13-17.3)	Eurofins	2021	Metal Hydroxide Fraction	4700	27.6	100	22.2	610	2.7
UA	K-SB-12	(13-17.3)	Eurofins	2021	Organic Fraction	<51	NA	7.4	1.6	230	1.0
UA	K-SB-12	(13-17.3)	Eurofins	2021	Acid/Sulfide Fraction	7900	46.5	73	16.2	4200	18.3
UA	K-SB-12	(13-17.3)	Eurofins	2021	Residual Fraction	4000	23.5	31	6.9	18000	78.3
UA	K-SB-12	(13-17.3)	Eurofins	2021	Sum	17000	NA	450	NA	23000	NA
UA	K-SB-12	(13-17.3)	Eurofins	2021	Total/NA	13000	NA	360	NA	31000	NA
UA	K-SB-12	(13-17.3)	SGS	2021	Total	20000	NA	500	NA	21000	NA
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Exchangeable Fraction	45	0.3	9.3	2.9	41.0	0.3

Table 4-7. SEP Results from 2021 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Iron		Manganese		Aluminum	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Carbonate Fraction	210	1.6	62	19.4	63	0.39
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Non-Crystalline Minerals Fraction	1000	7.7	31	9.7	45	0.3
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Metal Hydroxide Fraction	2900	22.3	120	37.5	280	1.8
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Organic Fraction	<49	NA	17	5.3	110	0.7
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Acid/Sulfide Fraction	5700	43.8	46	14.4	2300	14.4
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Residual Fraction	3200	24.6	35	10.9	13000	81.3
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Sum	13000	NA	320	NA	16000	NA
UA	K-SB-12	(17.3-21.0)	Eurofins	2021	Total/NA	11000	NA	310	NA	23000	NA
UA	K-SB-12	(17.3-21.0)	SGS	2021	Total	21000	NA	500	NA	42000	NA
UA	K-SB-28	(18-21.5)	Eurofins	2021	Exchangeable Fraction	120	1.2	1.2	0.4	130.0	0.6
UA	K-SB-28	(18-21.5)	Eurofins	2021	Carbonate Fraction	78	0.8	48	15.0	55	0.26
UA	K-SB-28	(18-21.5)	Eurofins	2021	Non-Crystalline Minerals Fraction	150	1.5	86	26.9	26	0.1
UA	K-SB-28	(18-21.5)	Eurofins	2021	Metal Hydroxide Fraction	2200	22.0	100	31.3	180	0.9
UA	K-SB-28	(18-21.5)	Eurofins	2021	Organic Fraction	<48	NA	5	1.5	76	0.4
UA	K-SB-28	(18-21.5)	Eurofins	2021	Acid/Sulfide Fraction	4500	45.0	40	12.5	1600	7.6
UA	K-SB-28	(18-21.5)	Eurofins	2021	Residual Fraction	3200	32.0	42	13.1	19000	90.5
UA	K-SB-28	(18-21.5)	Eurofins	2021	Sum	10000	NA	320	NA	21000	NA
UA	K-SB-28	(18-21.5)	Eurofins	2021	Total/NA	9100	NA	370	NA	14000	NA
UA	K-SB-28	(18-21.5)	SGS	2021	Total	19000	NA	480	NA	37000	NA
USCU	K-SB-07	(7-10)	Eurofins	2021	Exchangeable Fraction	57	0.3	88.0	19.1	51.0	0.1
USCU	K-SB-07	(7-10)	Eurofins	2021	Carbonate Fraction	79	0.4	87	18.9	72	0.18
USCU	K-SB-07	(7-10)	Eurofins	2021	Non-Crystalline Minerals Fraction	470	2.2	74	16.1	330	0.8
USCU	K-SB-07	(7-10)	Eurofins	2021	Metal Hydroxide Fraction	7000	33.3	110	23.9	3600	8.8
USCU	K-SB-07	(7-10)	Eurofins	2021	Organic Fraction	<54	NA	12	2.6	<29	NA
USCU	K-SB-07	(7-10)	Eurofins	2021	Acid/Sulfide Fraction	8700	41.4	42	9.1	11000	26.8
USCU	K-SB-07	(7-10)	Eurofins	2021	Residual Fraction	5000	23.8	46	10.0	26000	63.4
USCU	K-SB-07	(7-10)	Eurofins	2021	Sum	21000	NA	460	NA	41000	NA
USCU	K-SB-07	(7-10)	Eurofins	2021	Total/NA	22000	NA	400	NA	57000	NA
USCU	K-SB-07	(7-10)	SGS	2021	Total	27000	NA	490	NA	67000	NA

Table 4-7. SEP Results from 2021 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Iron		Manganese		Aluminum	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
UA	K-SB-07	(10-15)	Eurofins	2021	Exchangeable Fraction	48	0.2	0.5	0.2	40.0	0.2
UA	K-SB-07	(10-15)	Eurofins	2021	Carbonate Fraction	52	0.2	5	1.8	66	0.25
UA	K-SB-07	(10-15)	Eurofins	2021	Non-Crystalline Minerals Fraction	210	1.0	99	36.7	190	0.7
UA	K-SB-07	(10-15)	Eurofins	2021	Metal Hydroxide Fraction	9200	41.8	84	31.1	2800	10.8
UA	K-SB-07	(10-15)	Eurofins	2021	Organic Fraction	<53	NA	<2.2	NA	71	0.3
UA	K-SB-07	(10-15)	Eurofins	2021	Acid/Sulfide Fraction	6900	31.4	40	14.8	5900	22.7
UA	K-SB-07	(10-15)	Eurofins	2021	Residual Fraction	5100	23.2	38	14.1	17000	65.4
UA	K-SB-07	(10-15)	Eurofins	2021	Sum	22000	NA	270	NA	26000	NA
UA	K-SB-07	(10-15)	Eurofins	2021	Total/NA	19000	NA	230	NA	44000	NA
UA	K-SB-07	(10-15)	SGS	2021	Total	28000	NA	340	NA	54000	NA
UA	K-SB-32	(31-36)	Eurofins	2021	Exchangeable Fraction	52	0.4	1.4	0.3	43.0	0.2
UA	K-SB-32	(31-36)	Eurofins	2021	Carbonate Fraction	57	0.4	40	8.5	58	0.23
UA	K-SB-32	(31-36)	Eurofins	2021	Non-Crystalline Minerals Fraction	140	1.0	190	40.4	49	0.2
UA	K-SB-32	(31-36)	Eurofins	2021	Metal Hydroxide Fraction	3200	22.9	130	27.7	390	1.6
UA	K-SB-32	(31-36)	Eurofins	2021	Organic Fraction	<49	NA	6	1.2	150	0.6
UA	K-SB-32	(31-36)	Eurofins	2021	Acid/Sulfide Fraction	6000	42.9	65	13.8	3800	15.2
UA	K-SB-32	(31-36)	Eurofins	2021	Residual Fraction	4900	35.0	43	9.1	21000	84.0
UA	K-SB-32	(31-36)	Eurofins	2021	Sum	14000	NA	470	NA	25000	NA
UA	K-SB-32	(31-36)	Eurofins	2021	Total/NA	12000	NA	380	NA	33000	NA
UA	K-SB-32	(31-36)	SGS	2021	Total	17000	NA	420	NA	36000	NA
UA	K-SB-03	(19-20)	Eurofins	2021	Exchangeable Fraction	46	0.4	8.4	2.0	44.0	0.2
UA	K-SB-03	(19-20)	Eurofins	2021	Carbonate Fraction	190	1.6	100	24.4	63	0.25
UA	K-SB-03	(19-20)	Eurofins	2021	Non-Crystalline Minerals Fraction	1400	11.7	52	12.7	56	0.2
UA	K-SB-03	(19-20)	Eurofins	2021	Metal Hydroxide Fraction	2400	20.0	160	39.0	230	0.9
UA	K-SB-03	(19-20)	Eurofins	2021	Organic Fraction	<50	NA	8	1.8	160	0.6
UA	K-SB-03	(19-20)	Eurofins	2021	Acid/Sulfide Fraction	4300	35.8	51	12.4	2200	8.8
UA	K-SB-03	(19-20)	Eurofins	2021	Residual Fraction	3700	30.8	32	7.8	22000	88.0
UA	K-SB-03	(19-20)	Eurofins	2021	Sum	12000	NA	410	NA	25000	NA
UA	K-SB-03	(19-20)	Eurofins	2021	Total/NA	12000	NA	470	NA	15000	NA
UA	K-SB-03	(19-20)	SGS	2021	Total	15000	NA	500	NA	32000	NA

Notes:

Values below detection limits not included in percent of sum calculation or figures

NA = not applicable

< = below method detection limit

SEP = sequential extraction procedure

ft bgs = feet below ground surface

mg/kg = milligrams per kilogram

% = percent

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Total and Total/NA = total metals 2021 data analyzed by Eurofins and SGS. Full total metal analysis presented in Attachment 2

Percentages may not sum to 100 for each fraction due to results below the reporting limit and rounding

Table 4-8. SEP Results from 2023 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Iron		Manganese	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
UA	K-SB-02	(10-15)	SGS	2023	Water Soluble	52	0.2	0.4	0.2
UA	K-SB-02	(10-15)	SGS	2023	Exchangeable Metals	15	0.0	15	5.7
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Carbonates	830	2.5	85	31
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Fe and Mn Oxides	2400	7.3	33	12
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Organics	520	1.6	11	3.9
UA	K-SB-02	(10-15)	SGS	2023	Residual	29000	88	120	44
UA	K-SB-02	(10-15)	SGS	2023	Sum	33000	NA	270	NA
UA	K-SB-02	(15-20)	SGS	2023	Water Soluble	10	0.0	0.1	0.0
UA	K-SB-02	(15-20)	SGS	2023	Exchangeable Metals	6.4	0.0	10	2.9
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Carbonates	1300	6.2	220	61
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Fe and Mn Oxides	2100	10	46	13
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Organics	320	1.5	6.7	1.9
UA	K-SB-02	(15-20)	SGS	2023	Residual	17000	81	80	22
UA	K-SB-02	(15-20)	SGS	2023	Sum	21000	NA	360	NA
USCU	K-SB-07S	(7-11)	SGS	2023	Water Soluble	64	0.2	0.9	0.2
USCU	K-SB-07S	(7-11)	SGS	2023	Exchangeable Metals	10	0.0	31	6.0
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Carbonates	410	1.4	270	52
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Fe and Mn Oxides	2600	9.0	84	16
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Organics	740	2.6	30	5.8
USCU	K-SB-07S	(7-11)	SGS	2023	Residual	25000	86	100	19
USCU	K-SB-07S	(7-11)	SGS	2023	Sum	29000	NA	520	NA
UA	K-SB-28	(19-25)	SGS	2023	Water Soluble	0.6	0.0	0.1	0.0
UA	K-SB-28	(19-25)	SGS	2023	Exchangeable Metals	22	0.1	10	2.5
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Carbonates	1800	9.0	170	41
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Fe and Mn Oxides	3900	20	130	32
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Organics	1800	9.0	10	2.4
UA	K-SB-28	(19-25)	SGS	2023	Residual	13000	65	94	23
UA	K-SB-28	(19-25)	SGS	2023	Sum	20000	NA	410	NA

Notes:

Values below detection limits not included in percent of sum calculation or figures

NA = not applicable

< = below method detection limit

Table **4-8**. SEP Results **from 2023 Analysis**

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Aluminum		Boron	
						Concentration (mg/kg)	Percent of Sum (%)	Concentration (mg/kg)	Percent of Sum (%)
UA	K-SB-02	(10-15)	SGS	2023	Water Soluble	56	0.2	0.5	3.4
UA	K-SB-02	(10-15)	SGS	2023	Exchangeable Metals	26	0.1	0.4	2.3
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Carbonates	630	2.0	0.9	5.8
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Fe and Mn Oxides	800	2.5	1.5	9.8
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Organics	1600	5.0	0.4	2.5
UA	K-SB-02	(10-15)	SGS	2023	Residual	29000	91	12	76
UA	K-SB-02	(10-15)	SGS	2023	Sum	32000	NA	15	NA
UA	K-SB-02	(15-20)	SGS	2023	Water Soluble	14	0.1	0.6	6.3
UA	K-SB-02	(15-20)	SGS	2023	Exchangeable Metals	6.5	0.0	0.5	5.1
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Carbonates	530	2.3	1.4	15
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Fe and Mn Oxides	700	3.0	1.6	18
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Organics	960	4.2	0.4	4.3
UA	K-SB-02	(15-20)	SGS	2023	Residual	21000	91	4.8	52
UA	K-SB-02	(15-20)	SGS	2023	Sum	23000	NA	9.2	NA
USCU	K-SB-07S	(7-11)	SGS	2023	Water Soluble	76	0.2	3.4	19
USCU	K-SB-07S	(7-11)	SGS	2023	Exchangeable Metals	13	0.0	2.8	16
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Carbonates	530	1.2	1.7	9.8
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Fe and Mn Oxides	880	2.0	4.6	26
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Organics	1900	4.4	0.7	4.0
USCU	K-SB-07S	(7-11)	SGS	2023	Residual	40000	93	4.4	25
USCU	K-SB-07S	(7-11)	SGS	2023	Sum	43000	NA	18	NA
UA	K-SB-28	(19-25)	SGS	2023	Water Soluble	3.3	0.0	0.8	8.9
UA	K-SB-28	(19-25)	SGS	2023	Exchangeable Metals	14	0.1	0.5	6.3
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Carbonates	530	1.9	2.0	23
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Fe and Mn Oxides	630	2.3	3.3	38
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Organics	680	2.4	0.7	8.1
UA	K-SB-28	(19-25)	SGS	2023	Residual	26000	93	1.3	16
UA	K-SB-28	(19-25)	SGS	2023	Sum	28000	NA	8.6	NA

Notes:

Values below detection limits not included in percent of sum calculation or figures

NA = not applicable

< = below method detection limit

Table 4-8. SEP Results from 2023 Analysis

HSU	Location	Depth Range (ft bgs)	Analyst	Analysis Year	SEP Fraction	Sulfur Concentration (mg/kg)	Sulfur Percent of Sum (%)
UA	K-SB-02	(10-15)	SGS	2023	Water Soluble	150	16
UA	K-SB-02	(10-15)	SGS	2023	Exchangeable Metals	520	57
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Carbonates	<32	NA
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Fe and Mn Oxides	220	24
UA	K-SB-02	(10-15)	SGS	2023	Metals Bound to Organics	<34	NA
UA	K-SB-02	(10-15)	SGS	2023	Residual	24	2.7
UA	K-SB-02	(10-15)	SGS	2023	Sum	910	NA
UA	K-SB-02	(15-20)	SGS	2023	Water Soluble	170	13
UA	K-SB-02	(15-20)	SGS	2023	Exchangeable Metals	580	45
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Carbonates	350	27
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Fe and Mn Oxides	220	17
UA	K-SB-02	(15-20)	SGS	2023	Metals Bound to Organics	<36	NA
UA	K-SB-02	(15-20)	SGS	2023	Residual	26	2.0
UA	K-SB-02	(15-20)	SGS	2023	Sum	1300	NA
USCU	K-SB-07S	(7-11)	SGS	2023	Water Soluble	260	4.9
USCU	K-SB-07S	(7-11)	SGS	2023	Exchangeable Metals	4500	85
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Carbonates	320.0	6.0
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Fe and Mn Oxides	220	4.2
USCU	K-SB-07S	(7-11)	SGS	2023	Metals Bound to Organics	<35	NA
USCU	K-SB-07S	(7-11)	SGS	2023	Residual	23	0.4
USCU	K-SB-07S	(7-11)	SGS	2023	Sum	5300	NA
UA	K-SB-28	(19-25)	SGS	2023	Water Soluble	510	14
UA	K-SB-28	(19-25)	SGS	2023	Exchangeable Metals	550	15
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Carbonates	400.0	11
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Fe and Mn Oxides	290	8
UA	K-SB-28	(19-25)	SGS	2023	Metals Bound to Organics	1800	50
UA	K-SB-28	(19-25)	SGS	2023	Residual	67	1.9
UA	K-SB-28	(19-25)	SGS	2023	Sum	3600	NA

Notes:

Values below detection limits not included in percent of sum calculation or figures

NA = not applicable

< = below method detection limit

Table 4-8. SEP Results from 2023 Analysis

SEP = sequential extraction procedure
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram
% = percent
HSU = hydrostratigraphic unit
CCR = coal combustion residual
UA = uppermost aquifer
USCU = upper semi-confining unit
Percentages may not sum to 100 for each fraction due to results below the reporting limit and rounding

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
AP1	8/26/2020	CCR	8.57	2.7	608	164	87
AP1	3/30/2021	CCR	8.2	2.2	426	155	95
AP1	9/1/2021	CCR	8.16	6	544	127	-48
AP1	2/23/2022	CCR	8.17	19	446	163	70
MW-1	6/1/2013	UA	6.3	--	--	--	--
MW-1	6/3/2013	UA	--	--	394	--	--
MW-1	12/1/2013	UA	6.6	--	--	--	--
MW-1	12/11/2013	UA	--	--	326	--	--
MW-1	6/11/2014	UA	6.5	--	378	--	--
MW-1	12/2/2014	UA	6.7	--	344	--	--
MW-1	6/3/2015	UA	--	--	--	--	--
MW-1	6/16/2015	UA	6.8	--	358	--	--
MW-1	12/15/2015	UA	6.6	<1.0	314	--	94
MW-1	2/29/2016	UA	6.6	<1.0	292	--	122
MW-1	5/16/2016	UA	6.9	<1.0	336	--	103
MW-1	8/22/2016	UA	6.8	1	358	--	136
MW-1	11/15/2016	UA	7	<1.0	390	--	51
MW-1	2/13/2017	UA	6.8	<1.0	326	--	115
MW-1	5/18/2017	UA	6.7	<1.0	370	--	69
MW-1	7/18/2017	UA	6.7	<1.0	334	178	137
MW-1	11/6/2017	UA	6.8	4.5	340	--	263
MW-1	5/31/2018	UA	6.5	<1.0	356	--	163
MW-1	8/28/2018	UA	6.2	2.5	374	--	86
MW-1	11/8/2018	UA	6.4	--	400	--	--
MW-1	2/14/2019	UA	6.7	<1.0	312	--	100
MW-1	5/14/2019	UA	6.4	--	364	--	--
MW-1	8/21/2019	UA	6.3	2.8	334	--	233
MW-1	11/13/2019	UA	6.47	--	326	--	--
MW-1	2/11/2020	UA	6.57	1.8	366	190	128
MW-1	5/12/2020	UA	6.62	--	350	--	--
MW-1	8/26/2020	UA	6.58	1.7	300	188	109
MW-1	12/2/2020	UA	6.56	--	302	--	--
MW-1	2/24/2021	UA	6.5	0	332	182	218.6
MW-1	3/15/2021	UA	6.5	0	330	165	181.6

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
AP1	8/26/2020	CCR	0.228	1.85	72.8	23	0.84
AP1	3/30/2021	CCR	0.136	0.81	65.7	27	0.45
AP1	9/1/2021	CCR	0.246	1.38	70.3	33	0.67
AP1	2/23/2022	CCR	0.170	0.696	68.6	29	0.42
MW-1	6/1/2013	UA	--	--	--	--	--
MW-1	6/3/2013	UA	0.048	0.154	--	12	0.16
MW-1	12/1/2013	UA	--	--	--	--	--
MW-1	12/11/2013	UA	0.052	0.232	--	13	0.2
MW-1	6/11/2014	UA	0.048	0.185	--	13	0.17
MW-1	12/2/2014	UA	0.049	0.235	--	13	0.19
MW-1	6/3/2015	UA	--	--	--	--	0.17
MW-1	6/16/2015	UA	0.048	0.192	--	10	0.16
MW-1	12/15/2015	UA	0.046	0.255	58.8	12	0.19
MW-1	2/29/2016	UA	0.045	0.203	63.9	11	0.16
MW-1	5/16/2016	UA	0.045	0.229	59.3	10	0.16
MW-1	8/22/2016	UA	0.047	0.269	61.1	11	0.18
MW-1	11/15/2016	UA	0.047	0.271	57.6	11	0.18
MW-1	2/13/2017	UA	0.044	0.228	57.5	10	0.16
MW-1	5/18/2017	UA	0.047	0.256	57	12	0.16
MW-1	7/18/2017	UA	0.044	0.273	55.6	11	0.18
MW-1	11/6/2017	UA	0.049	0.281	60.3	11	0.18
MW-1	5/31/2018	UA	0.044	0.234	59.1	12	0.19
MW-1	8/28/2018	UA	0.044	0.258	59.8	11	0.18
MW-1	11/8/2018	UA	0.062	0.352	--	12	0.19
MW-1	2/14/2019	UA	0.050	0.243	66	10	0.17
MW-1	5/14/2019	UA	0.045	0.21	--	11	0.19
MW-1	8/21/2019	UA	0.049	0.29	60.2	10	0.18
MW-1	11/13/2019	UA	0.046	0.278	--	9	0.19
MW-1	2/11/2020	UA	0.047	0.222	59.6	8	0.18
MW-1	5/12/2020	UA	0.046	0.223	--	8	0.18
MW-1	8/26/2020	UA	0.046	0.252	57.5	7	0.23
MW-1	12/2/2020	UA	0.046	0.28	--	7	0.2
MW-1	2/24/2021	UA	0.048	0.214	57	7	0.19
MW-1	3/15/2021	UA	0.043	0.195	55.3	6	0.18

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
AP1	8/26/2020	CCR	--	0.0191	35.8	--	--
AP1	3/30/2021	CCR	--	0.0098	26	--	--
AP1	9/1/2021	CCR	--	0.0189	29.4	--	--
AP1	2/23/2022	CCR	--	0.0087	26.2	--	--
MW-1	6/1/2013	UA	--	--	--	--	--
MW-1	6/3/2013	UA	<0.02	--	--	0.154	--
MW-1	12/1/2013	UA	--	--	--	--	--
MW-1	12/11/2013	UA	0.0306	--	--	0.1	--
MW-1	6/11/2014	UA	0.0551	--	--	0.121	--
MW-1	12/2/2014	UA	<0.02	--	--	0.184	--
MW-1	6/3/2015	UA	--	--	--	--	--
MW-1	6/16/2015	UA	0.0216	--	--	0.217	--
MW-1	12/15/2015	UA	<0.025	0.0019	--	0.172	--
MW-1	2/29/2016	UA	--	0.0017	--	--	--
MW-1	5/16/2016	UA	<0.025	0.0016	--	0.212	--
MW-1	8/22/2016	UA	--	0.0016	--	--	--
MW-1	11/15/2016	UA	<0.025	0.0021	--	0.206	--
MW-1	2/13/2017	UA	--	0.0015	--	--	--
MW-1	5/18/2017	UA	<0.025	0.0017	--	0.26	--
MW-1	7/18/2017	UA	--	0.002	27.8	--	--
MW-1	11/6/2017	UA	<0.025	--	--	0.203	--
MW-1	5/31/2018	UA	<0.025	0.0017	--	0.306	--
MW-1	8/28/2018	UA	--	0.0026	--	--	--
MW-1	11/8/2018	UA	0.0259	--	--	0.248	--
MW-1	2/14/2019	UA	--	0.0019	--	--	--
MW-1	5/14/2019	UA	<0.025	--	--	0.366	--
MW-1	8/21/2019	UA	--	<0.003	--	--	--
MW-1	11/13/2019	UA	<0.025	--	--	0.34	--
MW-1	2/11/2020	UA	--	<0.003	28.6	--	--
MW-1	5/12/2020	UA	<0.025	--	--	0.426	--
MW-1	8/26/2020	UA	--	<0.003	28.3	--	--
MW-1	12/2/2020	UA	<0.025	--	--	0.456	--
MW-1	2/24/2021	UA	0.1	<0.005	27.4	0.672	--
MW-1	3/15/2021	UA	<0.025	<0.003	27.8	0.444	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
AP1	8/26/2020	CCR	0.0143	9.41	95.4	332
AP1	3/30/2021	CCR	0.0099	5.84	50.5	195
AP1	9/1/2021	CCR	0.0144	8.2	73.2	275
AP1	2/23/2022	CCR	0.0095	5.35	45.1	172
MW-1	6/1/2013	UA	--	--	--	--
MW-1	6/3/2013	UA	--	--	--	108
MW-1	12/1/2013	UA	--	--	--	--
MW-1	12/11/2013	UA	--	--	--	113
MW-1	6/11/2014	UA	--	--	--	122
MW-1	12/2/2014	UA	--	--	--	107
MW-1	6/3/2015	UA	--	--	--	--
MW-1	6/16/2015	UA	--	--	--	106
MW-1	12/15/2015	UA	<0.001	--	--	113
MW-1	2/29/2016	UA	<0.001	--	--	117
MW-1	5/16/2016	UA	<0.001	--	--	108
MW-1	8/22/2016	UA	<0.001	--	--	117
MW-1	11/15/2016	UA	<0.001	--	--	109
MW-1	2/13/2017	UA	<0.001	--	--	105
MW-1	5/18/2017	UA	<0.001	--	--	109
MW-1	7/18/2017	UA	<0.001	0.236	15.6	101
MW-1	11/6/2017	UA	--	--	--	104
MW-1	5/31/2018	UA	<0.0015	--	--	91
MW-1	8/28/2018	UA	0.0016	--	--	94
MW-1	11/8/2018	UA	--	--	--	95
MW-1	2/14/2019	UA	<0.0015	--	--	92
MW-1	5/14/2019	UA	--	--	--	97
MW-1	8/21/2019	UA	<0.0015	--	--	80
MW-1	11/13/2019	UA	--	--	--	101
MW-1	2/11/2020	UA	<0.0015	0.272	16.3	92
MW-1	5/12/2020	UA	--	--	--	102
MW-1	8/26/2020	UA	<0.0015	0.28	17.4	93
MW-1	12/2/2020	UA	--	--	--	97
MW-1	2/24/2021	UA	<0.0015	0.245	16.8	93
MW-1	3/15/2021	UA	<0.0015	0.222	16.5	89

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-1	3/30/2021	UA	6.5	<1.0	298	191	126
MW-1	4/5/2021	UA	6	0	304	196	204.3
MW-1	5/19/2021	UA	6.08	<1.0	310	169	214
MW-1	6/10/2021	UA	6.19	<1.0	306	178	68
MW-1	7/1/2021	UA	6.25	<1.0	306	180	81
MW-1	7/22/2021	UA	6.31	<1.0	302	180	94
MW-1	8/10/2021	UA	6.35	<1.0	308	177	106
MW-1	9/1/2021	UA	6.46	4.4	302	182	117
MW-1	11/17/2021	UA	6.14	--	300	--	--
MW-1	2/22/2022	UA	6.42	<1.0	334	172	39
MW-1	9/1/2022	UA	6.31	<1.0	328	--	182
MW-1	1/30/2023	UA	6.49	4.2	300	198	120
MW-1	6/12/2023	UA	6.14	<1.0	306	180	113
MW-1	9/5/2023	UA	6.44	1.4	352	186	42
MW-1	11/27/2023	UA	6.36	2.2	324	160	85
MW-11	11/28/2023	UA	6.88	8.1	642	414	17
MW-12	12/15/2015	UA	6.9	3.7	1070	--	40
MW-12	2/29/2016	UA	6.8	27	1140	--	18
MW-12	5/16/2016	UA	7	17.6	1140	--	-19
MW-12	8/22/2016	UA	7.2	13.1	1160	--	-77
MW-12	11/15/2016	UA	7.2	3.5	1140	--	-97
MW-12	2/13/2017	UA	6.7	18.5	1180	--	5
MW-12	5/18/2017	UA	6.7	9.3	1170	--	19
MW-12	7/18/2017	UA	6.9	15.2	1170	532	-81
MW-12	11/6/2017	UA	7.1	6.9	1110	--	160
MW-12	5/31/2018	UA	6.6	9.7	1230	--	40
MW-12	8/28/2018	UA	6.7	9.9	1160	--	-53
MW-12	11/8/2018	UA	7	--	1210	--	--
MW-12	2/14/2019	UA	6.9	42.3	1130	--	-34
MW-12	5/14/2019	UA	6.48	--	1100	--	--
MW-12	8/20/2019	UA	6.4	1.4	1160	--	42
MW-12	11/13/2019	UA	6.69	--	1100	--	--
MW-12	2/11/2020	UA	6.65	24	1070	498	-10
MW-12	5/12/2020	UA	6.79	--	1040	--	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-1	3/30/2021	UA	0.045	0.204	57.8	6	0.18
MW-1	4/5/2021	UA	0.041	0.204	56.4	7	0.19
MW-1	5/19/2021	UA	0.041	0.218	57.8	7	0.18
MW-1	6/10/2021	UA	0.044	0.217	54.8	8	0.21
MW-1	7/1/2021	UA	0.047	0.226	58.3	8	0.2
MW-1	7/22/2021	UA	0.050	0.296	57.3	12	0.2
MW-1	8/10/2021	UA	0.041	0.266	54.8	9	0.19
MW-1	9/1/2021	UA	0.047	0.301	55.2	9	0.19
MW-1	11/17/2021	UA	0.045	0.28	--	9	0.22
MW-1	2/22/2022	UA	0.044	0.222	58.8	10	0.16
MW-1	9/1/2022	UA	0.052	0.295	56.3	12	0.2
MW-1	1/30/2023	UA	0.043	0.2	58	13	0.19
MW-1	6/12/2023	UA	0.043	0.208	51.4	15	0.2
MW-1	9/5/2023	UA	0.042	0.27	54.3	13	0.26
MW-1	11/27/2023	UA	0.045	0.293	58.2	14	0.2
MW-11	11/28/2023	UA	0.137	1.76	115	32	0.52
MW-12	12/15/2015	UA	0.137	2.1	197	49	0.22
MW-12	2/29/2016	UA	0.113	2.64	220	39	0.18
MW-12	5/16/2016	UA	0.119	2.48	205	44	0.18
MW-12	8/22/2016	UA	0.115	2.53	198	44	0.19
MW-12	11/15/2016	UA	0.112	2.43	200	42	0.21
MW-12	2/13/2017	UA	0.094	3.03	199	41	0.17
MW-12	5/18/2017	UA	0.106	2.51	199	33	0.18
MW-12	7/18/2017	UA	0.095	3.55	235	39	0.18
MW-12	11/6/2017	UA	0.101	2.99	212	38	0.18
MW-12	5/31/2018	UA	0.070	3.87	214	35	0.16
MW-12	8/28/2018	UA	0.082	3	209	33	0.18
MW-12	11/8/2018	UA	0.089	3.3	--	35	0.18
MW-12	2/14/2019	UA	0.089	3.06	224	32	0.19
MW-12	5/14/2019	UA	0.077	1.95	--	20	0.18
MW-12	8/20/2019	UA	0.066	4.42	219	29	0.18
MW-12	11/13/2019	UA	0.092	3	--	27	0.18
MW-12	2/11/2020	UA	0.056	2.26	197	22	0.17
MW-12	5/12/2020	UA	0.076	2.05	--	22	0.21

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-1	3/30/2021	UA	--	<0.003	26.3	--	--
MW-1	4/5/2021	UA	<0.025	<0.003	28.2	0.388	--
MW-1	5/19/2021	UA	<0.025	<0.003	24.3	0.408	--
MW-1	6/10/2021	UA	<0.025	<0.003	26	0.466	--
MW-1	7/1/2021	UA	<0.025	<0.003	26.9	0.492	--
MW-1	7/22/2021	UA	<0.025	<0.003	26.2	0.481	--
MW-1	8/10/2021	UA	<0.025	<0.003	28.4	0.343	--
MW-1	9/1/2021	UA	--	<0.003	27.2	--	--
MW-1	11/17/2021	UA	<0.025	--	--	0.38	--
MW-1	2/22/2022	UA	<0.025	<0.003	27.8	0.459	--
MW-1	9/1/2022	UA	0.183	<0.0022	--	0.52	--
MW-1	1/30/2023	UA	0.0649	<0.0014	27.2	0.779	--
MW-1	6/12/2023	UA	<0.02	<0.0015	26.1	0.478	0.425
MW-1	9/5/2023	UA	0.0336	<0.0017	25.1	0.397	0.463
MW-1	11/27/2023	UA	--	<0.0016	27	--	
MW-11	11/28/2023	UA	--	<0.0025	47.3	--	
MW-12	12/15/2015	UA	--	0.0093	--	--	--
MW-12	2/29/2016	UA	--	0.0082	--	--	--
MW-12	5/16/2016	UA	--	0.0088	--	--	--
MW-12	8/22/2016	UA	--	0.0102	--	--	--
MW-12	11/15/2016	UA	--	0.0106	--	--	--
MW-12	2/13/2017	UA	--	0.0088	--	--	--
MW-12	5/18/2017	UA	4.85	0.009	--	0.594	--
MW-12	7/18/2017	UA	--	0.0097	92.8	--	--
MW-12	11/6/2017	UA	6.15	--	--	0.523	--
MW-12	5/31/2018	UA	2.58	0.0085	--	0.863	--
MW-12	8/28/2018	UA	--	0.0097	--	--	--
MW-12	11/8/2018	UA	2.8	--	--	0.656	--
MW-12	2/14/2019	UA	--	0.0095	--	--	--
MW-12	5/14/2019	UA	2.59	--	--	1.19	--
MW-12	8/20/2019	UA	--	0.0087	--	--	--
MW-12	11/13/2019	UA	3.4	--	--	0.74	--
MW-12	2/11/2020	UA	--	0.0068	81	--	--
MW-12	5/12/2020	UA	4.89	--	--	0.678	--

Table **5**-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-1	3/30/2021	UA	<0.0015	0.234	15.2	84
MW-1	4/5/2021	UA	<0.0015	0.296	15.8	84
MW-1	5/19/2021	UA	<0.0015	0.215	16.1	84
MW-1	6/10/2021	UA	<0.0015	0.246	15.3	90
MW-1	7/1/2021	UA	<0.0015	0.255	15.6	87
MW-1	7/22/2021	UA	<0.0015	0.263	15.3	85
MW-1	8/10/2021	UA	<0.0015	0.259	18.8	86
MW-1	9/1/2021	UA	<0.0015	0.261	15.8	85
MW-1	11/17/2021	UA	--	--	--	95
MW-1	2/22/2022	UA	<0.0015	0.277	15.5	83
MW-1	9/1/2022	UA	<0.0006	--	--	91
MW-1	1/30/2023	UA	<0.0006	0.294	16	89
MW-1	6/12/2023	UA	<0.0037	0.243	16.2	83
MW-1	9/5/2023	UA	<0.0006	0.315	15.4	80
MW-1	11/27/2023	UA	<0.0006	0.276	16.6	92
MW-11	11/28/2023	UA	0.0031	0.873	40	128
MW-12	12/15/2015	UA	0.0013	--	--	326
MW-12	2/29/2016	UA	<0.001	--	--	390
MW-12	5/16/2016	UA	<0.001	--	--	379
MW-12	8/22/2016	UA	<0.001	--	--	398
MW-12	11/15/2016	UA	0.0011	--	--	330
MW-12	2/13/2017	UA	<0.001	--	--	390
MW-12	5/18/2017	UA	<0.001	--	--	406
MW-12	7/18/2017	UA	<0.001	2.36	53.2	383
MW-12	11/6/2017	UA	--	--	--	388
MW-12	5/31/2018	UA	<0.0015	--	--	413
MW-12	8/28/2018	UA	<0.0015	--	--	388
MW-12	11/8/2018	UA	--	--	--	381
MW-12	2/14/2019	UA	<0.0015	--	--	393
MW-12	5/14/2019	UA	--	--	--	399
MW-12	8/20/2019	UA	<0.0015	--	--	371
MW-12	11/13/2019	UA	--	--	--	345
MW-12	2/11/2020	UA	<0.0015	2.99	40.9	370
MW-12	5/12/2020	UA	--	--	--	368

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-12	8/26/2020	UA	6.61	7.8	1100	534	-28
MW-12	12/2/2020	UA	6.72	--	1150	--	--
MW-12	3/30/2021	UA	6.5	5.3	908	486	28
MW-12	6/10/2021	UA	6.63	--	985	--	--
MW-12	9/1/2021	UA	6.67	9.6	1050	517	-64
MW-12	11/18/2021	UA	6.73	--	1040	--	--
MW-12	2/23/2022	UA	6.63	23	1110	518	-40
MW-12	9/1/2022	UA	6.55	5.1	1100	--	76
MW-12	2/1/2023	UA	6.63	9.1	1060	535	-56
MW-12	6/13/2023	UA	6.72	8.4	1080	534	-35
MW-12	9/7/2023	UA	6.46	8	1190	532	-58
MW-12	11/28/2023	UA	6.75	9.3	1090	514	-38
MW-12S	2/25/2021	USCU	6.8	0	598	336	10.6
MW-12S	3/16/2021	USCU	6.8	0	648	372	27.3
MW-12S	4/6/2021	USCU	6.2	0	814	486	-24
MW-12S	5/20/2021	USCU	6.5	4.6	654	340	-21
MW-12S	6/10/2021	USCU	6.48	<1.0	--	450	145
MW-12S	7/2/2021	USCU	6.4	<1.0	730	420	-20
MW-12S	7/23/2021	USCU	6.47	1	884	454	-107
MW-12S	8/11/2021	USCU	6.59	7.9	818	443	-89
MW-2	6/1/2013	UA	7.2	--	--	--	--
MW-2	6/3/2013	UA	--	--	590	--	--
MW-2	12/1/2013	UA	7.3	--	--	--	--
MW-2	12/11/2013	UA	--	--	516	--	--
MW-2	6/11/2014	UA	7.3	--	556	--	--
MW-2	12/2/2014	UA	7.6	--	496	--	--
MW-2	6/3/2015	UA	--	--	--	--	--
MW-2	6/16/2015	UA	7.5	--	500	--	--
MW-2	12/15/2015	UA	7.1	65.4	566	--	-5
MW-2	2/29/2016	UA	7.2	10.8	416	--	78
MW-2	5/16/2016	UA	7.4	30.5	534	--	4
MW-2	8/22/2016	UA	7.4	4.5	566	--	34
MW-2	11/15/2016	UA	7.5	9.8	576	--	-49
MW-2	2/13/2017	UA	7.2	1.9	520	--	143

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-12	8/26/2020	UA	0.073	3.76	211	31	0.22
MW-12	12/2/2020	UA	0.071	3.76	--	32	0.16
MW-12	3/30/2021	UA	0.085	1.97	181	17	0.18
MW-12	6/10/2021	UA	0.088	2.48	--	34	0.26
MW-12	9/1/2021	UA	0.080	2.78	197	40	0.22
MW-12	11/18/2021	UA	0.089	3.21	--	36	0.25
MW-12	2/23/2022	UA	0.078	3.39	216	27	0.18
MW-12	9/1/2022	UA	0.086	4.06	206	31	0.19
MW-12	2/1/2023	UA	0.071	2.71	212	30	0.2
MW-12	6/13/2023	UA	0.094	3.39	210	31	0.2
MW-12	9/7/2023	UA	0.087	3.94	204	29	0.2
MW-12	11/28/2023	UA	0.089	2.78	191	31	0.26
MW-12S	2/25/2021	USCU	0.083	0.856	124	25	0.15
MW-12S	3/16/2021	USCU	0.094	1.18	145	15	0.19
MW-12S	4/6/2021	USCU	0.073	1.73	169	7	0.21
MW-12S	5/20/2021	USCU	0.114	1.43	154	2	0.19
MW-12S	6/10/2021	USCU	0.057	2.07	169	5	0.26
MW-12S	7/2/2021	USCU	0.174	1.33	181	5	0.21
MW-12S	7/23/2021	USCU	0.106	2.63	175	6	0.27
MW-12S	8/11/2021	USCU	0.107	1.58	159	6	0.24
MW-2	6/1/2013	UA	--	--	--	--	--
MW-2	6/3/2013	UA	0.138	0.0631	--	17	0.51
MW-2	12/1/2013	UA	--	--	--	--	--
MW-2	12/11/2013	UA	0.135	0.0651	--	15	0.51
MW-2	6/11/2014	UA	0.120	0.0574	--	17	0.49
MW-2	12/2/2014	UA	0.118	0.0573	--	18	0.51
MW-2	6/3/2015	UA	--	--	--	--	0.49
MW-2	6/16/2015	UA	0.122	0.0608	--	17	0.46
MW-2	12/15/2015	UA	0.127	0.11	105	16	0.47
MW-2	2/29/2016	UA	0.111	0.0873	104	17	0.43
MW-2	5/16/2016	UA	0.113	0.0892	101	15	0.45
MW-2	8/22/2016	UA	0.114	0.0808	97.3	14	0.47
MW-2	11/15/2016	UA	0.113	0.102	101	13	0.47
MW-2	2/13/2017	UA	0.112	0.101	97.5	14	0.44

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-12	8/26/2020	UA	--	0.0079	90.5	--	--
MW-12	12/2/2020	UA	1.87	--	--	0.848	--
MW-12	3/30/2021	UA	--	0.0069	74.1	--	--
MW-12	6/10/2021	UA	5.89	--	--	0.383	--
MW-12	9/1/2021	UA	--	0.0096	86.2	--	--
MW-12	11/18/2021	UA	3.52	--	--	0.476	--
MW-12	2/23/2022	UA	2.89	0.0095	91.9	0.861	--
MW-12	9/1/2022	UA	3.93	0.0085	--	0.666	--
MW-12	2/1/2023	UA	3.19	0.0078	87.5	0.516	--
MW-12	6/13/2023	UA	6.95	0.0102	88.2	0.489	0.384
MW-12	9/7/2023	UA	3.92	0.0089	87.6	0.478	0.504
MW-12	11/28/2023	UA	--	0.01	78.6	--	
MW-12S	2/25/2021	USCU	3.38	<0.005	31.3	1.96	--
MW-12S	3/16/2021	USCU	4.46	<0.003	37.9	2.63	--
MW-12S	4/6/2021	USCU	14.3	<0.003	55.2	4.74	--
MW-12S	5/20/2021	USCU	2.89	<0.003	31.8	1.85	--
MW-12S	6/10/2021	USCU	14.7	<0.003	53.1	4.36	--
MW-12S	7/2/2021	USCU	2.35	<0.003	29.8	0.908	--
MW-12S	7/23/2021	USCU	18	<0.003	50.6	4.57	--
MW-12S	8/11/2021	USCU	6.28	<0.003	44.2	2.16	--
MW-2	6/1/2013	UA	--	--	--	--	--
MW-2	6/3/2013	UA	2.85	--	--	0.329	--
MW-2	12/1/2013	UA	--	--	--	--	--
MW-2	12/11/2013	UA	1.55	--	--	0.299	--
MW-2	6/11/2014	UA	1.12	--	--	0.218	--
MW-2	12/2/2014	UA	1.84	--	--	0.319	--
MW-2	6/3/2015	UA	--	--	--	--	--
MW-2	6/16/2015	UA	1.67	--	--	0.207	--
MW-2	12/15/2015	UA	3.38	0.0068	--	0.332	--
MW-2	2/29/2016	UA	--	0.0063	--	--	--
MW-2	5/16/2016	UA	1.14	0.0056	--	0.203	--
MW-2	8/22/2016	UA	--	0.0055	--	--	--
MW-2	11/15/2016	UA	0.852	0.0057	--	0.298	--
MW-2	2/13/2017	UA	--	0.0058	--	--	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-12	8/26/2020	UA	<0.0015	3.11	58.9	424
MW-12	12/2/2020	UA	--	--	--	411
MW-12	3/30/2021	UA	<0.0015	2.34	37.5	295
MW-12	6/10/2021	UA	--	--	--	329
MW-12	9/1/2021	UA	<0.0015	2.14	51	332
MW-12	11/18/2021	UA	--	--	--	368
MW-12	2/23/2022	UA	<0.0015	2.55	48.8	404
MW-12	9/1/2022	UA	<0.0007	--	--	426
MW-12	2/1/2023	UA	<0.0006	2.46	54.1	388
MW-12	6/13/2023	UA	<0.0037	2.33	54.6	378
MW-12	9/7/2023	UA	<0.0006	2.43	57.5	380
MW-12	11/28/2023	UA	0.0017	2.08	46.7	350
MW-12S	2/25/2021	USCU	0.004	6.42	18.6	140
MW-12S	3/16/2021	USCU	0.0035	7.33	24.1	128
MW-12S	4/6/2021	USCU	0.0037	7.69	29.2	212
MW-12S	5/20/2021	USCU	0.0044	8.92	24.2	118
MW-12S	6/10/2021	USCU	0.0035	9.16	28.6	243
MW-12S	7/2/2021	USCU	0.007	11.3	25.4	176
MW-12S	7/23/2021	USCU	0.0047	9.52	27.5	239
MW-12S	8/11/2021	USCU	0.0055	10.9	30.2	223
MW-2	6/1/2013	UA	--	--	--	--
MW-2	6/3/2013	UA	--	--	--	168
MW-2	12/1/2013	UA	--	--	--	--
MW-2	12/11/2013	UA	--	--	--	153
MW-2	6/11/2014	UA	--	--	--	166
MW-2	12/2/2014	UA	--	--	--	135
MW-2	6/3/2015	UA	--	--	--	--
MW-2	6/16/2015	UA	--	--	--	150
MW-2	12/15/2015	UA	0.004	--	--	171
MW-2	2/29/2016	UA	0.0053	--	--	143
MW-2	5/16/2016	UA	0.0043	--	--	159
MW-2	8/22/2016	UA	0.0039	--	--	169
MW-2	11/15/2016	UA	0.004	--	--	161
MW-2	2/13/2017	UA	0.0043	--	--	173

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-2	5/18/2017	UA	7.2	<1.0	596	--	62
MW-2	7/18/2017	UA	7.3	6	512	298	-23
MW-2	11/6/2017	UA	7.1	7.2	506	--	207
MW-2	5/31/2018	UA	7	23.2	538	--	44
MW-2	8/28/2018	UA	6.8	13.2	558	--	-38
MW-2	11/8/2018	UA	6.9	--	556	--	--
MW-2	2/14/2019	UA	7.4	27.6	442	--	76
MW-2	5/14/2019	UA	7.16	--	516	--	--
MW-2	8/20/2019	UA	7.1	5	488	--	2
MW-2	11/13/2019	UA	7.26	--	464	--	--
MW-2	2/11/2020	UA	7.35	9.1	508	264	103
MW-2	5/12/2020	UA	7.36	--	490	--	--
MW-2	8/26/2020	UA	7.27	6.9	442	262	77
MW-2	12/2/2020	UA	7.29	--	474	--	--
MW-2	2/24/2021	UA	7.2	61.48	490	264	38.9
MW-2	3/15/2021	UA	7.3	210.91	494	246	15.6
MW-2	3/30/2021	UA	7.1	9.9	458	256	86
MW-2	4/5/2021	UA	6.7	75.12	482	262	68.7
MW-2	5/19/2021	UA	6.98	10	464	238	-73
MW-2	6/10/2021	UA	6.96	9.8	456	249	-63
MW-2	7/1/2021	UA	6.52	9.8	470	250	62
MW-2	7/22/2021	UA	6.63	7.2	480	260	124
MW-2	8/10/2021	UA	6.91	21	490	258	102
MW-2	9/1/2021	UA	7.02	25	476	254	-41
MW-2	11/17/2021	UA	6.88	--	464	--	--
MW-2	2/22/2022	UA	6.98	4.7	508	246	51
MW-2	9/1/2022	UA	6.97	35	496	--	169
MW-2	1/31/2023	UA	7.02	590	470	353	-19
MW-2	6/12/2023	UA	6.96	220	535	347	111
MW-2	9/5/2023	UA	6.75	51	495	270	-48
MW-2	11/27/2023	UA	6.95	54	485	256	8
MW-20	2/26/2021	UA	7.2	3.11	572	375	172.9
MW-20	3/16/2021	UA	7.1	0	594	386	70.8
MW-20	4/6/2021	UA	6.5	0	608	390	71.3

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-2	5/18/2017	UA	0.112	0.106	104	14	0.43
MW-2	7/18/2017	UA	0.112	0.111	99.2	15	0.45
MW-2	11/6/2017	UA	0.114	0.0848	102	14	0.44
MW-2	5/31/2018	UA	0.163	0.0787	125	14	0.5
MW-2	8/28/2018	UA	0.103	0.0907	104	14	0.44
MW-2	11/8/2018	UA	0.156	0.152	--	14	0.45
MW-2	2/14/2019	UA	0.116	0.0701	104	18	0.55
MW-2	5/14/2019	UA	0.107	0.058	--	18	0.55
MW-2	8/20/2019	UA	0.107	0.0667	94.2	16	0.48
MW-2	11/13/2019	UA	0.120	0.0571	--	17	0.53
MW-2	2/11/2020	UA	0.117	0.0565	94.9	18	0.52
MW-2	5/12/2020	UA	0.107	0.0488	--	18	0.52
MW-2	8/26/2020	UA	0.106	0.0576	96.6	17	0.55
MW-2	12/2/2020	UA	0.103	0.0714	--	15	0.48
MW-2	2/24/2021	UA	0.113	0.0571	96.7	15	0.46
MW-2	3/15/2021	UA	0.115	0.069	97.3	17	0.44
MW-2	3/30/2021	UA	0.113	0.0609	96.2	16	0.47
MW-2	4/5/2021	UA	0.150	0.0711	111	18	0.44
MW-2	5/19/2021	UA	0.094	0.0698	95.4	16	0.43
MW-2	6/10/2021	UA	0.110	0.0552	92	18	0.51
MW-2	7/1/2021	UA	0.116	0.0582	96.6	17	0.48
MW-2	7/22/2021	UA	0.126	0.0852	96.6	16	0.46
MW-2	8/10/2021	UA	0.126	0.0791	106	16	0.45
MW-2	9/1/2021	UA	0.101	0.128	93.4	15	0.42
MW-2	11/17/2021	UA	0.115	0.0543	--	50	0.51
MW-2	2/22/2022	UA	0.123	0.0571	97.2	19	0.48
MW-2	9/1/2022	UA	0.141	0.0735	97.7	19	0.49
MW-2	1/31/2023	UA	0.326	0.0751	291	19	0.44
MW-2	6/12/2023	UA	0.315	0.0474	225	16	0.48
MW-2	9/5/2023	UA	0.138	0.063	104	14	0.51
MW-2	11/27/2023	UA	0.123	0.0745	95	15	0.45
MW-20	2/26/2021	UA	0.164	0.34	106	25	0.42
MW-20	3/16/2021	UA	0.142	0.4	115	24	0.4
MW-20	4/6/2021	UA	0.122	0.442	112	26	0.41

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-2	5/18/2017	UA	0.658	0.0051	--	0.17	--
MW-2	7/18/2017	UA	--	0.0055	41.5	--	--
MW-2	11/6/2017	UA	0.868	--	--	0.306	--
MW-2	5/31/2018	UA	20.1	0.016	--	0.718	--
MW-2	8/28/2018	UA	--	0.0043	--	--	--
MW-2	11/8/2018	UA	1.56	--	--	0.339	--
MW-2	2/14/2019	UA	--	0.007	--	--	--
MW-2	5/14/2019	UA	0.732	--	--	0.165	--
MW-2	8/20/2019	UA	--	0.0051	--	--	--
MW-2	11/13/2019	UA	3.27	--	--	0.489	--
MW-2	2/11/2020	UA	--	0.007	34.7	--	--
MW-2	5/12/2020	UA	0.481	--	--	0.156	--
MW-2	8/26/2020	UA	--	0.0051	36.1	--	--
MW-2	12/2/2020	UA	0.217	--	--	0.113	--
MW-2	2/24/2021	UA	1.26	<0.005	35.6	0.347	--
MW-2	3/15/2021	UA	1.62	0.0052	36.8	0.258	--
MW-2	3/30/2021	UA	--	0.005	33.2	--	--
MW-2	4/5/2021	UA	9.81	0.0116	43.1	0.441	--
MW-2	5/19/2021	UA	0.56	0.0035	28.4	0.221	--
MW-2	6/10/2021	UA	0.568	0.0044	33.3	0.165	--
MW-2	7/1/2021	UA	0.805	0.0042	34.6	0.312	--
MW-2	7/22/2021	UA	0.682	0.0048	35.6	0.333	--
MW-2	8/10/2021	UA	1.18	0.0061	45.5	0.337	--
MW-2	9/1/2021	UA	--	0.004	36.5	--	--
MW-2	11/17/2021	UA	0.692	--	--	0.363	--
MW-2	2/22/2022	UA	0.562	0.0052	35.2	0.23	--
MW-2	9/1/2022	UA	1.57	0.0067	--	0.34	--
MW-2	1/31/2023	UA	86.1	0.0595	99.5	1.56	--
MW-2	6/12/2023	UA	34.1	0.0241	76	1.29	0.273
MW-2	9/5/2023	UA	8.19	0.0096	36.9	0.441	0.394
MW-2	11/27/2023	UA	--	0.0056	33.7	--	
MW-20	2/26/2021	UA	0.135	0.0233	54.3	0.313	--
MW-20	3/16/2021	UA	0.369	0.0201	56.3	0.357	--
MW-20	4/6/2021	UA	1.6	0.0169	57.9	0.472	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-2	5/18/2017	UA	0.0037	--	--	178
MW-2	7/18/2017	UA	0.0042	1.5	28.2	159
MW-2	11/6/2017	UA	--	--	--	159
MW-2	5/31/2018	UA	0.0051	--	--	142
MW-2	8/28/2018	UA	0.0033	--	--	145
MW-2	11/8/2018	UA	--	--	--	139
MW-2	2/14/2019	UA	0.0058	--	--	136
MW-2	5/14/2019	UA	--	--	--	132
MW-2	8/20/2019	UA	0.0046	--	--	119
MW-2	11/13/2019	UA	--	--	--	132
MW-2	2/11/2020	UA	0.005	1.58	27.8	138
MW-2	5/12/2020	UA	--	--	--	153
MW-2	8/26/2020	UA	0.0047	1.32	27.1	139
MW-2	12/2/2020	UA	--	--	--	139
MW-2	2/24/2021	UA	0.0038	1.3	27.3	138
MW-2	3/15/2021	UA	0.0037	1.29	26	146
MW-2	3/30/2021	UA	0.0036	1.13	24.7	129
MW-2	4/5/2021	UA	0.0041	2.63	25.8	137
MW-2	5/19/2021	UA	0.0035	0.83	24.1	145
MW-2	6/10/2021	UA	0.004	1.22	24.2	150
MW-2	7/1/2021	UA	0.0033	1.08	24	151
MW-2	7/22/2021	UA	0.0036	1.1	23.2	146
MW-2	8/10/2021	UA	0.0062	1.42	31.6	144
MW-2	9/1/2021	UA	0.0034	1.28	22.4	133
MW-2	11/17/2021	UA	--	--	--	152
MW-2	2/22/2022	UA	0.0043	1.17	25.7	148
MW-2	9/1/2022	UA	0.0056	--	--	161
MW-2	1/31/2023	UA	0.0085	8.52	27.3	153
MW-2	6/12/2023	UA	<0.0037	2.77	27.3	149
MW-2	9/5/2023	UA	0.0046	2.25	23.6	130
MW-2	11/27/2023	UA	0.0075	1.34	22.8	140
MW-20	2/26/2021	UA	0.0124	2.75	32	134
MW-20	3/16/2021	UA	0.0094	2.45	30.3	127
MW-20	4/6/2021	UA	0.0064	1.99	28.2	130

Table **5**-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-20	5/18/2021	UA	6.94	9.4	624	392	107
MW-20	6/9/2021	UA	6.81	8.6	--	422	-118
MW-20	7/1/2021	UA	6.87	7.5	628	416	-93
MW-20	7/22/2021	UA	6.93	8.7	610	411	-93
MW-20	8/10/2021	UA	6.93	9.9	636	417	-63
MW-20	1/31/2023	UA	6.99	3.8	648	418	6
MW-20	6/13/2023	UA	6.95	4.5	666	430	114
MW-20	9/6/2023	UA	6.9	9.3	642	420	-227
MW-20	11/28/2023	UA	7.09	65	656	414	18
MW-20S	2/26/2021	USCU	6.8	0.79	842	445	150.9
MW-20S	3/16/2021	USCU	6.9	0	846	453	113.9
MW-20S	4/6/2021	USCU	6.3	0	878	475	162.4
MW-20S	5/19/2021	USCU	6.52	9.8	922	421	77
MW-20S	6/9/2021	USCU	6.43	7.3	--	453	58
MW-20S	7/1/2021	USCU	6.52	3.8	936	454	83
MW-20S	7/22/2021	USCU	6.53	1.3	1020	454	81
MW-20S	8/10/2021	USCU	6.58	5.1	1020	454	73
MW-20S	1/31/2023	USCU	6.71	2.2	1130	454	-13
MW-20S	6/13/2023	USCU	6.77	<1.0	1250	466	105
MW-20S	9/6/2023	USCU	6.71	7.8	1030	480	-210
MW-20S	11/28/2023	USCU	7.01	5.3	925	472	102
MW-28	2/24/2021	UA	6.9	0	1790	443	89
MW-28	3/16/2021	UA	7	0	1830	435	15.6
MW-28	4/7/2021	UA	6.3	0	1640	422	65.2
MW-28	5/18/2021	UA	6.54	<1.0	1700	405	-59
MW-28	6/10/2021	UA	6.64	<1.0	--	454	-6
MW-28	7/2/2021	UA	6.68	<1.0	1610	451	47
MW-28	7/23/2021	UA	6.65	1	1720	446	4
MW-28	8/11/2021	UA	6.76	2.7	1570	421	-50
MW-28	2/1/2023	UA	6.66	8.8	1620	422	28
MW-28	6/13/2023	UA	6.76	<1.0	1770	466	108
MW-28	9/6/2023	UA	6.81	4.1	1860	456	19
MW-28	11/28/2023	UA	6.58	2.8	1780	444	77
MW-29	2/25/2021	UA	6.7	0	778	501	106.4

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-20	5/18/2021	UA	0.115	0.463	123	23	0.38
MW-20	6/9/2021	UA	0.117	0.44	132	24	0.41
MW-20	7/1/2021	UA	0.117	0.503	119	24	0.39
MW-20	7/22/2021	UA	0.138	0.564	125	24	0.39
MW-20	8/10/2021	UA	0.119	0.499	127	26	0.37
MW-20	1/31/2023	UA	0.077	0.55	132	23	0.34
MW-20	6/13/2023	UA	0.121	0.586	133	22	0.36
MW-20	9/6/2023	UA	0.105	0.642	122	20	0.39
MW-20	11/28/2023	UA	0.103	0.592	120	20	0.38
MW-20S	2/26/2021	USCU	0.038	1.18	158	24	0.18
MW-20S	3/16/2021	USCU	0.042	1.2	163	20	0.17
MW-20S	4/6/2021	USCU	0.037	1.2	162	21	0.18
MW-20S	5/19/2021	USCU	0.041	1.38	174	21	0.18
MW-20S	6/9/2021	USCU	0.038	1.37	187	20	0.2
MW-20S	7/1/2021	USCU	<0.001	0.0611	175	20	0.2
MW-20S	7/22/2021	USCU	0.044	1.89	187	20	0.2
MW-20S	8/10/2021	USCU	0.049	1.65	201	22	0.19
MW-20S	1/31/2023	USCU	0.035	1.81	202	15	0.17
MW-20S	6/13/2023	USCU	0.037	2.19	204	14	0.19
MW-20S	9/6/2023	USCU	0.035	2.13	180	18	0.22
MW-20S	11/28/2023	USCU	0.044	1.64	168	19	0.21
MW-28	2/24/2021	UA	0.024	9.09	265	14	0.13
MW-28	3/16/2021	UA	0.023	9.29	264	13	0.54
MW-28	4/7/2021	UA	0.029	10.8	247	13	0.13
MW-28	5/18/2021	UA	0.021	9.7	256	12	0.12
MW-28	6/10/2021	UA	0.020	9.42	261	14	0.14
MW-28	7/2/2021	UA	0.026	9.56	237	13	0.13
MW-28	7/23/2021	UA	0.024	10.9	244	12	0.14
MW-28	8/11/2021	UA	0.022	8.35	219	13	0.12
MW-28	2/1/2023	UA	0.024	7.96	270	13	0.14
MW-28	6/13/2023	UA	0.027	9	286	15	0.13
MW-28	9/6/2023	UA	0.023	9.88	264	14	0.15
MW-28	11/28/2023	UA	0.028	8.2	251	13	0.15
MW-29	2/25/2021	UA	0.091	1.59	144	50	0.13

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-20	5/18/2021	UA	3.33	0.0142	57.7	0.48	--
MW-20	6/9/2021	UA	3.3	0.0118	64.1	0.443	--
MW-20	7/1/2021	UA	1.98	0.0122	57.8	0.471	--
MW-20	7/22/2021	UA	4.92	0.0134	60.3	0.6	--
MW-20	8/10/2021	UA	0.783	0.01	74.7	0.521	--
MW-20	1/31/2023	UA	--	0.004	66.4	--	--
MW-20	6/13/2023	UA	0.244	0.005	64	0.631	0.58
MW-20	9/6/2023	UA	0.122	0.0046	59.1	0.175	0.189
MW-20	11/28/2023	UA	--	0.0049	65.8	--	
MW-20S	2/26/2021	USCU	0.0261	<0.005	79.9	0.146	--
MW-20S	3/16/2021	USCU	0.14	<0.003	81.9	0.151	--
MW-20S	4/6/2021	USCU	0.0635	<0.003	85.4	0.149	--
MW-20S	5/19/2021	USCU	0.0753	<0.003	83.6	0.19	--
MW-20S	6/9/2021	USCU	0.0331	<0.003	92.5	0.181	--
MW-20S	7/1/2021	USCU	<0.025	<0.003	88.1	<0.002	--
MW-20S	7/22/2021	USCU	0.196	<0.003	91.4	0.566	--
MW-20S	8/10/2021	USCU	0.351	<0.003	125	0.284	--
MW-20S	1/31/2023	USCU	--	<0.0014	100	--	--
MW-20S	6/13/2023	USCU	<0.02	<0.0015	103	0.152	0.11
MW-20S	9/6/2023	USCU	0.588	<0.0015	89.1	0.402	0.423
MW-20S	11/28/2023	USCU	--	<0.0015	91	--	
MW-28	2/24/2021	UA	<0.025	0.0066	122	0.591	--
MW-28	3/16/2021	UA	0.113	0.0066	121	0.487	--
MW-28	4/7/2021	UA	0.141	0.0076	116	1.15	--
MW-28	5/18/2021	UA	0.219	0.0069	107	0.412	--
MW-28	6/10/2021	UA	0.174	0.0072	120	0.424	--
MW-28	7/2/2021	UA	0.195	0.0061	107	0.837	--
MW-28	7/23/2021	UA	0.261	0.0078	110	0.766	--
MW-28	8/11/2021	UA	0.397	0.0057	121	0.779	--
MW-28	2/1/2023	UA	--	0.0057	121	--	--
MW-28	6/13/2023	UA	0.101	0.0061	132	1.2	0.813
MW-28	9/6/2023	UA	0.141	0.0063	120	1.42	1.5
MW-28	11/28/2023	UA	--	0.0061	123	--	
MW-29	2/25/2021	UA	0.066	0.0084	68.5	0.175	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-20	5/18/2021	UA	0.0055	1.74	26.6	134
MW-20	6/9/2021	UA	0.0051	2.18	26.1	141
MW-20	7/1/2021	UA	0.0055	1.75	24.2	137
MW-20	7/22/2021	UA	0.006	1.81	24.5	143
MW-20	8/10/2021	UA	0.0056	1.85	30.5	147
MW-20	1/31/2023	UA	0.0031	1.06	23.2	180
MW-20	6/13/2023	UA	<0.0041	1.21	23	180
MW-20	9/6/2023	UA	0.0043	1.08	22.4	140
MW-20	11/28/2023	UA	0.0034	1.3	25	149
MW-20S	2/26/2021	USCU	<0.0015	0.162	23.2	243
MW-20S	3/16/2021	USCU	<0.0015	0.208	22.1	254
MW-20S	4/6/2021	USCU	<0.0015	0.216	21.9	260
MW-20S	5/19/2021	USCU	<0.0015	<0.175	22.2	297
MW-20S	6/9/2021	USCU	<0.0015	0.203	22.7	346
MW-20S	7/1/2021	USCU	<0.0015	0.383	22	312
MW-20S	7/22/2021	USCU	<0.0015	0.38	23.9	392
MW-20S	8/10/2021	USCU	<0.0015	0.262	31.7	383
MW-20S	1/31/2023	USCU	<0.0006	0.214	27.4	441
MW-20S	6/13/2023	USCU	<0.0037	0.188	29.6	519
MW-20S	9/6/2023	USCU	<0.0006	0.223	25.6	352
MW-20S	11/28/2023	USCU	<0.0009	0.277	28.2	356
MW-28	2/24/2021	UA	<0.0015	1.1	132	884
MW-28	3/16/2021	UA	<0.0015	0.964	129	929
MW-28	4/7/2021	UA	<0.0015	1.16	150	889
MW-28	5/18/2021	UA	<0.0015	0.803	123	795
MW-28	6/10/2021	UA	<0.0015	1.07	121	903
MW-28	7/2/2021	UA	<0.0015	0.943	113	815
MW-28	7/23/2021	UA	<0.0015	1.03	119	774
MW-28	8/11/2021	UA	<0.0015	0.878	136	883
MW-28	2/1/2023	UA	<0.0006	0.964	127	801
MW-28	6/13/2023	UA	<0.0037	0.978	128	951
MW-28	9/6/2023	UA	0.0045	0.997	122	920
MW-28	11/28/2023	UA	<0.0006	1.04	125	891
MW-29	2/25/2021	UA	<0.0015	0.789	46.4	148

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-29	3/16/2021	UA	6.9	0	774	516	76.3
MW-29	4/6/2021	UA	6.2	0	768	486	103
MW-29	5/21/2021	UA	6.63	1.5	764	482	48
MW-29	6/10/2021	UA	6.62	<1.0	--	515	29
MW-29	7/2/2021	UA	6.59	<1.0	788	509	28
MW-29	7/23/2021	UA	6.66	<1.0	790	509	47
MW-29	8/11/2021	UA	6.73	<1.0	756	513	-4
MW-32	2/25/2021	UA	6.6	0	1180	471	-50.4
MW-32	3/17/2021	UA	6.4	0	1190	454	34.7
MW-32	4/7/2021	UA	6	0	1190	486	63.8
MW-32	5/19/2021	UA	6.32	1	1190	454	-40
MW-32	6/9/2021	UA	6.21	<1.0	--	486	-7
MW-32	7/1/2021	UA	6.36	3.4	1180	486	51
MW-32	7/22/2021	UA	6.46	1	1150	486	35
MW-32	8/10/2021	UA	6.47	<1.0	1190	480	20
MW-32	1/31/2023	UA	6.45	<1.0	1100	486	-15
MW-32	6/13/2023	UA	6.58	<1.0	1050	524	104
MW-32	9/6/2023	UA	6.57	3.4	1050	520	-22
MW-32	11/27/2023	UA	6.38	4.3	1060	508	142
MW-4	6/1/2013	UA	6.7	--	--	--	--
MW-4	6/3/2013	UA	--	--	540	--	--
MW-4	12/1/2013	UA	6.9	--	--	--	--
MW-4	12/11/2013	UA	--	--	534	--	--
MW-4	6/11/2014	UA	6.9	--	508	--	--
MW-4	12/2/2014	UA	7.4	--	504	--	--
MW-4	6/3/2015	UA	--	--	--	--	--
MW-4	6/16/2015	UA	7.3	--	530	--	--
MW-4	12/15/2015	UA	6.9	--	514	--	--
MW-4	5/16/2016	UA	7.1	--	496	--	--
MW-4	11/15/2016	UA	7.3	--	552	--	--
MW-4	5/18/2017	UA	6.8	--	544	--	--
MW-4	11/6/2017	UA	7.1	--	506	--	--
MW-4	5/31/2018	UA	6.8	--	492	--	--
MW-4	11/8/2018	UA	7	--	546	--	--

Table **5**-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-29	3/16/2021	UA	0.089	1.65	149	47	0.6
MW-29	4/6/2021	UA	0.091	1.78	148	48	0.13
MW-29	5/21/2021	UA	0.079	1.66	154	44	0.12
MW-29	6/10/2021	UA	0.081	1.66	153	46	0.13
MW-29	7/2/2021	UA	0.098	1.85	149	48	0.12
MW-29	7/23/2021	UA	0.095	2.01	150	51	0.12
MW-29	8/11/2021	UA	0.080	1.57	136	49	0.11
MW-32	2/25/2021	UA	0.104	1.56	172	14	0.18
MW-32	3/17/2021	UA	0.098	1.58	190	13	0.16
MW-32	4/7/2021	UA	0.091	1.88	193	14	0.18
MW-32	5/19/2021	UA	0.080	1.67	193	13	0.18
MW-32	6/9/2021	UA	0.085	1.62	198	14	0.19
MW-32	7/1/2021	UA	0.097	1.75	186	13	0.18
MW-32	7/22/2021	UA	0.088	1.87	192	13	0.18
MW-32	8/10/2021	UA	0.073	1.44	176	13	0.18
MW-32	1/31/2023	UA	0.047	1.38	188	12	0.17
MW-32	6/13/2023	UA	0.057	1.67	180	11	0.17
MW-32	9/6/2023	UA	0.052	1.81	165	10	0.19
MW-32	11/27/2023	UA	0.051	1.61	163	11	0.17
MW-4	6/1/2013	UA	--	--	--	--	--
MW-4	6/3/2013	UA	0.112	0.513	--	30	0.34
MW-4	12/1/2013	UA	--	--	--	--	--
MW-4	12/11/2013	UA	0.122	0.665	--	31	0.35
MW-4	6/11/2014	UA	0.119	0.488	--	34	0.33
MW-4	12/2/2014	UA	0.153	0.408	--	32	0.38
MW-4	6/3/2015	UA	--	--	--	--	0.35
MW-4	6/16/2015	UA	0.172	0.339	--	31	0.35
MW-4	12/15/2015	UA	0.132	0.627	--	30	0.33
MW-4	5/16/2016	UA	0.121	0.602	--	28	0.31
MW-4	11/15/2016	UA	0.171	0.43	--	30	0.35
MW-4	5/18/2017	UA	0.121	0.661	--	29	0.31
MW-4	11/6/2017	UA	0.070	0.4	--	28	0.31
MW-4	5/31/2018	UA	0.145	0.563	--	29	0.33
MW-4	11/8/2018	UA	0.140	0.679	--	27	0.32

Table **5**-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-29	3/16/2021	UA	0.301	0.009	70.4	0.0655	--
MW-29	4/6/2021	UA	0.0519	0.0091	70.7	0.0465	--
MW-29	5/21/2021	UA	0.0914	0.0083	67.5	0.0256	--
MW-29	6/10/2021	UA	0.0545	0.0087	69.6	0.0374	--
MW-29	7/2/2021	UA	0.0635	0.0088	68.8	0.0311	--
MW-29	7/23/2021	UA	<0.025	0.0106	68	0.0161	--
MW-29	8/11/2021	UA	<0.025	0.0078	75.8	0.0114	--
MW-32	2/25/2021	UA	0.0971	<0.005	95.2	2.04	--
MW-32	3/17/2021	UA	0.343	<0.003	93.5	2.18	--
MW-32	4/7/2021	UA	0.254	<0.003	104	2.48	--
MW-32	5/19/2021	UA	0.185	<0.003	95.7	2.52	--
MW-32	6/9/2021	UA	0.158	<0.003	100	2.41	--
MW-32	7/1/2021	UA	0.137	<0.003	94.7	2.48	--
MW-32	7/22/2021	UA	0.249	<0.003	96	3.29	--
MW-32	8/10/2021	UA	0.412	<0.003	108	3.23	--
MW-32	1/31/2023	UA	--	<0.0014	95.1	--	--
MW-32	6/13/2023	UA	<0.031	<0.0015	90.9	2.44	2.22
MW-32	9/6/2023	UA	0.0599	<0.0015	84.5	2.79	4.29
MW-32	11/27/2023	UA	--	<0.0015	90.1	--	
MW-4	6/1/2013	UA	--	--	--	--	--
MW-4	6/3/2013	UA	2.65	--	--	0.136	--
MW-4	12/1/2013	UA	--	--	--	--	--
MW-4	12/11/2013	UA	1.17	--	--	0.15	--
MW-4	6/11/2014	UA	1.72	--	--	0.16	--
MW-4	12/2/2014	UA	1.05	--	--	0.191	--
MW-4	6/3/2015	UA	--	--	--	--	--
MW-4	6/16/2015	UA	1.6	--	--	0.253	--
MW-4	12/15/2015	UA	0.611	--	--	0.217	--
MW-4	5/16/2016	UA	1.06	--	--	0.221	--
MW-4	11/15/2016	UA	0.802	--	--	0.271	--
MW-4	5/18/2017	UA	0.906	--	--	0.21	--
MW-4	11/6/2017	UA	0.153	--	--	0.103	--
MW-4	5/31/2018	UA	0.43	--	--	0.318	--
MW-4	11/8/2018	UA	0.253	--	--	0.189	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-29	3/16/2021	UA	<0.0015	0.885	46.2	149
MW-29	4/6/2021	UA	<0.0015	0.773	45.9	148
MW-29	5/21/2021	UA	<0.0015	0.701	44.2	148
MW-29	6/10/2021	UA	<0.0015	0.82	42.2	154
MW-29	7/2/2021	UA	<0.0015	0.72	40.1	154
MW-29	7/23/2021	UA	<0.0015	0.747	43.1	163
MW-29	8/11/2021	UA	<0.0015	0.757	49.2	161
MW-32	2/25/2021	UA	<0.0015	0.486	65	443
MW-32	3/17/2021	UA	<0.0015	0.515	66.9	425
MW-32	4/7/2021	UA	<0.0015	0.532	75.3	477
MW-32	5/19/2021	UA	<0.0015	0.376	68.5	462
MW-32	6/9/2021	UA	<0.0015	0.494	65.9	474
MW-32	7/1/2021	UA	<0.0015	0.675	65.8	464
MW-32	7/22/2021	UA	<0.0015	0.482	66.4	454
MW-32	8/10/2021	UA	<0.0015	0.577	75.8	465
MW-32	1/31/2023	UA	<0.0006	0.47	69.1	418
MW-32	6/13/2023	UA	<0.0037	0.422	62.4	414
MW-32	9/6/2023	UA	<0.0006	0.378	59.1	340
MW-32	11/27/2023	UA	<0.0006	0.418	65.1	356
MW-4	6/1/2013	UA	--	--	--	--
MW-4	6/3/2013	UA	--	--	--	69
MW-4	12/1/2013	UA	--	--	--	--
MW-4	12/11/2013	UA	--	--	--	81
MW-4	6/11/2014	UA	--	--	--	62
MW-4	12/2/2014	UA	--	--	--	42
MW-4	6/3/2015	UA	--	--	--	--
MW-4	6/16/2015	UA	--	--	--	35
MW-4	12/15/2015	UA	--	--	--	72
MW-4	5/16/2016	UA	--	--	--	74
MW-4	11/15/2016	UA	--	--	--	35
MW-4	5/18/2017	UA	--	--	--	72
MW-4	11/6/2017	UA	--	--	--	62
MW-4	5/31/2018	UA	--	--	--	58
MW-4	11/8/2018	UA	--	--	--	52

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-4	5/14/2019	UA	6.71	--	496	--	--
MW-4	11/13/2019	UA	6.94	--	458	--	--
MW-4	5/12/2020	UA	6.98	--	484	--	--
MW-4	12/2/2020	UA	7.16	--	432	--	--
MW-4	2/25/2021	UA	6.9	0	474	386	-80.2
MW-4	3/16/2021	UA	6.9	0	470	401	-36.1
MW-4	4/6/2021	UA	6.4	0	474	394	-9.5
MW-4	5/19/2021	UA	6.61	<1.0	478	358	-139
MW-4	6/9/2021	UA	6.59	--	478	--	--
MW-4	11/17/2021	UA	6.65	--	454	--	--
MW-4	2/22/2022	UA	6.81	<1.0	492	387	-32
MW-4	9/1/2022	UA	6.86	2.3	478	--	22
MW-4	1/31/2023	UA	6.84	5.6	472	--	-94
MW-4	9/5/2023	UA	6.86	2.1	480	--	-79
MW-6	6/1/2013	UA	6.4	--	--	--	--
MW-6	6/3/2013	UA	--	--	504	--	--
MW-6	12/1/2013	UA	6.2	--	--	--	--
MW-6	12/12/2013	UA	--	--	804	--	--
MW-6	6/11/2014	UA	6.6	--	672	--	--
MW-6	12/2/2014	UA	6.8	--	668	--	--
MW-6	6/4/2015	UA	--	--	--	--	--
MW-6	6/16/2015	UA	7	--	635	--	--
MW-6	12/15/2015	UA	6.5	3.3	676	--	169
MW-6	2/29/2016	UA	6.7	3.6	358	--	136
MW-6	5/16/2016	UA	7	2	484	--	165
MW-6	8/22/2016	UA	6.5	3.7	588	--	154
MW-6	11/15/2016	UA	6.8	5.8	726	--	62
MW-6	2/13/2017	UA	6.6	2	624	--	170
MW-6	5/18/2017	UA	6.6	<1.0	530	--	53
MW-6	7/18/2017	UA	6.5	2.5	622	274	103
MW-6	11/6/2017	UA	6.7	0	780	--	218
MW-6	5/31/2018	UA	6.5	<1.0	554	--	168
MW-6	8/28/2018	UA	6.6	6.1	544	--	71
MW-6	11/8/2018	UA	6.8	--	620	--	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-4	5/14/2019	UA	0.112	0.618	--	26	0.33
MW-4	11/13/2019	UA	0.152	0.438	--	28	0.38
MW-4	5/12/2020	UA	0.115	0.668	--	26	0.33
MW-4	12/2/2020	UA	0.146	0.565	--	28	0.38
MW-4	2/25/2021	UA	0.129	0.55	85.1	30	0.34
MW-4	3/16/2021	UA	0.122	0.567	91.2	29	0.32
MW-4	4/6/2021	UA	0.133	0.715	94.6	27	0.31
MW-4	5/19/2021	UA	0.097	0.843	93.6	26	0.29
MW-4	6/9/2021	UA	0.120	0.49	--	30	0.38
MW-4	11/17/2021	UA	0.141	0.518	--	33	0.39
MW-4	2/22/2022	UA	0.126	0.667	--	28	0.32
MW-4	9/1/2022	UA	0.152	0.362	--	34	0.4
MW-4	1/31/2023	UA	0.116	0.52	--	30	0.32
MW-4	9/5/2023	UA	0.137	0.531	--	30	0.4
MW-6	6/1/2013	UA	--	--	--	--	--
MW-6	6/3/2013	UA	0.027	0.961	--	<5.0	0.26
MW-6	12/1/2013	UA	--	--	--	--	--
MW-6	12/12/2013	UA	0.033	1.94	--	10	0.16
MW-6	6/11/2014	UA	0.026	1.19	--	6	0.2
MW-6	12/2/2014	UA	0.033	1.39	--	6	0.18
MW-6	6/4/2015	UA	--	--	--	--	0.19
MW-6	6/16/2015	UA	0.031	1	--	5	0.19
MW-6	12/15/2015	UA	0.032	1.58	113	7	0.18
MW-6	2/29/2016	UA	0.027	0.837	101	5	0.17
MW-6	5/16/2016	UA	0.030	0.874	98.6	5	0.19
MW-6	8/22/2016	UA	0.037	1.16	116	<5.0	0.2
MW-6	11/15/2016	UA	0.034	1.54	113	7	0.17
MW-6	2/13/2017	UA	0.029	1.04	100	<5.0	0.16
MW-6	5/18/2017	UA	0.029	1.02	96	<5.0	0.19
MW-6	7/18/2017	UA	0.060	1.48	105	<5.0	0.17
MW-6	11/6/2017	UA	0.041	1.91	139	11	0.16
MW-6	5/31/2018	UA	0.032	1.07	93.6	<5.0	0.19
MW-6	8/28/2018	UA	0.044	1.16	122	<5.0	0.22
MW-6	11/8/2018	UA	0.037	1.45	--	<5.0	0.19

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-4	5/14/2019	UA	0.386	--	--	0.205	--
MW-4	11/13/2019	UA	0.258	--	--	0.202	--
MW-4	5/12/2020	UA	0.368	--	--	0.257	--
MW-4	12/2/2020	UA	0.161	--	--	0.357	--
MW-4	2/25/2021	UA	0.429	<0.005	42.8	0.402	--
MW-4	3/16/2021	UA	0.285	0.0031	43.4	0.34	--
MW-4	4/6/2021	UA	0.267	0.0034	47.5	0.319	--
MW-4	5/19/2021	UA	0.181	<0.003	37.3	0.2	--
MW-4	6/9/2021	UA	0.221	--	--	0.265	--
MW-4	11/17/2021	UA	0.225	--	--	0.253	--
MW-4	2/22/2022	UA	0.256	--	--	0.386	--
MW-4	9/1/2022	UA	0.571	--	--	0.341	--
MW-4	1/31/2023	UA	0.327	--	--	0.387	--
MW-4	9/5/2023	UA	0.428	--	--	0.249	--
MW-6	6/1/2013	UA	--	--	--	--	--
MW-6	6/3/2013	UA	0.28	--	--	0.0167	--
MW-6	12/1/2013	UA	--	--	--	--	--
MW-6	12/12/2013	UA	0.161	--	--	0.0051	--
MW-6	6/11/2014	UA	0.0309	--	--	<0.005	--
MW-6	12/2/2014	UA	0.0296	--	--	<0.003	--
MW-6	6/4/2015	UA	--	--	--	--	--
MW-6	6/16/2015	UA	0.134	--	--	0.0042	--
MW-6	12/15/2015	UA	0.339	0.0012	--	0.0109	--
MW-6	2/29/2016	UA	--	<0.001	--	--	--
MW-6	5/16/2016	UA	0.103	<0.001	--	0.0063	--
MW-6	8/22/2016	UA	--	0.0012	--	--	--
MW-6	11/15/2016	UA	0.0345	0.0012	--	0.0039	--
MW-6	2/13/2017	UA	--	<0.001	--	--	--
MW-6	5/18/2017	UA	0.0437	<0.001	--	0.0037	--
MW-6	7/18/2017	UA	--	<0.001	48.3	--	--
MW-6	11/6/2017	UA	0.124	--	--	0.0037	--
MW-6	5/31/2018	UA	0.0704	<0.0015	--	<0.002	--
MW-6	8/28/2018	UA	--	<0.0015	--	--	--
MW-6	11/8/2018	UA	0.122	--	--	0.0034	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-4	5/14/2019	UA	--	--	--	51
MW-4	11/13/2019	UA	--	--	--	19
MW-4	5/12/2020	UA	--	--	--	43
MW-4	12/2/2020	UA	--	--	--	18
MW-4	2/25/2021	UA	<0.0015	0.544	37.5	35
MW-4	3/16/2021	UA	<0.0015	0.616	38.3	34
MW-4	4/6/2021	UA	<0.0015	0.602	42.5	45
MW-4	5/19/2021	UA	<0.0015	0.371	35.5	57
MW-4	6/9/2021	UA	--	--	--	27
MW-4	11/17/2021	UA	--	--	--	13
MW-4	2/22/2022	UA	--	--	--	38
MW-4	9/1/2022	UA	--	--	--	11
MW-4	1/31/2023	UA	--	--	--	29
MW-4	9/5/2023	UA	--	--	--	22
MW-6	6/1/2013	UA	--	--	--	--
MW-6	6/3/2013	UA	--	--	--	167
MW-6	12/1/2013	UA	--	--	--	--
MW-6	12/12/2013	UA	--	--	--	401
MW-6	6/11/2014	UA	--	--	--	272
MW-6	12/2/2014	UA	--	--	--	233
MW-6	6/4/2015	UA	--	--	--	--
MW-6	6/16/2015	UA	--	--	--	161
MW-6	12/15/2015	UA	<0.001	--	--	287
MW-6	2/29/2016	UA	<0.001	--	--	164
MW-6	5/16/2016	UA	<0.001	--	--	167
MW-6	8/22/2016	UA	<0.001	--	--	187
MW-6	11/15/2016	UA	<0.001	--	--	275
MW-6	2/13/2017	UA	<0.001	--	--	246
MW-6	5/18/2017	UA	<0.001	--	--	153
MW-6	7/18/2017	UA	<0.001	0.314	30.7	238
MW-6	11/6/2017	UA	--	--	--	335
MW-6	5/31/2018	UA	<0.0015	--	--	195
MW-6	8/28/2018	UA	<0.0015	--	--	133
MW-6	11/8/2018	UA	--	--	--	159

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
MW-6	2/15/2019	UA	6.7	8.6	464	--	161
MW-6	5/14/2019	UA	6.55	--	532	--	--
MW-6	8/21/2019	UA	6.4	2.2	550	--	224
MW-6	11/13/2019	UA	6.58	--	490	--	--
MW-6	2/11/2020	UA	6.71	3	478	290	126
MW-6	5/12/2020	UA	6.72	--	500	--	--
MW-6	8/26/2020	UA	6.55	6.5	476	308	128
MW-6	12/2/2020	UA	6.55	--	608	--	--
MW-6	3/30/2021	UA	6.6	<1.0	368	226	116
MW-6	6/10/2021	UA	6.36	--	442	--	--
MW-6	9/1/2021	UA	6.41	7.3	498	284	78
MW-6	11/18/2021	UA	6.46	--	486	--	--
MW-6	2/23/2022	UA	6.62	27	422	258	129
MW-6	9/1/2022	UA	6.36	<1.0	542	--	128
MW-6	2/1/2023	UA	6.52	6.6	430	273	102
MW-6	6/13/2023	UA	6.57	2.5	462	299	96
MW-6	9/6/2023	UA	6.54	6.7	584	328	39
MW-6	11/28/2023	UA	6.4	15	670	314	74
MW-7	11/27/2023	UA	6.75	11	1000	418	27
MW-7S	11/27/2023	USCU	6.68	4.5	1300	417	-56
XPW01	3/1/2021	CCR	7.5	11.74	652	159	-49.6
XPW01	3/18/2021	CCR	7.3	0	634	168	4.3
XPW01	4/7/2021	CCR	6.9	0	648	163	40.1
XPW01	5/21/2021	CCR	7.01	9	696	180	116
XPW01	6/10/2021	CCR	7.35	<1.0	--	162	-48
XPW01	7/2/2021	CCR	7.31	<1.0	466	149	-74
XPW01	7/22/2021	CCR	7.27	<1.0	514	114	0
XPW01	8/11/2021	CCR	7.53	<1.0	544	114	-124
XPW01	2/23/2022	CCR	7.49	<1.0	458	154	-63
XPW01	1/31/2023	CCR	7.54	<1.0	340	163	-117
XPW01	6/13/2023	CCR	7.44	11	510	217	71
XPW01	9/7/2023	CCR	--	--	--	--	--
XPW02	3/1/2021	CCR	7	71.01	946	248	-87.3
XPW02	3/18/2021	CCR	6.7	0	954	259	-64.1

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
MW-6	2/15/2019	UA	0.037	0.649	101	<5.0	0.19
MW-6	5/14/2019	UA	0.035	0.792	--	<4.0	0.22
MW-6	8/21/2019	UA	0.040	1.32	113	<5.0	0.19
MW-6	11/13/2019	UA	0.039	0.804	--	<4.0	0.2
MW-6	2/11/2020	UA	0.027	0.632	90.9	<5.0	0.2
MW-6	5/12/2020	UA	0.033	0.836	--	<4.0	0.2
MW-6	8/26/2020	UA	0.043	1.09	103	<5.0	0.24
MW-6	12/2/2020	UA	0.042	1.46	--	7	0.18
MW-6	3/30/2021	UA	0.029	0.64	75.6	<5.0	0.21
MW-6	6/10/2021	UA	0.036	0.906	--	3	0.22
MW-6	9/1/2021	UA	0.041	1.28	93.5	4	0.19
MW-6	11/18/2021	UA	0.045	1.14	--	3	0.21
MW-6	2/23/2022	UA	0.040	0.71	85.1	2	0.19
MW-6	9/1/2022	UA	0.045	1.62	111	<3.0	0.21
MW-6	2/1/2023	UA	0.034	0.8	85.2	2	0.18
MW-6	6/13/2023	UA	0.043	0.996	93.2	<2.0	0.2
MW-6	9/6/2023	UA	0.048	1.47	104	5	0.22
MW-6	11/28/2023	UA	0.050	1.44	110	9	0.2
MW-7	11/27/2023	UA	0.061	0.563	174	8	0.28
MW-7S	11/27/2023	USCU	0.036	4.81	180	9	0.29
XPW01	3/1/2021	CCR	0.056	1.5	76.8	29	0.84
XPW01	3/18/2021	CCR	0.070	1.58	78.2	25	0.8
XPW01	4/7/2021	CCR	0.057	1.53	70.5	29	0.73
XPW01	5/21/2021	CCR	0.056	1.53	89.9	28	0.63
XPW01	6/10/2021	CCR	0.048	1.18	80.1	29	0.71
XPW01	7/2/2021	CCR	0.052	1.2	66.1	28	0.64
XPW01	7/22/2021	CCR	0.049	1.41	64.8	29	0.62
XPW01	8/11/2021	CCR	0.044	1.3	60.8	29	0.61
XPW01	2/23/2022	CCR	0.045	1.03	63.9	26	0.79
XPW01	1/31/2023	CCR	0.060	0.527	53.7	23	0.65
XPW01	6/13/2023	CCR	0.089	0.674	81.1	22	0.56
XPW01	9/7/2023	CCR	--	--	--	--	--
XPW02	3/1/2021	CCR	0.064	3.74	160	6	0.45
XPW02	3/18/2021	CCR	0.057	4.22	169	4	0.37

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
MW-6	2/15/2019	UA	--	<0.0015	--	--	--
MW-6	5/14/2019	UA	0.103	--	--	0.0029	--
MW-6	8/21/2019	UA	--	<0.003	--	--	--
MW-6	11/13/2019	UA	0.1	--	--	0.0033	--
MW-6	2/11/2020	UA	--	<0.003	39.7	--	--
MW-6	5/12/2020	UA	0.0606	--	--	<0.002	--
MW-6	8/26/2020	UA	--	<0.003	45.2	--	--
MW-6	12/2/2020	UA	0.145	--	--	0.0043	--
MW-6	3/30/2021	UA	--	<0.003	29.7	--	--
MW-6	6/10/2021	UA	0.0998	--	--	0.0036	--
MW-6	9/1/2021	UA	--	<0.003	42.4	--	--
MW-6	11/18/2021	UA	0.0795	--	--	0.0026	--
MW-6	2/23/2022	UA	0.996	<0.003	36.5	0.0261	--
MW-6	9/1/2022	UA	0.148	<0.0014	--	0.0162	--
MW-6	2/1/2023	UA	0.303	<0.0014	36.2	0.0056	--
MW-6	6/13/2023	UA	0.131	<0.0015	39.4	<0.0053	<0.0025
MW-6	9/6/2023	UA	0.514	<0.0015	44.5	0.0152	0.0083
MW-6	11/28/2023	UA	--	<0.0018	51.3	--	
MW-7	11/27/2023	UA	--	<0.0028	82	--	
MW-7S	11/27/2023	USCU	--	<0.0015	74.8	--	
XPW01	3/1/2021	CCR	0.708	0.0159	37.2	0.106	--
XPW01	3/18/2021	CCR	4.57	0.0197	37.7	0.136	--
XPW01	4/7/2021	CCR	0.0589	0.0179	40.1	0.0972	--
XPW01	5/21/2021	CCR	0.475	0.0171	44.8	0.0109	--
XPW01	6/10/2021	CCR	0.153	0.0145	30.6	0.0043	--
XPW01	7/2/2021	CCR	0.0891	0.0124	26.2	0.0053	--
XPW01	7/22/2021	CCR	0.483	0.0142	25.6	0.0108	--
XPW01	8/11/2021	CCR	0.165	0.0111	29.9	0.0204	--
XPW01	2/23/2022	CCR	--	0.0145	28.6	--	--
XPW01	1/31/2023	CCR	--	0.011	27	--	--
XPW01	6/13/2023	CCR	<0.035	0.0151	37.3	0.0481	0.0412
XPW01	9/7/2023	CCR	0.0586	--	--	0.0376	0.0566
XPW02	3/1/2021	CCR	30.8	0.0529	33.9	0.497	--
XPW02	3/18/2021	CCR	30.5	0.0573	35	0.401	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
MW-6	2/15/2019	UA	<0.0015	--	--	106
MW-6	5/14/2019	UA	--	--	--	107
MW-6	8/21/2019	UA	<0.0015	--	--	153
MW-6	11/13/2019	UA	--	--	--	114
MW-6	2/11/2020	UA	<0.0015	0.168	15.5	97
MW-6	5/12/2020	UA	--	--	--	131
MW-6	8/26/2020	UA	<0.0015	0.367	23.2	157
MW-6	12/2/2020	UA	--	--	--	237
MW-6	3/30/2021	UA	<0.0015	0.176	14.1	98
MW-6	6/10/2021	UA	--	--	--	117
MW-6	9/1/2021	UA	<0.0015	0.374	24	173
MW-6	11/18/2021	UA	--	--	--	160
MW-6	2/23/2022	UA	<0.0015	0.398	15.3	108
MW-6	9/1/2022	UA	<0.0006	--	--	144
MW-6	2/1/2023	UA	<0.0006	0.312	19.3	127
MW-6	6/13/2023	UA	<0.0037	0.253	20.9	126
MW-6	9/6/2023	UA	<0.0006	0.419	25.9	151
MW-6	11/28/2023	UA	<0.0006	0.5	30.4	222
MW-7	11/27/2023	UA	0.0023	2.25	26.8	360
MW-7S	11/27/2023	USCU	<0.0014	2.91	106	525
XPW01	3/1/2021	CCR	0.0154	7.84	87.9	353
XPW01	3/18/2021	CCR	0.0161	7.96	83.3	280
XPW01	4/7/2021	CCR	0.0142	7.98	88.5	295
XPW01	5/21/2021	CCR	0.0147	7.27	73.2	312
XPW01	6/10/2021	CCR	0.0131	7.83	57.7	215
XPW01	7/2/2021	CCR	0.0121	6.97	55.7	202
XPW01	7/22/2021	CCR	0.0147	6.91	62.5	237
XPW01	8/11/2021	CCR	0.0161	7.31	79.5	267
XPW01	2/23/2022	CCR	0.01	6.56	52.3	221
XPW01	1/31/2023	CCR	0.0049	5.14	33.8	125
XPW01	6/13/2023	CCR	<0.0045	5.83	37.8	205
XPW01	9/7/2023	CCR	--	--	--	--
XPW02	3/1/2021	CCR	0.0446	19.4	74.4	437
XPW02	3/18/2021	CCR	0.0429	19.7	74.6	465

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
XPW02	4/7/2021	CCR	6.1	488.38	1010	254	-25.5
XPW02	5/21/2021	CCR	6.55	9.9	770	230	-133
XPW02	6/10/2021	CCR	6.44	9.4	--	273	-121
XPW02	7/2/2021	CCR	6.56	9	858	275	-111
XPW02	7/22/2021	CCR	6.62	6.5	810	251	-127
XPW02	8/11/2021	CCR	6.67	1.2	828	276	-139
XPW02	2/22/2022	CCR	6.76	9.9	522	222	-104
XPW02	2/1/2023	CCR	6.67	170	262	236	-110
XPW02	6/13/2023	CCR	6.65	71	620	258	28
XPW02	9/7/2023	CCR	--	--	--	--	--
XPW03	3/2/2021	CCR	7.1	21.51	1710	375	-48.2
XPW03	3/18/2021	CCR	6.8	55.29	1440	356	-21.2
XPW03	4/7/2021	CCR	6.6	0	1880	384	-12.4
XPW03	5/20/2021	CCR	6.74	9.9	1440	343	-89
XPW03	6/10/2021	CCR	6.74	10	--	407	84
XPW03	7/1/2021	CCR	6.82	6.8	1180	401	-93
XPW03	7/22/2021	CCR	6.82	8.1	1300	361	-68
XPW03	8/11/2021	CCR	6.9	9.8	1370	373	-119
XPW03	2/22/2022	CCR	6.97	9.7	1280	351	-86
XPW03	2/1/2023	CCR	6.87	50	290	432	-3
XPW03	6/13/2023	CCR	6.88	160	1280	402	47
XPW03	9/7/2023	CCR	--	--	--	--	--

Table **5**-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
XPW02	4/7/2021	CCR	0.082	4.22	165	4	0.37
XPW02	5/21/2021	CCR	0.074	3.49	145	3	0.32
XPW02	6/10/2021	CCR	0.066	3.72	158	3	0.35
XPW02	7/2/2021	CCR	0.068	4.23	145	3	0.33
XPW02	7/22/2021	CCR	0.047	3.11	142	13	0.31
XPW02	8/11/2021	CCR	0.058	3.52	138	3	0.31
XPW02	2/22/2022	CCR	0.071	2.39	109	2	0.31
XPW02	2/1/2023	CCR	0.160	2.99	140	2	0.31
XPW02	6/13/2023	CCR	0.062	3.15	132	<2.0	0.31
XPW02	9/7/2023	CCR	--	--	--	--	--
XPW03	3/2/2021	CCR	0.048	2.92	180	5	0.69
XPW03	3/18/2021	CCR	0.089	2.69	154	4	0.62
XPW03	4/7/2021	CCR	0.082	4.21	153	4	0.78
XPW03	5/20/2021	CCR	0.033	2.81	150	3	0.58
XPW03	6/10/2021	CCR	0.036	3.11	140	4	0.68
XPW03	7/1/2021	CCR	0.050	3.1	128	3	0.65
XPW03	7/22/2021	CCR	0.039	2.77	156	3	0.56
XPW03	8/11/2021	CCR	0.037	2.85	161	3	0.51
XPW03	2/22/2022	CCR	0.034	2.54	151	3	0.54
XPW03	2/1/2023	CCR	0.041	3.22	199	4	0.61
XPW03	6/13/2023	CCR	0.053	3.03	151	<2.0	0.61
XPW03	9/7/2023	CCR	--	--	--	--	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
XPW02	4/7/2021	CCR	33.9	0.057	38	0.395	--
XPW02	5/21/2021	CCR	22.5	0.041	26.8	0.244	--
XPW02	6/10/2021	CCR	24.1	0.0515	30.4	0.234	--
XPW02	7/2/2021	CCR	28.2	0.0556	27.8	0.284	--
XPW02	7/22/2021	CCR	24.6	0.0437	27.7	0.224	--
XPW02	8/11/2021	CCR	28	0.0505	33.8	0.232	--
XPW02	2/22/2022	CCR	--	0.0337	21.5	--	--
XPW02	2/1/2023	CCR	--	0.0403	28.6	--	--
XPW02	6/13/2023	CCR	22.2	0.0437	24	0.202	0.173
XPW02	9/7/2023	CCR	26.9	--	--	0.164	0.245
XPW03	3/2/2021	CCR	5.02	0.0299	51.5	0.197	--
XPW03	3/18/2021	CCR	39.3	0.0304	47.5	0.219	--
XPW03	4/7/2021	CCR	39.1	0.0308	60.6	0.222	--
XPW03	5/20/2021	CCR	3.35	0.0256	50.7	0.164	--
XPW03	6/10/2021	CCR	2.67	0.0301	53.8	0.162	--
XPW03	7/1/2021	CCR	4.92	0.0272	50.5	0.196	--
XPW03	7/22/2021	CCR	5.73	0.0283	54.4	0.181	--
XPW03	8/11/2021	CCR	3.87	0.0271	56.9	0.188	--
XPW03	2/22/2022	CCR	--	0.0308	51.4	--	--
XPW03	2/1/2023	CCR	--	0.0267	69.1	--	--
XPW03	6/13/2023	CCR	29.9	0.0215	51.8	0.551	0.107
XPW03	9/7/2023	CCR	11	--	--	0.197	0.244

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
XPW02	4/7/2021	CCR	0.0445	21.8	86.4	435
XPW02	5/21/2021	CCR	0.0358	15.2	53.4	314
XPW02	6/10/2021	CCR	0.0364	18.6	62.3	359
XPW02	7/2/2021	CCR	0.0349	18.2	63.2	359
XPW02	7/22/2021	CCR	0.0318	18.1	56	330
XPW02	8/11/2021	CCR	0.0364	18.1	65.3	353
XPW02	2/22/2022	CCR	0.0332	13.2	24.3	201
XPW02	2/1/2023	CCR	0.052	14.8	37.5	282
XPW02	6/13/2023	CCR	0.0342	16.6	36.7	257
XPW02	9/7/2023	CCR	--	--	--	--
XPW03	3/2/2021	CCR	0.0494	14.2	330	937
XPW03	3/18/2021	CCR	0.0434	12.2	264	745
XPW03	4/7/2021	CCR	0.0559	17	464	1110
XPW03	5/20/2021	CCR	0.0346	12.3	264	715
XPW03	6/10/2021	CCR	0.0383	13.4	273	751
XPW03	7/1/2021	CCR	0.0386	11.6	223	537
XPW03	7/22/2021	CCR	0.0441	13.4	221	642
XPW03	8/11/2021	CCR	0.0353	13.5	216	684
XPW03	2/22/2022	CCR	0.0362	15.1	196	642
XPW03	2/1/2023	CCR	0.048	15.5	364	1000
XPW03	6/13/2023	CCR	0.0443	14.5	249	699
XPW03	9/7/2023	CCR	--	--	--	--

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	pH (field) (SU)	Turbidity, field (NTU)	Total Dissolved Solids (mg/L)	Alkalinity, total	Oxidation Reduction Potential (mV)
XPW04	3/2/2021	CCR	7.1	6.27	416	228	-96.1
XPW04	3/18/2021	CCR	6.7	0	386	286	-85.1
XPW04	4/7/2021	CCR	6.3	0	394	286	-65.7
XPW04	5/20/2021	CCR	6.74	7	374	166	-146
XPW04	6/9/2021	CCR	6.64	<1.0	--	214	-165
XPW04	7/1/2021	CCR	6.88	1	384	131	-131
XPW04	7/22/2021	CCR	6.66	<1.0	396	122	-127
XPW04	8/10/2021	CCR	6.92	<1.0	450	147	-147
XPW04	2/22/2022	CCR	6.9	5.2	368	240	-144
XPW04	2/1/2023	CCR	6.88	<1.0	325	221	-137
XPW04	6/13/2023	CCR	6.79	47	340	252	-22
XPW04	9/7/2023	CCR	--	--	--	--	--

Notes:

-- = not measured

< = below method detection limit

mg/L = milligrams per liter

SU= standard units

NTU = Nephelometric Turbidity unit

mV= millivolts

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Samples with turbidity >100 NTU not included in principal component analysis

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Barium, total (mg/L)	Boron, total (mg/L)	Calcium, total (mg/L)	Chloride, total (mg/L)	Fluoride, total (mg/L)
XPW04	3/2/2021	CCR	0.130	1.5	68.4	18	0.46
XPW04	3/18/2021	CCR	0.133	1.54	62.2	14	0.5
XPW04	4/7/2021	CCR	0.095	2.28	63.7	15	0.42
XPW04	5/20/2021	CCR	0.072	1.26	51.8	7	0.42
XPW04	6/9/2021	CCR	0.080	1.5	63	9	0.5
XPW04	7/1/2021	CCR	0.095	1.87	61.1	10	0.49
XPW04	7/22/2021	CCR	0.072	1.54	65	10	0.46
XPW04	8/10/2021	CCR	0.068	1.94	69.7	12	0.48
XPW04	2/22/2022	CCR	0.082	1.72	63.2	10	0.41
XPW04	2/1/2023	CCR	0.081	0.902	49.4	14	0.31
XPW04	6/13/2023	CCR	0.095	1.18	50.7	12	0.39
XPW04	9/7/2023	CCR	--	--	--	--	--

Notes:

-- = not measured

< = below method detection limit

mg/L = milligrams per liter

SU= standard units

NTU = Nephelometric Turbidity unit

mV= millivolts

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Samples with turbidity >100 NTU not included in principal component a

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Iron, total (mg/L)	Lithium, total (mg/L)	Magnesium, total (mg/L)	Manganese, total (mg/L)	Manganese, dissolved (mg/L)
XPW04	3/2/2021	CCR	40.8	0.0315	26.5	0.34	--
XPW04	3/18/2021	CCR	40.9	0.0289	27.4	0.26	--
XPW04	4/7/2021	CCR	37.3	0.0282	29.3	0.292	--
XPW04	5/20/2021	CCR	34.1	0.019	22.4	0.182	--
XPW04	6/9/2021	CCR	31.8	0.021	25.8	0.184	--
XPW04	7/1/2021	CCR	31.7	0.0217	25.5	0.22	--
XPW04	7/22/2021	CCR	33.1	0.0204	26	0.175	--
XPW04	8/10/2021	CCR	12.6	0.0212	26.6	0.215	--
XPW04	2/22/2022	CCR	--	0.0227	23.5	--	--
XPW04	2/1/2023	CCR	--	0.0147	23	--	--
XPW04	6/13/2023	CCR	31.2	0.0166	24.1	0.148	0.136
XPW04	9/7/2023	CCR	37.4	--	--	0.196	0.281

Notes:

-- = not measured

< = below method detection limit

mg/L = milligrams per liter

SU= standard units

NTU = Nephelometric Turbidity unit

mV= millivolts

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Samples with turbidity >100 NTU not included in principal component a

Table 5-1. Groundwater Analytical Data

Well ID	Date	HSU	Molybdenum, total (mg/L)	Potassium, total (mg/L)	Sodium, total (mg/L)	Sulfate, total (mg/L)
XPW04	3/2/2021	CCR	0.0065	6.69	39.3	51
XPW04	3/18/2021	CCR	0.0064	6.9	38.6	44
XPW04	4/7/2021	CCR	0.0088	6.65	42	51
XPW04	5/20/2021	CCR	0.0068	4.44	25.6	78
XPW04	6/9/2021	CCR	0.0099	6.1	26.8	88
XPW04	7/1/2021	CCR	0.0135	6.21	28.5	87
XPW04	7/22/2021	CCR	0.0107	5.8	29.1	85
XPW04	8/10/2021	CCR	0.0107	6.98	33.5	104
XPW04	2/22/2022	CCR	0.0102	6.12	28.8	75
XPW04	2/1/2023	CCR	0.0051	5.26	30.3	34
XPW04	6/13/2023	CCR	<0.0066	5.01	29.9	29
XPW04	9/7/2023	CCR	--	--	--	--

Notes:

-- = not measured

< = below method detection limit

mg/L = milligrams per liter

SU= standard units

NTU = Nephelometric Turbidity unit

mV= millivolts

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

Samples with turbidity >100 NTU not included in principal component a

ATTACHMENT 1

Monitored Natural Attenuation Field Investigation Status Update, Primary Ash Pond (CCR Unit 141) Kincaid Power Plant, Christian County, Illinois

GOLDER
MEMBER OF WSP

TECHNICAL MEMORANDUM

DATE December 16, 2021 **Project No.** 21454831

TO David Mitchell, Stu Cravens, Vic Modeer
Kincaid Generation, LLC

CC Brian Hennings - Ramboll

FROM Patrick J. Behling, Jeffrey Ingram - Golder **EMAIL JIngram@golder.com**

MONITORED NATURAL ATTENUATION FIELD INVESTIGATION STATUS UPDATE, PRIMARY ASH POND (CCR UNIT 141) KINCAID POWER PLANT, CHRISTIAN COUNTY, ILLINOIS

1.0 INTRODUCTION AND BACKGROUND

The following Technical Memorandum summarizes the results received to date from the Monitored Natural Attenuation (MNA) Field Investigation completed by Golder Associates USA Inc. (Golder) for the Primary Ash Pond (PAP, CCR Unit 141) located at the Kincaid Power Plant (KPP or Site) operated by Kincaid Generation, LLC (KG) in Christian County, Illinois. Data collected as part of this investigation will be an integral part of the MNA Feasibility Demonstration for the PAP and will be used for KG's Illinois Part 845 Coal Combustion Residual (CCR) compliance program. A Site plan showing the PAP, existing Part 845 monitoring wells, and the MNA boring locations is provided in **Figure 1**.

This memorandum only includes laboratory analytical data that has been received to date. Golder will update this memorandum when the remaining data has been received and reviewed.

2.0 PROJECT SCOPE OF WORK

As part of the MNA Feasibility Demonstration, and ongoing discussions with KG, Golder completed the following activities as part of this Field Investigation:

- Screened for potential underground utilities in the vicinity of the proposed borings prior to completing any drilling or ground disturbance activities.
- Advanced a total of eight (8) soil borings ranging in depth from 20 to 40 feet below ground surface (FT BGS).
- Collected twelve (12) soil samples from eight (8) soil borings for laboratory analysis.
- Collected groundwater samples from five (5) existing monitoring wells for laboratory analysis.

3.0 FIELD INVESTIGATION

3.1 Private Utility Locate

Prior to conducting any work onsite, Golder reviewed Site plans/drawings provided by KG and/or Site representatives and met with Site representatives to assist in identifying underground utility locations in the vicinity of the proposed borings. Golder also sub-contracted with GPRS to provide ground penetrating radar (GPR) and electromagnetic (EM) tracing services to screen the proposed boring locations in the field. All boring locations were cleared by GPRS personnel before drilling commenced.

3.2 Drilling and Aquifer Solids Sampling

Drilling was completed by Cascade Environmental Drilling using a roto-sonic drill rig under direct supervision of a Golder Geologist. Continuous soil core samples were obtained at each borehole location and were logged in the field by Golder personnel. Soils were classified according to the Unified Soil Classification System (USCS) and in accordance with the standard Golder Soil Logging Technical Procedure.

During the field investigation, eight (8) soil borings were advanced at the locations shown on **Figure 1**. Soil boring logs are provided in **Attachment A**. The following units were encountered during the field investigation (unit names are consistent with the Groundwater Monitoring Plan (Ramboll, 2021) in the Newton Part 845 Operating Permit):

- Shallow Saturated Zone — This zone is made up of the surficial soils and the upper confining unit. The Shallow Saturated Zone consists of low permeability silty clay and clayey silt of the Cahokia Formation, with occasional, discontinuous sand lenses referred to as potential migration pathways. The contact between the Shallow Saturated Zone and the underlying uppermost aquifer rangers from approximately 574 feet above mean sea level (FT MSL) and 586 FT MSL in the borings completed for this investigation. Samples from the Shallow Saturated Zone unit are shown in **Table 1**.
- Uppermost Aquifer – This zone consists of moderately permeability sand, silty sand, clayey sand, and gravel units of the Upper Cahokia, where saturated, and thin sands and gravels of the Lower Cahokia . This unit is present between approximately 570 and 586 FT MSL in the borings completed for this investigation. Samples collected from the uppermost aquifer are shown in **Table 1**.
- Lower Confining Unit – This unit consists of the Vandalia Till and is generally made up of dense silts and hard clays. The lower confining unit was present below the uppermost aquifer. The contact between these two units ranges from approximately 570 FT MSL to 583 FT MSL in the borings completed for this investigation. There were no samples collected from the lower confining unit.

Twelve (12) soil samples were collected for laboratory analysis from the soil borings (see **Figure 1** for sample location). Details regarding collected samples are included in **Table 1**.

Table 1: Laboratory Sample Locations and Intervals

Borehole ID	Sample ID	Sample Depth (FT BGS)	Soil Type / Geologic Unit Sampled
K-SB-02	K-SB-02 (10.0 – 14.7)	10.0 – 14.7	Silty Clay / Shallow Saturated Zone

Borehole ID	Sample ID	Sample Depth (FT BGS)	Soil Type / Geologic Unit Sampled
	K-SB-02 (14.7 – 17.5)	14.7 – 17.5	Clayey Silt / Shallow Saturated Zone
K-SB-03	K-SB-03 (19.0 – 20.0)	19.0 – 20.0	Poorly Graded Sand / Uppermost Aquifer
K-SB-07	K-SB-07 (7.0 – 10.0)	7.0 – 10.0	Clay / Shallow Saturated Zone
	K-SB-07 (10.0 – 15.0)	10.0 – 15.0	Clayey Silt / Uppermost Aquifer
K-SB-08	K-SB-08 (4.0 – 7.0)	4.0 – 7.0	Clayey Silt / Shallow Saturated Zone
	K-SB-08 (13.0 – 17.0)	13.0 – 17.0	Silty Sand / Uppermost Aquifer
K-SB-12	K-SB-12 (13.0 – 17.3)	13.0 – 17.3	Clayey Sand / Shallow Saturated Zone
	K-SB-12 (17.3 – 21.0)	17.3 – 21.0	Clayey Silt and Sand / Uppermost Aquifer
K-SB-28	K-SB-28 (18.0 – 21.5)	18.0 – 21.5	Silty Sand / Uppermost Aquifer
K-SB-32	K-SB-32 (31.0 – 36.0)	31.0 – 36.0	Sandy Silty Clay / Uppermost Aquifer
K-SB-XPW03	K-SB-XPW03 (10.0 – 20.0)	10.0 – 20.0	CCR

Notes
1) FT BGS – Feet Below Ground Surface.

After the soil samples had been collected, the soil borings were plugged using hydrated 3/8-inch bentonite grout chips to ground surface. Additional material recovered during the drilling process was disposed onsite near the borehole location.

3.2.1 Laboratory Analysis

Soil samples collected during the field investigation were placed in clean containers and properly labeled with sample location, depth, project name, sampler initials, analyses to be performed, date, and time of collection. Sample information was logged on a chain of custody (COC) and shipped to the following laboratories analysis:

- Eurofins TestAmerica for 7 Step Sequential Extraction; and
- SiREM for the Batch Testing, Total Metals testing, Reitveld XRD, leachability, Cation Exchange Capacity (CEC), and Total Organic Carbon (TOC) analyses.

The following laboratory analyses were conducted for each soil sample:

- 6010B 7-step sequential extraction (Iron, Aluminum, Arsenic, Manganese, Lead, Lithium, Molybdenum, Cobalt, Calcium, Selenium, Beryllium, and Chromium)
- EPA 6010B for Total Metals (Iron, Aluminum, Arsenic, Manganese, Lead, Lithium, Molybdenum, Cobalt, Calcium, Selenium, Beryllium, and Chromium).
- Bulk Mineralogy by Reitveld XRD Analysis.
- Cation Exchange Capacity (CEC) Analysis.
- Total Organic Carbon Analysis.
- SPLP Method 1312 Leachability Test (for CCR source sample only).

Currently, only the results from Test America have been received, and are included in **Attachment B**. A separate Technical Memorandum will be provided when results from SiREM are completed.

3.3 Groundwater Sampling

Groundwater sampling was completed by Golder personnel concurrently with drilling activities. Six (6) previously existing monitoring wells were sampled (see **Figure 1** for sample locations). Groundwater sample collection locations for the MNA evaluation are included in **Table 2**.

Table 2: Groundwater Sample Locations

Well ID	Adjacent Borehole Sample
MW-02 (background)	K-SB-02 (14.7-17.5)
MW-07S	K-SB-07 (7.0 -10.0)
MW-07	K-SB-07 (15.0 - 20.0)
MW-12	K-SB-12 (13.0 -17.3)
MW-12D	K-SB-12 (17.3 – 21.0)
MW-28	K-SB-12 (18.0 - 21.5)

3.3.1 Groundwater Sample Laboratory Analysis

Groundwater samples collected during the field investigation were placed in clean containers and properly labeled with well ID, project name, sampler initials, analyses to be performed, date, and time of collection. Sample information was logged on a chain of custody (COC) and shipped to SiREM Laboratories to be included in batch testing analysis along with soil samples collected at adjacent boreholes. Results for the batch testing has not yet been completed and will be provided in a separate Technical Memorandum.

4.0 CLOSING

Golder appreciates the opportunity to serve as your consultant on this project. If you have any questions concerning this technical memorandum or need additional information, please contact the undersigned

Golder Associates Inc.

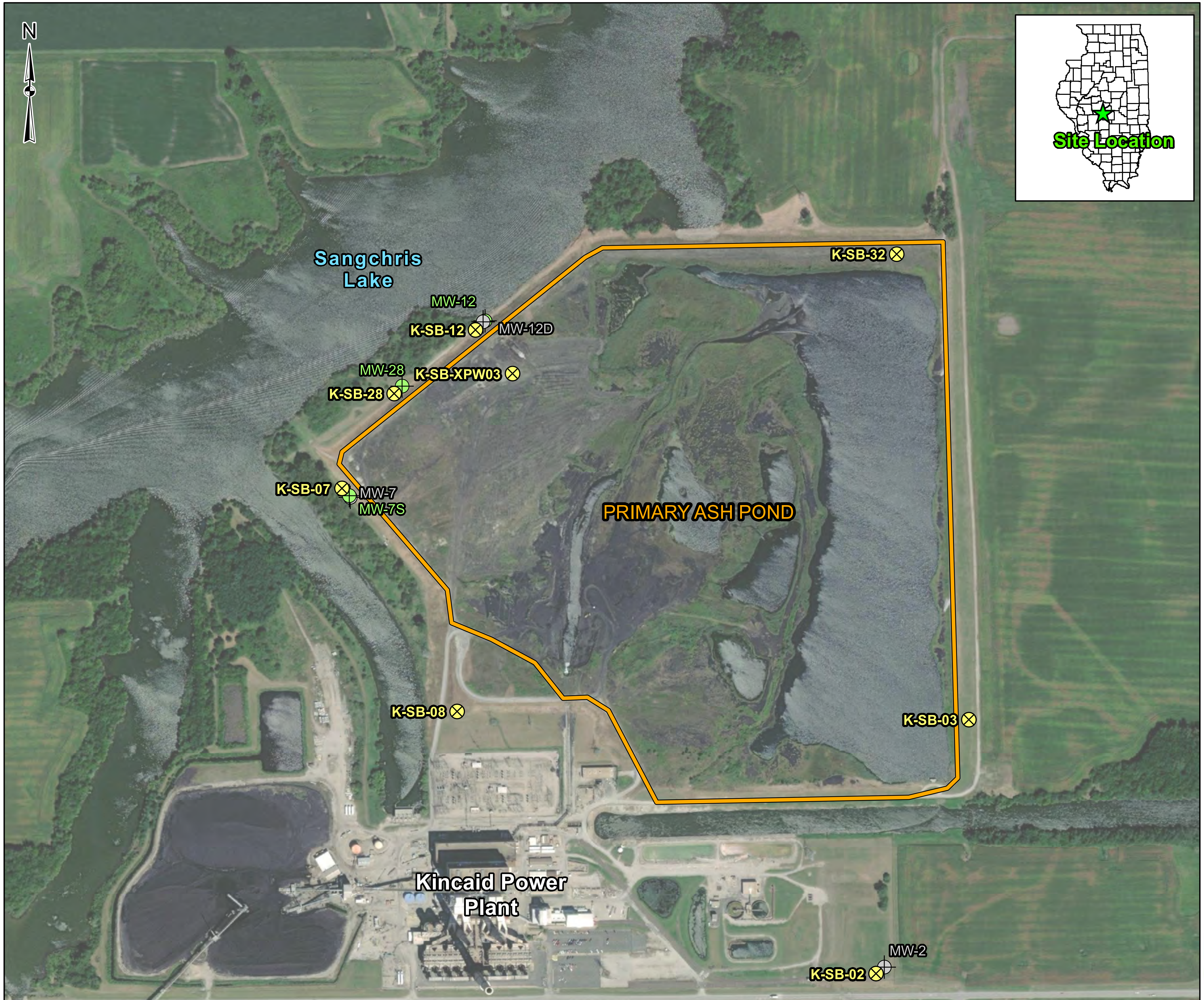
Jeffrey Ingram
Senior Project Geologist

Patrick J. Behling
Principal and Practice Leader

JSI/PJB

Attachments: Figure 1 – Kincaid Power Plant Monitored Natural Attenuation Boring and Groundwater Sample Locations
Appendix A – Soil Boring Logs
Appendix B – Eurofins TestAmerica Laboratory Data

Figures



LEGEND

- Primary Ash
- MNA Soil Boring Locations

Exceedance

- Groundwater Sampling Location - Part 845 Well With Potential Exceedances
- Groundwayer Sampling Location - Part 845 Well With No Potential Exceedances

0 250 500 1,000 1,500 Feet

NOTE(S)

1. SOIL BORING LOCATIONS SURVEYED BY INGENAE ON SEPTEMBER 2, 2021.

REFERENCE(S)

1. RAMBOLL 2021, TABLE 2 SUMMARY OF POTENTIAL EXCEEDANCES.
2. RAMBOLL 2021, GROUNDWATER MONITORING PLAN, PRIMARY ASH POND, KINCAID POWER PLANT, KINCAID, ILLINOIS.

CLIENT
KINCAID GENERATION, LLC.

PROJECT
KINCAID POWER PLANT MNA FEASABILITY STUDY

TITLE
KINCAID POWER PLANT MONITORED NATURAL ATTENUATION BORING AND GROUNDWATER SAMPLE LOCATIONS

CONSULTANT
GOLDER MEMBER OF WSP

YYYY-MM-DD	2021-12-07
DESIGNED	JSI
PREPARED	ETF
REVIEWED	BTT
APPROVED	XXX

PROJECT NO. 21454831

FIGURE 1

APPENDIX A

Soil Boring Logs

RECORD OF BOREHOLE K-SB-02

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,065,502.76 E: 2,487,550.52

ELEVATION: 599
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-1.0) (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, some fine poorly graded sub-rounded gravel, trace roots; dark yellowish brown (10YR 4/2), TOPSOIL; non-cohesive, dry, loose.	ML		598.0 / 1.0				
		(1.0-3.0) (ML) CLAYEY SILT, non-plastic to low plasticity fines, some fine poorly graded sub-rounded sand; dark yellowish brown (10YR 4/2); cohesive, w<PL, stiff.	ML		596.0 / 3.0				
		(3.0-14.7) (CL) SILTY CLAY, low to medium plasticity fines, trace fine sand, trace roots; dark yellowish orange (10YR 6/6); cohesive, w~PL, firm.	CL						
5		(5.0) Same As Above (SAA) except, no roots, soft.			594.0 / 5.0	1	SO	10.0 / 10.0	
10	6" Sonic	(10.0) SAA except, color to yellowish gray (5Y 7/2) and trace gravel.			589.0 / 10.0				(10.0-14.7) Silty clay sample collected at 07:30 - 8/25/2021.
15		(14.7-17.5) (ML) sandy CLAYEY SILT, non-plastic to low plasticity fines, fine poorly graded sub-rounded sand; yellowish gray (5Y 7/2) with dark yellowish orange (10YR 6/6) sand; cohesive, w>PL, firm.	ML		584.3 / 14.7	2	SO	10.0 / 10.0	(14.7-17.5) Sandy clayey silt sample collected at 07:30 - 8/25/2021.
		(17.5-20.0) (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, some fine to coarse gravel, trace low plasticity fines; moderate yellowish brown (10YR 5/4); non-cohesive, moist, very dense.	ML		581.5 / 17.5				
20		END OF BORING AT 20.0 FEET BELOW GROUND SURFACE.			579.0 / 20.0				
25									
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-03

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/26/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,066,852.74 E: 2,488,055.01

ELEVATION: 599.33
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-3.5) FILL - (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand; dark yellowish brown (10YR 2/2) with light gray (N6); non-cohesive, dry, very loose.	ML						
		(2.0) Same As Above (SAA) except, pale yellowish orange (10YR 8/6) and loose.			597.3 / 2.0				
		(3.5-16.0) (ML) CLAYEY SILT, low plasticity fines, some fine poorly graded sub-rounded sand; moderate yellowish brown (10YR 5/4) with light gray (N6) mottling; cohesive, w<PL, soft.	ML		595.8 / 3.5				
5						1	SO	10.0 / 10.0	
10	6" Sonic								
15						2	SO	10.0 / 10.0	
		(16.0-19.0) (ML) sandy CLAYEY SILT, low plasticity fines, fine poorly graded sub-rounded sand; moderate yellowish brown (10YR 5/4) with light gray (N6) mottling; cohesive, w<PL, soft.	ML		583.3 / 16.0				
		(19.0-22.0) (SP) SAND, poorly graded, fine to medium grained poorly graded sub-rounded sand, some non-plastic fines, trace sub-rounded gravel; medium gray (N5); non-cohesive, moist, compact.	SP		580.3 / 19.0				(19.0-20.0) Sand sample collected at 08:15 - 8/26/2021.
20	6" Sonic	(20.0) SAA except, fine grained sand.			579.3 / 20.0				
		(22.0-30.0) (ML) SILT, non-plastic fines, trace low plasticity fines, trace fine sub-rounded sand, trace sub-rounded gravel; medium light gray (N6); non-cohesive, moist, very dense.	ML		577.3 / 22.0				
25						3	SO	10.0 / 10.0	
30					569.3				

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-03

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/26/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,066,852.74 E: 2,488,055.01

ELEVATION: 599.33
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES NUMBER	TYPE	REC / ATT	REMARKS
30		END OF BORING AT 30.0 FEET BELOW GROUND SURFACE.			30.0				
35									
40									
45									
50									
55									
60									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-07

SHEET 1 of 1

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,067,988.05 E: 2,484,747.32

ELEVATION: 595.55
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-7.0) (CL) sandy CLAY, medium to high plasticity fines, fine poorly graded sub-rounded sand; very dusky red (10R 2/2) to dark yellowish orange (10YR 6/6); cohesive, w>PL, firm.	CL		588.6 / 7.0	1	SO	10.0 / 10.0	
7.0		(7.0-10.0) (CL) SILTY CLAY, medium to high plasticity fines, trace fine sub-rounded sand; moderate yellowish brown (10YR 5/4) with light brown (5YR 5/6) mottling; cohesive, w>PL, stiff.	CL		585.6 / 10.0				(7.0-10.0) Silty clay sample collected at 13:10 - 8/25/2021.
10	6" Sonic	(10.0-15.0) (ML) sandy CLAYEY SILT, non-plastic to low plasticity fines, fine poorly graded sub-rounded sand, trace fine sub-rounded gravel; dark yellowish orange (10YR 6/6); cohesive, w<PL, soft	ML		580.6 / 15.0	2	SO	10.0 / 10.0	(10.0-15.0) Sandy clayey silt sample collected at 13:30 - 8/25/2021.
15		(15.0-20.0) (ML) CLAYEY SILT, non-plastic to low plasticity fines, trace fine sub-rounded sand, trace fine sub-rounded gravel; light gray (N6); cohesive, w<PL, hard.	ML		575.6 / 20.0				
20		END OF BORING AT 20.0 FEET BELOW GROUND SURFACE.							
25									
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-08

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/26/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,066,822.75 E: 2,485,322.69

ELEVATION: 599.67
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-0.5) (ML) SILT, non-plastic fines, trace fine sub-rounded sand, trace organics (grass/roots); dark yellowish brown (10YR 4/2), TOPSOIL; non-cohesive, dry, very loose.	ML		599.2 / 0.5	1	SO	10.0 / 10.0	
		(0.5-3.7) (ML) SILT, non-plastic fines, trace fine sub-rounded sand, trace fine sub-rounded gravel; moderate brown (5YR 4/4); non-cohesive, dry, loose.	ML		596.0 / 3.7				
5		(3.7-7.0) (ML) CLAYEY SILT, non-plastic to low plasticity fines, trace fine grained sand; dark yellowish brown (10YR 2/2); cohesive, w<PL, very stiff.	ML		592.7 / 7.0				(4.0-7.0) Clayey silt sample collected at 09:25 - 8/26/2021.
		(7.0-10.0) (CL) SILTY CLAY, low to medium plasticity fines, trace fine sub-rounded sand; light olive brown (5Y 5/6); cohesive, w>PL, stiff.	CL		589.7 / 10.0				
10	6" Sonic	(10.0-14.0) (CL) sandy CLAY, medium to high plasticity fines, fine poorly graded sub-rounded sand, trace sub-rounded gravel; pale yellowish brown (10YR 6/2); cohesive, w>PL, firm.	CL		585.7 / 14.0	2	SO	3.0 / 3.0	(10.0) Due to target depth of hole, drillers use a 3' run to end the hole at the desired total depth.
	6" Sonic					3	SO	10.0 / 10.0	(13.0-17.0) Silty sand sample collected at 09:55 - 8/26/2021.
15		(14.0-17.0) (SM) SILTY SAND, fine poorly graded sub-rounded sand, non-plastic fines, trace fine sub-rounded gravel; moderate yellowish brown (10YR 5/4); non-cohesive, moist, compact.	ML		582.7 / 17.0				
20		(17.0-23.0) (ML) CLAYEY SILT, non-plastic to low plasticity fines, trace fine sub-rounded sand, trace fine sub-rounded gravel; light gray (N6); cohesive, w<PL, hard.	ML		576.7 / 23.0				
25		END OF BORING AT 23.0 FEET BELOW GROUND SURFACE.							
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-12

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,068,919.56 E: 2,485,427.70

ELEVATION: 591.01
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-1.0) (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, fine poorly graded sub-rounded gravel; dark yellowish brown (10YR 4/2), TOPSOIL; non-cohesive, dry, loose.	ML		590.0 / 1.0	1	SO	10.0 / 10.0	
		(1.0-8.0) (SC) CLAYEY SAND, fine to medium poorly graded sub-rounded sand, low to medium plasticity fines, trace fine sub-rounded gravel; dusky brown (5YR 2/2); non-cohesive, moist, compact.	SC		582.5 / 8.5				
5									
		(8.5-10.0) (CL) sandy CLAY, medium to high plasticity fines, fine poorly graded sub-rounded sand; dusky brown (5YR 2/2); cohesive, w<PL, firm.	CL		581.0 / 10.0				
10	6" Sonic	(10.0-13.0) (SC) CLAYEY SAND, fine poorly graded sub-rounded sand, low to medium plasticity fines, trace fine sub-rounded gravel; light brown (5YR 6/4) to grayish yellow (5Y 8/4); non-cohesive, moist, compact.	SC		578.0 / 13.0	2	SO	3.0 / 3.0	(10.0) Due to target depth of hole, drillers use a 3' run to end the hole at the desired total depth.
	6" Sonic	(13.0-17.3) (SM) SILTY SAND, fine poorly graded sub-rounded sand, non-plastic to low plasticity fines, trace fine sub-rounded gravel; light brown (5YR 5/6); non-cohesive, moist, compact.	SM		573.7 / 17.3	3	SO	10.0 / 10.0	(13.0-17.3) Silty sand sample collected at 09:30 - 8/25/2021.
15									
		(17.3-21.0) (SP&SM) SAND AND SILT, fine poorly graded sub-rounded sand, non-plastic fines, trace fine sub-rounded gravel; medium gray (N5); non-cohesive, moist, compact.	SM		570.0 / 21.0				(17.3-21.0) Sand and silt sample collected at 09:30 - 8/25/2021.
20									
		(21.0-23.0) (ML) SILT, non-plastic fines, trace fine sub-rounded grained sand, trace fine sub-rounded gravel; medium gray (N5); non-cohesive, moist, very dense.	ML		568.0 / 23.0				
		END OF BORING AT 23.0 FEET BELOW GROUND SURFACE.							
25									
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-28

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,068,619.51 E: 2,485,021.89

ELEVATION: 598.49
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-5.0) (CL) sandy SILTY CLAY, low to medium plasticity fines, fine poorly graded sub-rounded sand; moderate yellowish brown (10YR 5/4); cohesive, w~PL, soft.	CL		593.5 / 5.0	1	SO	10.0 / 10.0	
5		(5.0-11.0) (CL) SILTY CLAY, low to medium plasticity fines, trace fine poorly graded sub-rounded sand; moderate yellowish brown (10YR 5/4) cohesive, w~PL, firm.	CL		587.5 / 11.0				
10	6" Sonic	(11.0-18.0) (ML) SILT, non-plastic to low plasticity fines, some fine poorly graded sub-rounded sand; moderate yellowish brown (10YR 5/4); non-cohesive, moist, compact.	ML			2	SO	10.0 / 10.0	
		(14.0) Same As Above (SAA) except, stiff.			584.5 / 14.0				
15		(18.0-21.5) (SM) SILTY SAND, poorly graded, fine sand, some non-plastic fines, trace fine gravel; dark yellowish orange (10YR 6/6); non-cohesive, moist, compact.	SM		580.5 / 18.0				(18.0-21.5) Silty sand sample collected at 11:10 - 8/25/2021.
20	6" Sonic	(21.5-25.0) (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, trace gravel; medium gray (N5); non-cohesive, moist, compact.	ML		577.0 / 21.5	3	SO	5.0 / 5.0	
25		END OF BORING AT 25.0 FEET BELOW GROUND SURFACE.			573.5 / 25.0				
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-32

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,069,344.55 E: 2,487,609.44

ELEVATION: 615.91
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
0–10	6" Sonic	(0.0-10.0) CCR - (SM) SILTY SAND, fine poorly graded sub-rounded sand, non-plastic fines; medium dark gray (N4) to black (N1), ASH; non-cohesive, dry, loose.	SM		605.9 / 10.0	1	SO	5.0 / 10.0	(0.0) Poor recovery due to material falling out of core barrel during recovery.
10–17	6" Sonic	(10.0-17.0) (CL) sandy CLAY, medium to high plasticity fines, fine poorly graded sub-rounded sand; light olive gray (5Y 5/2) with light gray (N6) sand; cohesive, w~PL, firm.	CL		598.9 / 17.0	2	SO	10.0 / 10.0	
17–21		(17.0-21.0) (CL) SILTY CLAY, low to medium plasticity fines, trace fine sub-rounded sand; dusky yellowish brown (10YR 2/2); cohesive, w~PL, stiff.	CL		594.9 / 21.0				
21–30	6" Sonic	(21.0-30.0) (CL) SILTY CLAY, medium plasticity fines, trace fine sub-rounded sand; light olive gray (5Y 5/2) and dark yellowish orange (10YR 6/6); cohesive, w~PL, firm.	CL		585.9	3	SO	10.0 / 10.0	

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

RECORD OF BOREHOLE K-SB-32

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/25/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,069,344.55 E: 2,487,609.44

ELEVATION: 615.91
INCLINATION: -90

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	SAMPLES: NUMBER	TYPE	REC / ATT	REMARKS
30	6" Sonic	(30.0-36.0) (CL) sandy SILTY CLAY, medium plasticity fines, fine poorly graded sub-rounded sand, trace gravel; moderate yellowish brown (10YR 5/4); cohesive, w~PL, firm.	CL		30.0 / 579.9	4	SO	10.0 / 10.0	(31.0-36.0) Sandy silty clay sample collected at 15:25 - 8/25/2021.
35		(36.0-40.0) (ML) CLAYEY SILT, non-plastic fines, some fine poorly graded sub-rounded sand, trace fine gravel; light gray (N7); non-cohesive, moist, very dense.	ML		36.0 / 575.9				
40		END OF BORING AT 40.0 FEET BELOW GROUND SURFACE.			40.0				
45									
50									
55									
60									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

RECORD OF BOREHOLE K-SB-XPW03

SHEET 1 of 1

PROJECT: Part 845 MNA Evaluation
PROJECT NUMBER: 21454831
LOCATION: Kincaid Power Plant

DRILLING METHOD: Sonic
DRILLING DATE: 8/26/2021
DRILL RIG: Mini Sonic CC 150

DATUM: N/A
AZIMUTH: N/A
COORDINATES: N: 1,068,727.56 E: 2,485,608.71

ELEVATION: 616
INCLINATION: -90

DEPTH (feet)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION / DEPTH (ft)	NUMBER	TYPE	REC / ATT	REMARKS
0	6" Sonic	(0.0-2.0) CCR - (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, trace fine sub-rounded gravel; black (N1), ASH; non-cohesive, dry, loose.	ML		614.0 / 2.0	1	SO	10.0 / 10.0	
		(2.0-3.5) CCR - (ML) CLAYEY SILT, non-plastic to low plasticity fines, some fine poorly graded sub-rounded sand; light brown (5YR 5/6), ASH; cohesive, w<PL, firm.	ML		612.5 / 3.5				
5		(3.5-10.0) CCR - (ML) sandy SILT, non-plastic fines, fine poorly graded sub-rounded sand, trace fine sub-rounded gravel; black (N1), ASH; non-cohesive, dry, loose.	ML						
		(9.0) Same As Above (SAA) except, moist.			607.0 / 9.0				
10	6" Sonic	(10.0-20.0) CCR - (ML) SILT, non-plastic fines, some fine poorly graded sub-rounded sand, trace fine sub-rounded gravel; black (N1), ASH; non-cohesive, moist, loose.	ML		606.0 / 10.0	2	SO	7.0 / 10.0	(10.0-20.0) CCR material sample collected at 11:10 - 8/26/2021.
15									
20		END OF BORING AT 20.0 FEET BELOW GROUND SURFACE.			596.0 / 20.0				
25									
30									

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade Environmental
DRILLER: D. Gordon

LOGGED: BTT
CHECKED: EMS
REVIEWED:

GOLDER

APPENDIX B

Eurofins TestAmerica Laboratory Data

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-24471-1
Client Project/Site: Kincaid Power Station - Illinois

For:
Golder Associates Inc.
701 Emerson Road
Suite 250
Creve Coeur, Missouri 63141

Attn: Jeffrey Ingram

Authorized for release by:
11/29/2021 3:12:20 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
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*1	LCS/LCSD RPD exceeds control limits.
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: 140-24471-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-24471-1

Receipt
The samples were received on 9/3/2021 at 9:45am and arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.5º 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 ($MgSO_4$), 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 $HCl-HNO_3-H_2O$, 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, HNO_3, HCl and H_3BO_3. 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, HNO_3, HCl and H_3BO_3. 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 = $(C \times V \times V1 \times D) / (W \times S \times V2)$

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: 140-24471-1 (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 serial dilution performed for the following sample associated with batch 140-56350 was outside control limits: (140-24471-A-12-A SD ^10) and (140-24471-A-12-A SD ^25)

Method 6010B: The following samples were diluted due to the nature of the sample matrix: K-SB-02 (10-14.7) (140-24471-1), K-SB-02 (14.7-17.5) (140-24471-2), K-SB-12 (13-17.3) (140-24471-3), K-SB-12 (17.3-21.0) (140-24471-4), K-SB-28 (18-21.5) (140-24471-5), K-SB-07 (7-10) (140-24471-6), K-SB-07 (10-15) (140-24471-7), K-SB-32 (31-36) (140-24471-8), K-SB-03 (19-20) (140-24471-9), K-SB-08 (4-7) (140-24471-10), K-SB-08 (13-17) (140-24471-11) and K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, iron, within the calibration range: K-SB-02 (10-14.7) (140-24471-1) and K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Iron which interferes with Arsenic and Selenium: K-SB-02 (10-14.7) (140-24471-1) and K-SB-XPW03 (10-20) (140-24471-12). 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: K-SB-12 (17.3-21.0) (140-24471-4), K-SB-28 (18-21.5) (140-24471-5) and K-SB-03 (19-20) (140-24471-9). 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: K-SB-07 (7-10) (140-24471-6), K-SB-08 (4-7) (140-24471-10) and K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Aluminum which interferes with Lead: K-SB-07 (7-10) (140-24471-6) and K-SB-XPW03 (10-20) (140-24471-12). 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 samples: K-SB-07 (7-10) (140-24471-6) and K-SB-XPW03 (10-20) (140-24471-12).

Method 6010B SEP: LCSD for the following prep/analytical batch had low recoveries for lead and molybdenum. Recoveries were slightly outside the acceptance limits of 70-120%. LCS met acceptance criteria.

Job ID: 140-24471-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

(LCSD 140-55278/20-B ^5)

Method 6010B SEP: The method blank associated with the following prep/analytical batch was high for iron. The method blank was reanalyzed on 11/12/21 and met acceptance criteria. Contamination of the method blank may have caused the high result for iron.

(MB 140-55232/18-B ^4)

Method 6010B SEP: The method blank for the following prep/analytical batch was high for iron and aluminum. The method blank was reanalyzed on 11/12/21 and met acceptance criteria. Contamination of the method blank may have caused the high iron and aluminum results.

(MB 140-55278/18-B ^3)

Method 6010B SEP: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: K-SB-XPW03 (10-20) (140-24471-12).

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: K-SB-02 (10-14.7) (140-24471-1), K-SB-07 (7-10) (140-24471-6), K-SB-08 (4-7) (140-24471-10), K-SB-08 (13-17) (140-24471-11) and K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B SEP: The following sample was diluted due to the presence of Iron which interferes with Arsenic and Selenium: K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following sample was diluted to bring the concentration of target analyte, iron, within the calibration range: K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following sample was diluted due to the presence of silicon which interferes with Arsenic, Lead and Selenium: K-SB-07 (7-10) (140-24471-6). 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: K-SB-02 (10-14.7) (140-24471-1), K-SB-02 (14.7-17.5) (140-24471-2), K-SB-07 (7-10) (140-24471-6), K-SB-07 (10-15) (140-24471-7), K-SB-32 (31-36) (140-24471-8), K-SB-08 (4-7) (140-24471-10), K-SB-08 (13-17) (140-24471-11) and K-SB-XPW03 (10-20) (140-24471-12). Elevated reporting limits (RLs) are provided.

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: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-24471-1	K-SB-02 (10-14.7)	Solid	08/25/21 07:30	09/03/21 09:45
140-24471-2	K-SB-02 (14.7-17.5)	Solid	08/25/21 07:30	09/03/21 09:45
140-24471-3	K-SB-12 (13-17.3)	Solid	08/25/21 09:30	09/03/21 09:45
140-24471-4	K-SB-12 (17.3-21.0)	Solid	08/25/21 09:30	09/03/21 09:45
140-24471-5	K-SB-28 (18-21.5)	Solid	08/25/21 11:10	09/03/21 09:45
140-24471-6	K-SB-07 (7-10)	Solid	08/25/21 13:10	09/03/21 09:45
140-24471-7	K-SB-07 (10-15)	Solid	08/25/21 13:30	09/03/21 09:45
140-24471-8	K-SB-32 (31-36)	Solid	08/25/21 15:25	09/03/21 09:45
140-24471-9	K-SB-03 (19-20)	Solid	08/26/21 08:15	09/03/21 09:45
140-24471-10	K-SB-08 (4-7)	Solid	08/26/21 09:25	09/03/21 09:45
140-24471-11	K-SB-08 (13-17)	Solid	08/26/21 09:55	09/03/21 09:45
140-24471-12	K-SB-XPW03 (10-20)	Solid	08/26/21 11:10	09/03/21 09:45

Client Sample ID: K-SB-02 (10-14.7)

Lab Sample ID: 140-24471-1
Date Collected: 08/25/21 07:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 80.2

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**45**	**J B**	50	8.0	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Calcium	**1700**	**B**	1200	9.5	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Chromium	ND		2.5	0.35	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Cobalt	ND		12	0.22	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Iron	**49**	**B**	25	14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Lead	ND		2.5	0.55	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Lithium	ND		12	0.75	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Manganese	**0.59**	**J B**	3.7	0.15	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Molybdenum	ND		10	0.41	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4
Selenium	ND		2.5	0.85	mg/Kg	☼	11/03/21 08:00	11/11/21 16:17	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**62**	**B**	37	6.0	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Beryllium	**0.14**	**J B**	0.94	0.060	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Calcium	**880**	**J B**	940	8.2	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Chromium	ND		1.9	0.26	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Cobalt	ND		9.4	0.24	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Iron	**52**	**B**	19	11	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Lead	ND	*-	1.9	0.41	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Lithium	ND		9.4	0.56	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Manganese	**3.1**		2.8	1.0	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Molybdenum	ND	*-	7.5	0.31	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3
Selenium	ND		1.9	0.64	mg/Kg	☼	11/04/21 08:00	11/11/21 18:19	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**340**		12	2.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Arsenic	**0.50**	**J**	0.62	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Beryllium	**0.11**	**J**	0.31	0.019	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Calcium	**6.9**	**J**	310	1.9	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Chromium	**0.15**	**J**	0.62	0.087	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Cobalt	**0.56**	**J**	3.1	0.056	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Iron	**250**		6.2	3.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Lead	**0.67**		0.62	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Lithium	ND		3.1	0.19	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Manganese	**25**	**B**	0.94	0.034	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1
Selenium	ND		0.62	0.21	mg/Kg	☼	11/05/21 08:00	11/12/21 16:03	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3400**		12	2.0	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Arsenic	**2.4**	**B**	0.62	0.27	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Beryllium	**0.36**		0.31	0.020	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Calcium	**910**		310	2.7	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Chromium	**5.7**		0.62	0.087	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1

Client Sample ID: K-SB-02 (10-14.7)
Date Collected: 08/25/21 07:30
Date Received: 09/03/21 09:45

Lab Sample ID: 140-24471-1
Matrix: Solid
Percent Solids: 80.2

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**2.9**	**J**	3.1	0.066	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Iron	**9500**		6.2	3.6	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Lead	**6.7**		0.62	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Lithium	**3.7**		3.1	0.19	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Manganese	**78**		0.94	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Molybdenum	**0.17**	**J**	2.5	0.10	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1
Selenium	**1.3**		0.62	0.59	mg/Kg	☼	11/08/21 08:00	11/16/21 12:09	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		190	29	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Arsenic	ND		9.4	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Beryllium	ND		4.7	0.39	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Calcium	**170**	**J B**	4700	14	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Chromium	**4.1**	**J**	9.4	1.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Cobalt	ND		47	0.75	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Iron	ND		94	55	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Lead	ND		9.4	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Lithium	**6.3**	**J B**	47	2.7	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Manganese	**3.6**	**J *1**	14	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Molybdenum	ND		37	1.6	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5
Selenium	ND		9.4	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:11	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11000**		12	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Arsenic	**1.9**		0.62	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Beryllium	**0.21**	**J**	0.31	0.015	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Calcium	**210**	**J**	310	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Chromium	**10**		0.62	0.087	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Cobalt	**2.2**	**J**	3.1	0.057	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Iron	**10000**		6.2	3.6	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Lead	**3.2**		0.62	0.14	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Lithium	**7.1**		3.1	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Manganese	**45**		0.94	0.31	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1
Selenium	**0.88**		0.62	0.21	mg/Kg	☼	11/10/21 08:00	11/16/21 16:15	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**22000**		120	20	mg/Kg	☼	11/11/21 08:00	11/20/21 11:26	10
Arsenic	**0.96**		0.62	0.16	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Beryllium	**0.22**	**J**	0.31	0.020	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Calcium	**1200**		310	3.2	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Chromium	**17**		0.62	0.087	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Cobalt	**1.1**	**J**	6.2	0.065	mg/Kg	☼	11/11/21 08:00	11/20/21 15:13	2
Iron	**5200**		6.2	5.1	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Lead	**4.6**		1.2	0.27	mg/Kg	☼	11/11/21 08:00	11/20/21 15:13	2
Lithium	**14**		3.1	0.19	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Manganese	**44**		0.94	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1

Client Sample ID: K-SB-02 (10-14.7)

Lab Sample ID: 140-24471-1

Date Collected: 08/25/21 07:30 **Matrix: Solid**

Date Received: 09/03/21 09:45 **Percent Solids: 80.2**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1
Selenium	**0.34**	**J**	0.62	0.21	mg/Kg	☼	11/11/21 08:00	11/20/21 13:11	1

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			11/29/21 12:35	1
Arsenic	**5.7**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**1.0**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**5000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**37**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**6.8**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**25000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**15**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**31**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**200**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	**0.17**	**J**	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**2.5**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**46000**		120	20	mg/Kg	☼	10/28/21 08:00	11/24/21 10:53	10
Arsenic	**9.5**		1.2	0.32	mg/Kg	☼	10/28/21 08:00	11/24/21 14:03	2
Beryllium	**1.1**		0.31	0.020	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Calcium	**5400**		3100	32	mg/Kg	☼	10/28/21 08:00	11/24/21 10:53	10
Chromium	**30**		0.62	0.087	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Cobalt	**10**		3.1	0.032	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Iron	**36000**		12	10	mg/Kg	☼	10/28/21 08:00	11/24/21 14:03	2
Lead	**17**		0.62	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Lithium	**22**		3.1	0.19	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Manganese	**480**		0.94	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Molybdenum	**0.80**	**J**	2.5	0.10	mg/Kg	☼	10/28/21 08:00	11/24/21 12:05	1
Selenium	**2.9**		1.2	0.42	mg/Kg	☼	10/28/21 08:00	11/24/21 14:03	2

Client Sample ID: K-SB-02 (14.7-17.5)
Lab Sample ID: 140-24471-2
Date Collected: 08/25/21 07:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 86.4

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	53	B	46	7.4	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Arsenic	ND		2.3	0.60	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Beryllium	ND		1.2	0.36	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Calcium	1200	B	1200	8.8	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Chromium	0.41	J	2.3	0.32	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Cobalt	ND		12	0.21	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Iron	56	B	23	13	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Lead	ND		2.3	0.51	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Lithium	ND		12	0.69	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Manganese	2.4	J B	3.5	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Molybdenum	ND		9.3	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4
Selenium	ND		2.3	0.79	mg/Kg	☼	11/03/21 08:00	11/11/21 16:22	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	61	B	35	5.6	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Arsenic	ND		1.7	0.45	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Beryllium	0.12	J B	0.87	0.056	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Calcium	5900	B	870	7.6	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Chromium	ND		1.7	0.24	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Cobalt	ND		8.7	0.22	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Iron	53	B	17	10	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Lead	1.4	J *-	1.7	0.38	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Lithium	ND		8.7	0.52	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Manganese	81		2.6	0.97	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Molybdenum	ND	*-	6.9	0.28	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3
Selenium	ND		1.7	0.59	mg/Kg	☼	11/04/21 08:00	11/11/21 18:24	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	120		12	2.4	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Arsenic	0.28	J	0.58	0.15	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Beryllium	0.037	J	0.29	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Calcium	8.5	J	290	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Chromium	0.32	J	0.58	0.081	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Cobalt	0.85	J	2.9	0.052	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Iron	270		5.8	3.4	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Lead	ND		0.58	0.13	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Lithium	0.17	J	2.9	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Manganese	60	B	0.87	0.031	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Molybdenum	ND		2.3	0.095	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1
Selenium	ND		0.58	0.20	mg/Kg	☼	11/05/21 08:00	11/12/21 16:08	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		12	1.9	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Arsenic	1.9	B	0.58	0.25	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Beryllium	0.18	J	0.29	0.019	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Calcium	8300		290	2.5	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Chromium	2.7		0.58	0.081	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1

Client Sample ID: K-SB-02 (14.7-17.5) Lab Sample ID: 140-24471-2

Date Collected: 08/25/21 07:30 Matrix: Solid
Date Received: 09/03/21 09:45 Percent Solids: 86.4

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.4	J	2.9	0.061	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Iron	4800		5.8	3.4	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Lead	5.6		0.58	0.13	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Lithium	1.2	J	2.9	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Manganese	85		0.87	0.15	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Molybdenum	0.20	J	2.3	0.095	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1
Selenium	0.65		0.58	0.54	mg/Kg	☼	11/08/21 08:00	11/16/21 12:14	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	200		170	27	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Arsenic	ND		8.7	2.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Beryllium	ND		4.3	0.36	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Calcium	7800	B	4300	13	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Chromium	2.4	J	8.7	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Cobalt	ND		43	0.69	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Iron	ND		87	51	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Lead	ND		8.7	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Lithium	5.4	J B	43	2.5	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Manganese	6.3	J *1	13	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Molybdenum	ND		35	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5
Selenium	ND		8.7	3.0	mg/Kg	☼	11/10/21 08:00	11/16/21 14:16	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5400		12	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Arsenic	1.6		0.58	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Beryllium	0.12	J	0.29	0.014	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Calcium	3100		290	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Chromium	7.2		0.58	0.081	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Cobalt	1.6	J	2.9	0.053	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Iron	5800		5.8	3.4	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Lead	3.2		0.58	0.13	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Lithium	5.0		2.9	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Manganese	54		0.87	0.29	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Molybdenum	ND		2.3	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1
Selenium	0.41	J	0.58	0.20	mg/Kg	☼	11/10/21 08:00	11/16/21 16:20	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	15000		12	1.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Arsenic	0.87		0.58	0.15	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Beryllium	0.26	J	0.29	0.019	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Calcium	1200		290	3.0	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Chromium	15		0.58	0.081	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Cobalt	0.90	J	5.8	0.060	mg/Kg	☼	11/11/21 08:00	11/20/21 15:18	2
Iron	4200		5.8	4.7	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Lead	4.7		1.2	0.25	mg/Kg	☼	11/11/21 08:00	11/20/21 15:18	2
Lithium	9.9		2.9	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Manganese	48		0.87	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1

Client Sample ID: K-SB-02 (14.7-17.5)
Lab Sample ID: 140-24471-2
Date Collected: 08/25/21 07:30 — Matrix: Solid
Date Received: 09/03/21 09:45 — Percent Solids: 86.4

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.3	0.095	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1
Selenium	ND		0.58	0.20	mg/Kg	☼	11/11/21 08:00	11/20/21 13:16	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	4.7		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	0.72		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	28000		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	28		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	4.7		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	15000		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	15		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	22		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	340		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	0.20	J	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	1.1		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	24000		120	19	mg/Kg	☼	10/28/21 08:00	11/24/21 10:58	10
Arsenic	3.2		0.58	0.15	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Beryllium	0.50		0.29	0.019	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Calcium	33000		2900	30	mg/Kg	☼	10/28/21 08:00	11/24/21 10:58	10
Chromium	19		0.58	0.081	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Cobalt	3.3		2.9	0.030	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Iron	12000		5.8	4.7	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Lead	12		0.58	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Lithium	13		2.9	0.17	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Manganese	280		0.87	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Molybdenum	0.39	J	2.3	0.095	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1
Selenium	0.55	J	0.58	0.20	mg/Kg	☼	10/28/21 08:00	11/24/21 12:10	1

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-12 (13-17.3) **Lab Sample ID: 140-24471-3**
Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 86.3**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40**	**J B**	46	7.4	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Arsenic	ND		2.3	0.60	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Beryllium	ND		1.2	0.36	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Calcium	**1000**	**J B**	1200	8.8	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Chromium	ND		2.3	0.32	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Cobalt	ND		12	0.21	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Iron	**54**	**B**	23	13	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Lead	ND		2.3	0.51	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Lithium	ND		12	0.70	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Manganese	**0.64**	**J B**	3.5	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Molybdenum	ND		9.3	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4
Selenium	ND		2.3	0.79	mg/Kg	☼	11/03/21 08:00	11/11/21 16:27	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**64**	**B**	35	5.6	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Arsenic	ND		1.7	0.45	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Beryllium	**0.11**	**J B**	0.87	0.056	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Calcium	**7900**	**B**	870	7.7	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Chromium	**0.93**	**J**	1.7	0.24	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Cobalt	ND		8.7	0.22	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Iron	**92**	**B**	17	10	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Lead	ND	*-	1.7	0.38	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Lithium	ND		8.7	0.52	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Manganese	**49**		2.6	0.97	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Molybdenum	ND	*-	7.0	0.29	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3
Selenium	ND		1.7	0.59	mg/Kg	☼	11/04/21 08:00	11/11/21 18:29	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**62**		12	2.4	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Arsenic	**0.22**	**J**	0.58	0.15	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Beryllium	ND		0.29	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Calcium	**8.9**	**J**	290	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Chromium	**0.21**	**J**	0.58	0.081	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Cobalt	**1.6**	**J**	2.9	0.052	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Iron	**210**		5.8	3.4	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Lead	ND		0.58	0.13	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Lithium	**0.20**	**J**	2.9	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Manganese	**190**	**B**	0.87	0.031	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Molybdenum	ND		2.3	0.095	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1
Selenium	**0.24**	**J**	0.58	0.20	mg/Kg	☼	11/05/21 08:00	11/12/21 16:13	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**610**		12	1.9	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Arsenic	**1.8**	**B**	0.58	0.26	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Beryllium	**0.12**	**J**	0.29	0.019	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Calcium	**12000**		290	2.6	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Chromium	**2.0**		0.58	0.081	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1

Client Sample ID: K-SB-12 (13-17.3)

Lab Sample ID: 140-24471-3

Date Collected: 08/25/21 09:30
Date Received: 09/03/21 09:45

Matrix: Solid
Percent Solids: 86.3

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.99	J	2.9	0.061	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Iron	4700		5.8	3.4	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Lead	5.0		0.58	0.13	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Lithium	0.99	J	2.9	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Manganese	100		0.87	0.15	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Molybdenum	0.18	J	2.3	0.095	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1
Selenium	0.74		0.58	0.54	mg/Kg	☼	11/08/21 08:00	11/16/21 12:19	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	230		170	27	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Arsenic	ND		8.7	2.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Beryllium	ND		4.3	0.37	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Calcium	9000	B	4300	13	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Chromium	2.7	J	8.7	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Cobalt	ND		43	0.70	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Iron	ND		87	51	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Lead	ND		8.7	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Lithium	5.8	J B	43	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Manganese	7.4	J *1	13	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Molybdenum	ND		35	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5
Selenium	ND		8.7	3.0	mg/Kg	☼	11/10/21 08:00	11/16/21 14:21	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4200		12	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Arsenic	3.7		0.58	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Beryllium	0.15	J	0.29	0.014	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Calcium	5000		290	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Chromium	8.2		0.58	0.081	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Cobalt	2.3	J	2.9	0.053	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Iron	7900		5.8	3.4	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Lead	3.3		0.58	0.13	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Lithium	6.3		2.9	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Manganese	73		0.87	0.29	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Molybdenum	0.19	J	2.3	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1
Selenium	0.72		0.58	0.20	mg/Kg	☼	11/10/21 08:00	11/16/21 16:25	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	18000		12	1.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Arsenic	1.0		0.58	0.15	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Beryllium	0.36		0.29	0.019	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Calcium	1500		290	3.0	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Chromium	14		0.58	0.081	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Cobalt	0.57	J	2.9	0.030	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Iron	4000		5.8	4.8	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Lead	3.2		0.58	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Lithium	10		2.9	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Manganese	31		0.87	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1

Client Sample ID: K-SB-12 (13-17.3)

Lab Sample ID: 140-24471-3

Date Collected: 08/25/21 09:30

Matrix: Solid

Date Received: 09/03/21 09:45

Percent Solids: 86.3

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.12	J	2.3	0.095	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1
Selenium	ND		0.58	0.20	mg/Kg	☼	11/11/21 08:00	11/20/21 13:21	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23000		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	6.7		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	0.73		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	37000		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	28		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	5.5		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	17000		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	12		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	24		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	450		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	0.49	J	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	1.7		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	31000		120	19	mg/Kg	☼	10/28/21 08:00	11/24/21 11:02	10
Arsenic	4.9		0.58	0.15	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Beryllium	0.57		0.29	0.019	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Calcium	55000		2900	30	mg/Kg	☼	10/28/21 08:00	11/24/21 11:02	10
Chromium	19		0.58	0.081	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Cobalt	3.9		2.9	0.030	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Iron	13000		5.8	4.8	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Lead	9.7		0.58	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Lithium	15		2.9	0.17	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Manganese	360		0.87	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Molybdenum	0.38	J	2.3	0.095	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1
Selenium	0.39	J	0.58	0.20	mg/Kg	☼	10/28/21 08:00	11/24/21 12:25	1

Client Sample Results

Client: Golder Associates Inc.　　　　Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-12 (17.3-21.0)　　**Lab Sample ID: 140-24471-4**
Date Collected: 08/25/21 09:30　　**Matrix: Solid**
Date Received: 09/03/21 09:45　　**Percent Solids: 90.0**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41**	**J B**	44	7.1	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Arsenic	ND		2.2	0.58	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Beryllium	ND		1.1	0.34	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Calcium	**770**	**J B**	1100	8.4	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Chromium	ND		2.2	0.31	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Cobalt	ND		11	0.20	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Iron	**45**	**B**	22	13	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Lead	ND		2.2	0.49	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Lithium	ND		11	0.67	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Manganese	**9.3**	**B**	3.3	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Molybdenum	ND		8.9	0.36	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4
Selenium	ND		2.2	0.76	mg/Kg	☼	11/03/21 08:00	11/11/21 16:32	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**63**	**B**	33	5.3	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Arsenic	ND		1.7	0.43	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Beryllium	**0.10**	**J B**	0.83	0.053	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Calcium	**14000**	**B**	830	7.3	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Chromium	**0.36**	**J**	1.7	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Cobalt	**0.54**	**J**	8.3	0.21	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Iron	**210**	**B**	17	9.7	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Lead	**0.54**	**J *-**	1.7	0.37	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Lithium	ND		8.3	0.50	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Manganese	**62**		2.5	0.93	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Molybdenum	ND	*-	6.7	0.27	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3
Selenium	ND		1.7	0.57	mg/Kg	☼	11/04/21 08:00	11/11/21 18:34	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**45**		11	2.3	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Arsenic	**0.66**		0.56	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Beryllium	ND		0.28	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Calcium	**7.6**	**J**	280	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Chromium	**0.34**	**J**	0.56	0.078	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Cobalt	**0.35**	**J**	2.8	0.050	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Iron	**1000**		5.6	3.2	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Lead	ND		0.56	0.12	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Lithium	ND		2.8	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Manganese	**31**	**B**	0.83	0.030	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Molybdenum	**0.22**	**J**	2.2	0.091	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1
Selenium	**0.25**	**J**	0.56	0.19	mg/Kg	☼	11/05/21 08:00	11/12/21 16:18	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**280**		11	1.8	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Arsenic	**0.56**	**B**	0.56	0.24	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Beryllium	**0.063**	**J**	0.28	0.018	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Calcium	**19000**		280	2.4	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Chromium	**1.1**		0.56	0.078	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-12 (17.3-21.0) Lab Sample ID: 140-24471-4
Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 90.0**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**0.60**	**J**	2.8	0.059	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Iron	**2900**		5.6	3.2	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Lead	**2.5**		0.56	0.12	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Lithium	**1.3**	**J**	2.8	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Manganese	**120**		0.83	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Molybdenum	**0.18**	**J**	2.2	0.091	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1
Selenium	ND		0.56	0.52	mg/Kg	☼	11/08/21 08:00	11/16/21 12:24	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**110**	**J**	170	26	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Arsenic	ND		8.3	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Beryllium	ND		4.2	0.35	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Calcium	**11000**	**B**	4200	12	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Chromium	**1.3**	**J**	8.3	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Cobalt	ND		42	0.67	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Iron	ND		83	49	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Lead	ND		8.3	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Lithium	**6.0**	**J B**	42	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Manganese	**17**	***1**	13	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Molybdenum	ND		33	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5
Selenium	ND		8.3	2.9	mg/Kg	☼	11/10/21 08:00	11/16/21 14:26	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2300**		11	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Arsenic	**1.9**		0.56	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Beryllium	**0.11**	**J**	0.28	0.013	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Calcium	**5700**		280	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Chromium	**4.5**		0.56	0.078	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Cobalt	**2.1**	**J**	2.8	0.051	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Iron	**5700**		5.6	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Lead	**4.0**		0.56	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Lithium	**5.0**		2.8	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Manganese	**46**		0.83	0.28	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Molybdenum	**0.26**	**J**	2.2	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1
Selenium	**0.40**	**J**	0.56	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 16:29	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**13000**		11	1.8	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Arsenic	**0.64**		0.56	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Beryllium	**0.40**		0.28	0.018	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Calcium	**1100**		280	2.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Chromium	**14**		0.56	0.078	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Cobalt	**0.49**	**J**	2.8	0.029	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Iron	**3200**		5.6	4.6	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Lead	**4.2**		0.56	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Lithium	**8.3**		2.8	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Manganese	**35**		0.83	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1

Client Sample ID: K-SB-12 (17.3-21.0)

Lab Sample ID: 140-24471-4
Date Collected: 08/25/21 09:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 90.0

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.11	J	2.2	0.091	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1
Selenium	ND		0.56	0.19	mg/Kg	☼	11/11/21 08:00	11/20/21 13:26	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	3.8		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	0.68		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	52000		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	21		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	4.1		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	13000		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	11		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	21		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	320		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	0.77	J	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	0.65		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23000		110	18	mg/Kg	☼	10/28/21 08:00	11/24/21 11:07	10
Arsenic	4.0		1.1	0.29	mg/Kg	☼	10/28/21 08:00	11/24/21 14:08	2
Beryllium	0.48		0.28	0.018	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Calcium	50000		2800	29	mg/Kg	☼	10/28/21 08:00	11/24/21 11:07	10
Chromium	16		0.56	0.078	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Cobalt	3.3		2.8	0.029	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Iron	11000		5.6	4.6	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Lead	8.8		1.1	0.24	mg/Kg	☼	10/28/21 08:00	11/24/21 14:08	2
Lithium	12		2.8	0.17	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Manganese	310		0.83	0.12	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Molybdenum	1.3	J	2.2	0.091	mg/Kg	☼	10/28/21 08:00	11/24/21 12:30	1
Selenium	ND		1.1	0.38	mg/Kg	☼	10/28/21 08:00	11/24/21 14:08	2

Client Sample ID: K-SB-28 (18-21.5) Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 92.0**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	130	B	43	7.0	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Arsenic	ND		2.2	0.57	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Beryllium	ND		1.1	0.33	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Calcium	880	J B	1100	8.3	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Chromium	0.45	J	2.2	0.30	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Cobalt	0.24	J	11	0.20	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Iron	120	B	22	13	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Lead	ND		2.2	0.48	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Lithium	ND		11	0.65	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Manganese	1.2	J B	3.3	0.13	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Molybdenum	ND		8.7	0.36	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4
Selenium	ND		2.2	0.74	mg/Kg	☼	11/03/21 08:00	11/11/21 16:36	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	55	B	33	5.2	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Beryllium	0.086	J B	0.82	0.052	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Calcium	13000	B	820	7.2	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Chromium	ND		1.6	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Cobalt	ND		8.2	0.21	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Iron	78	B	16	9.5	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Lead	0.51	J *-	1.6	0.36	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Lithium	ND		8.2	0.49	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Manganese	48		2.4	0.91	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Molybdenum	ND	*-	6.5	0.27	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3
Selenium	ND		1.6	0.55	mg/Kg	☼	11/04/21 08:00	11/11/21 18:39	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26		11	2.3	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Arsenic	0.17	J	0.54	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Beryllium	ND		0.27	0.016	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Calcium	7.9	J	270	1.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Chromium	0.15	J	0.54	0.076	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Cobalt	0.94	J	2.7	0.049	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Iron	150		5.4	3.2	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Lead	ND		0.54	0.12	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Lithium	ND		2.7	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Manganese	86	B	0.82	0.029	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Molybdenum	ND		2.2	0.089	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1
Selenium	ND		0.54	0.18	mg/Kg	☼	11/05/21 08:00	11/12/21 16:23	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180		11	1.7	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Arsenic	0.81	B	0.54	0.24	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Beryllium	0.021	J	0.27	0.017	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Calcium	27000		270	2.4	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Chromium	0.90		0.54	0.076	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1

Client Sample ID: K-SB-28 (18-21.5)

Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10
Date Received: 09/03/21 09:45

Matrix: Solid
Percent Solids: 92.0

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.21	J	2.7	0.058	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Iron	2200		5.4	3.2	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Lead	3.7		0.54	0.12	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Lithium	0.59	J	2.7	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Manganese	100		0.82	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Molybdenum	ND		2.2	0.089	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1
Selenium	ND		0.54	0.51	mg/Kg	☼	11/08/21 08:00	11/16/21 12:29	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	76	J	160	26	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Arsenic	ND		8.2	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Beryllium	ND		4.1	0.34	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Calcium	10000	B	4100	12	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Chromium	1.8	J	8.2	1.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Cobalt	ND		41	0.65	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Iron	ND		82	48	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Lead	ND		8.2	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Lithium	7.0	J B	41	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Manganese	4.9	J *1	12	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Molybdenum	ND		33	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5
Selenium	ND		8.2	2.8	mg/Kg	☼	11/10/21 08:00	11/16/21 14:31	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1600		11	1.7	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Arsenic	1.8		0.54	0.16	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Beryllium	0.062	J	0.27	0.013	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Calcium	8600		270	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Chromium	3.8		0.54	0.076	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Cobalt	1.0	J	2.7	0.050	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Iron	4500		5.4	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Lead	1.9		0.54	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Lithium	3.2		2.7	0.16	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Manganese	40		0.82	0.27	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Molybdenum	ND		2.2	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1
Selenium	0.34	J	0.54	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 16:34	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	19000		11	1.7	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Arsenic	0.49	J	0.54	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Beryllium	0.29		0.27	0.017	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Calcium	2500		270	2.8	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Chromium	9.6		0.54	0.076	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Cobalt	0.42	J	2.7	0.028	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Iron	3200		5.4	4.5	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Lead	3.7		0.54	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Lithium	6.4		2.7	0.16	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Manganese	42		0.82	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1

Client Sample ID: K-SB-28 (18-21.5)
Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 92.0**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.2	0.089	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1
Selenium	ND		0.54	0.18	mg/Kg	☼	11/11/21 08:00	11/20/21 13:31	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**21000**		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	**3.3**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**0.46**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**62000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**17**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**2.8**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**10000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**9.8**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**17**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**320**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	ND		2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**0.34**	**J**	0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14000**		110	17	mg/Kg	☼	10/28/21 08:00	11/24/21 11:12	10
Arsenic	**3.2**		1.1	0.28	mg/Kg	☼	10/28/21 08:00	11/24/21 14:14	2
Beryllium	**0.30**		0.27	0.017	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Calcium	**68000**		2700	28	mg/Kg	☼	10/28/21 08:00	11/24/21 11:12	10
Chromium	**11**		0.54	0.076	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Cobalt	**2.5**	**J**	2.7	0.028	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Iron	**9100**		5.4	4.5	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Lead	**11**		1.1	0.24	mg/Kg	☼	10/28/21 08:00	11/24/21 14:14	2
Lithium	**9.4**		2.7	0.16	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Manganese	**370**		0.82	0.12	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Molybdenum	**0.30**	**J**	2.2	0.089	mg/Kg	☼	10/28/21 08:00	11/24/21 12:35	1
Selenium	ND		1.1	0.37	mg/Kg	☼	10/28/21 08:00	11/24/21 14:14	2

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-07 (7-10)

Lab Sample ID: 140-24471-6

Date Collected: 08/25/21 13:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**51**	**B**	49	7.8	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Arsenic	ND		2.4	0.63	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Calcium	**1700**	**B**	1200	9.3	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Chromium	ND		2.4	0.34	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Cobalt	ND		12	0.22	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Iron	**57**	**B**	24	14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Lead	ND		2.4	0.54	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Lithium	ND		12	0.73	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Manganese	**88**	**B**	3.7	0.15	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Molybdenum	ND		9.8	0.40	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4
Selenium	ND		2.4	0.83	mg/Kg	☼	11/03/21 08:00	11/11/21 16:41	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**72**	**B**	37	5.9	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Arsenic	ND		1.8	0.48	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Beryllium	**0.20**	**J B**	0.92	0.059	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Calcium	**950**	**B**	920	8.1	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Chromium	ND		1.8	0.26	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Cobalt	ND		9.2	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Iron	**79**	**B**	18	11	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Lead	**0.72**	**J *-**	1.8	0.40	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Lithium	ND		9.2	0.55	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Manganese	**87**		2.7	1.0	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Molybdenum	ND	*-	7.3	0.30	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3
Selenium	ND		1.8	0.62	mg/Kg	☼	11/04/21 08:00	11/11/21 18:44	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**330**		12	2.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Arsenic	**0.51**	**J**	0.61	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Beryllium	**0.16**	**J**	0.31	0.018	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Calcium	**9.2**	**J**	310	1.8	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Chromium	**0.29**	**J**	0.61	0.085	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Cobalt	**0.76**	**J**	3.1	0.055	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Iron	**470**		6.1	3.5	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Lead	**0.97**		0.61	0.13	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Lithium	ND		3.1	0.18	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Manganese	**74**	**B**	0.92	0.033	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Molybdenum	ND		2.4	0.10	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1
Selenium	ND		0.61	0.21	mg/Kg	☼	11/05/21 08:00	11/12/21 16:28	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3600**		12	2.0	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Arsenic	**2.4**	**B**	0.61	0.27	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Beryllium	**0.36**		0.31	0.020	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Calcium	**500**		310	2.7	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Chromium	**6.6**		0.61	0.085	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1

Client Sample ID: K-SB-07 (7-10) Lab Sample ID: 140-24471-6
Date Collected: 08/25/21 13:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**3.3**		3.1	0.065	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Iron	**7000**		6.1	3.5	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Lead	**6.2**		0.61	0.13	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Lithium	**2.6**	**J**	3.1	0.18	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Manganese	**110**		0.92	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Molybdenum	ND		2.4	0.10	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1
Selenium	**1.1**		0.61	0.57	mg/Kg	☼	11/08/21 08:00	11/16/21 12:34	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		180	29	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Arsenic	ND		9.2	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Beryllium	ND		4.6	0.38	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Calcium	**130**	**J B**	4600	13	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Chromium	**4.8**	**J**	9.2	1.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Cobalt	ND		46	0.73	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Iron	ND		92	54	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Lead	ND		9.2	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Lithium	**5.9**	**J B**	46	2.7	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Manganese	**12**	**J *1**	14	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Molybdenum	ND		37	1.5	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5
Selenium	ND		9.2	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:36	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11000**		12	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Arsenic	**2.0**		0.61	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Beryllium	**0.21**	**J**	0.31	0.015	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Calcium	**180**	**J**	310	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Chromium	**11**		0.61	0.085	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Cobalt	**1.8**	**J**	3.1	0.056	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Iron	**8700**		6.1	3.5	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Lead	**3.0**		0.61	0.13	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Lithium	**6.4**		3.1	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Manganese	**42**		0.92	0.31	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1
Selenium	**0.78**		0.61	0.21	mg/Kg	☼	11/10/21 08:00	11/16/21 16:49	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26000**		120	20	mg/Kg	☼	11/11/21 08:00	11/20/21 11:50	10
Arsenic	**0.99**	**J**	1.2	0.32	mg/Kg	☼	11/11/21 08:00	11/20/21 15:23	2
Beryllium	**0.12**	**J**	0.31	0.020	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Calcium	**1500**		310	3.2	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Chromium	**16**		0.61	0.085	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Cobalt	**0.71**	**J**	6.1	0.063	mg/Kg	☼	11/11/21 08:00	11/20/21 15:23	2
Iron	**5000**		6.1	5.0	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Lead	**4.0**		1.2	0.27	mg/Kg	☼	11/11/21 08:00	11/20/21 15:23	2
Lithium	**13**		3.1	0.18	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Manganese	**46**		0.92	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1

Client Sample ID: K-SB-07 (7-10) **Lab Sample ID: 140-24471-6**
Date Collected: 08/25/21 13:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.9**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.4	0.10	mg/Kg	☼	11/11/21 08:00	11/20/21 13:36	1
Selenium	ND		1.2	0.42	mg/Kg	☼	11/11/21 08:00	11/20/21 15:23	2

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41000**		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	**5.9**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**1.0**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**5000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**39**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**6.6**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**21000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**15**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**27**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**460**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	ND		2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**1.9**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**57000**		120	20	mg/Kg	☼	10/28/21 08:00	11/24/21 11:26	10
Arsenic	**5.5**		1.2	0.32	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Beryllium	**0.91**		0.31	0.020	mg/Kg	☼	10/28/21 08:00	11/24/21 12:41	1
Calcium	**5800**		3100	32	mg/Kg	☼	10/28/21 08:00	11/24/21 11:26	10
Chromium	**35**		0.61	0.085	mg/Kg	☼	10/28/21 08:00	11/24/21 12:41	1
Cobalt	**6.8**		6.1	0.063	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Iron	**22000**		12	10	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Lead	**16**		1.2	0.27	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Lithium	**23**		6.1	0.37	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Manganese	**400**		0.92	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:41	1
Molybdenum	**0.25**	**J**	4.9	0.20	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2
Selenium	**1.6**		1.2	0.42	mg/Kg	☼	10/28/21 08:00	11/24/21 14:19	2

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-07 (10-15) Lab Sample ID: 140-24471-7
Date Collected: 08/25/21 13:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 83.8**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40**	**J B**	48	7.6	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Calcium	**1200**	**B**	1200	9.1	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Chromium	ND		2.4	0.33	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Cobalt	ND		12	0.21	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Iron	**48**	**B**	24	14	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Lead	ND		2.4	0.53	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Lithium	ND		12	0.72	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Manganese	**0.50**	**J B**	3.6	0.15	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Molybdenum	ND		9.5	0.39	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4
Selenium	ND		2.4	0.81	mg/Kg	☼	11/03/21 08:00	11/11/21 16:46	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**66**	**B**	36	5.7	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Arsenic	ND		1.8	0.47	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Beryllium	**0.13**	**J B**	0.90	0.057	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Calcium	**780**	**J B**	900	7.9	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Chromium	ND		1.8	0.25	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Cobalt	ND		9.0	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Iron	**52**	**B**	18	10	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Lead	ND	*-	1.8	0.39	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Lithium	ND		9.0	0.54	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Manganese	**4.9**		2.7	1.0	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Molybdenum	ND	*-	7.2	0.29	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	3
Selenium	ND		1.8	0.61	mg/Kg	☼	11/04/21 08:00	11/11/21 18:58	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	☼	11/05/21 08:00	11/12/21 16:33	1
Arsenic	**0.66**		0.60	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Beryllium	**0.065**	**J**	0.30	0.018	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Calcium	**5.3**	**J**	300	1.8	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Chromium	**0.17**	**J**	0.60	0.084	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Cobalt	**1.9**	**J**	3.0	0.054	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Iron	**210**		6.0	3.5	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Lead	**0.44**	**J**	0.60	0.13	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Lithium	ND		3.0	0.18	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Manganese	**99**	**B**	0.90	0.032	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1
Selenium	ND		0.60	0.20	mg/Kg	☼	11/05/21 08:00	11/12/21 16:33	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2800**		12	1.9	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Arsenic	**3.8**	**B**	0.60	0.26	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Beryllium	**0.25**	**J**	0.30	0.019	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Calcium	**1600**		300	2.6	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Chromium	**5.2**		0.60	0.084	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1

Client Sample ID: K-SB-07 (10-15)
Lab Sample ID: 140-24471-7
Date Collected: 08/25/21 13:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 83.8

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	2.8	J	3.0	0.063	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Iron	9200		6.0	3.5	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Lead	6.3		0.60	0.13	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Lithium	3.1		3.0	0.18	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Manganese	84		0.90	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Molybdenum	0.19	J	2.4	0.098	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1
Selenium	1.3		0.60	0.56	mg/Kg	☼	11/08/21 08:00	11/16/21 12:38	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	71	J	180	28	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Beryllium	ND		4.5	0.38	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Calcium	280	J B	4500	13	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Chromium	3.2	J	9.0	1.3	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Cobalt	ND		45	0.72	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Iron	ND		90	53	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Lead	ND		9.0	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Lithium	7.6	J B	45	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Manganese	ND	*1	13	2.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Molybdenum	ND		36	1.5	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5
Selenium	ND		9.0	3.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:51	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5900		12	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Arsenic	2.4		0.60	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Beryllium	0.15	J	0.30	0.014	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Calcium	160	J	300	2.5	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Chromium	6.7		0.60	0.084	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Cobalt	1.6	J	3.0	0.055	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Iron	6900		6.0	3.5	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Lead	2.6		0.60	0.13	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Lithium	4.5		3.0	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Manganese	40		0.90	0.30	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1
Selenium	0.67		0.60	0.20	mg/Kg	☼	11/10/21 08:00	11/16/21 16:54	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17000		12	1.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Arsenic	1.1		0.60	0.16	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Beryllium	0.31		0.30	0.019	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Calcium	630		300	3.1	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Chromium	18		0.60	0.084	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Cobalt	0.87	J	6.0	0.062	mg/Kg	☼	11/11/21 08:00	11/20/21 15:27	2
Iron	5100		6.0	4.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Lead	3.9		1.2	0.26	mg/Kg	☼	11/11/21 08:00	11/20/21 15:27	2
Lithium	13		3.0	0.18	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Manganese	38		0.90	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1

Client Sample ID: K-SB-07 (10-15) **Lab Sample ID: 140-24471-7**
Date Collected: 08/25/21 13:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 83.8**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.4	0.098	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1
Selenium	ND		0.60	0.20	mg/Kg	☼	11/11/21 08:00	11/20/21 13:41	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26000**		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	**7.9**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**0.91**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**4700**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**33**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**7.2**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**22000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**13**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**28**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**270**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	**0.19**	**J**	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**2.0**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**44000**		120	19	mg/Kg	☼	10/28/21 08:00	11/24/21 11:31	10
Arsenic	**6.4**		0.60	0.16	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Beryllium	**0.80**		0.30	0.019	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Calcium	**6100**		3000	31	mg/Kg	☼	10/28/21 08:00	11/24/21 11:31	10
Chromium	**28**		0.60	0.084	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Cobalt	**5.6**		3.0	0.031	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Iron	**19000**		6.0	4.9	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Lead	**13**		0.60	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Lithium	**19**		3.0	0.18	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Manganese	**230**		0.90	0.13	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Molybdenum	**0.37**	**J**	2.4	0.098	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1
Selenium	**1.4**		0.60	0.20	mg/Kg	☼	10/28/21 08:00	11/24/21 12:46	1

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Client Sample ID: K-SB-32 (31-36)
Date Collected: 08/25/21 15:25
Date Received: 09/03/21 09:45

Lab Sample ID: 140-24471-8
Matrix: Solid
Percent Solids: 90.2

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**43**	**J B**	44	7.1	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Arsenic	ND		2.2	0.58	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Beryllium	ND		1.1	0.34	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Calcium	**1000**	**J B**	1100	8.4	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Chromium	**0.57**	**J**	2.2	0.31	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Cobalt	ND		11	0.20	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Iron	**52**	**B**	22	13	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Lead	ND		2.2	0.49	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Lithium	ND		11	0.67	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Manganese	**1.4**	**J B**	3.3	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Molybdenum	ND		8.9	0.36	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4
Selenium	ND		2.2	0.75	mg/Kg	☼	11/03/21 08:00	11/11/21 17:01	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**58**	**B**	33	5.3	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Arsenic	ND		1.7	0.43	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Beryllium	**0.093**	**J B**	0.83	0.053	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Calcium	**15000**	**B**	830	7.3	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Chromium	ND		1.7	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Cobalt	ND		8.3	0.21	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Iron	**57**	**B**	17	9.6	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Lead	ND	*-	1.7	0.37	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Lithium	ND		8.3	0.50	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Manganese	**40**		2.5	0.93	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Molybdenum	ND	*-	6.7	0.27	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3
Selenium	ND		1.7	0.57	mg/Kg	☼	11/04/21 08:00	11/11/21 19:03	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**49**		11	2.3	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Arsenic	**0.23**	**J**	0.55	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Beryllium	ND		0.28	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Calcium	**8.4**	**J**	280	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Chromium	**0.16**	**J**	0.55	0.078	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Cobalt	**2.1**	**J**	2.8	0.050	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Iron	**140**		5.5	3.2	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Lead	ND		0.55	0.12	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Lithium	ND		2.8	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Manganese	**190**	**B**	0.83	0.030	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Molybdenum	ND		2.2	0.091	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1
Selenium	ND		0.55	0.19	mg/Kg	☼	11/05/21 08:00	11/12/21 16:37	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**390**		11	1.8	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Arsenic	**1.6**	**B**	0.55	0.24	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Beryllium	**0.084**	**J**	0.28	0.018	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Calcium	**21000**		280	2.4	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Chromium	**1.2**		0.55	0.078	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1

Client Sample ID: K-SB-32 (31-36)
Lab Sample ID: 140-24471-8

Date Collected: 08/25/21 15:25 — **Matrix: Solid**

Date Received: 09/03/21 09:45 — **Percent Solids: 90.2**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.71	J	2.8	0.059	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Iron	3200		5.5	3.2	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Lead	5.4		0.55	0.12	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Lithium	0.99	J	2.8	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Manganese	130		0.83	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Molybdenum	0.16	J	2.2	0.091	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1
Selenium	0.53	J	0.55	0.52	mg/Kg	☼	11/08/21 08:00	11/16/21 12:53	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	150	J	170	26	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Arsenic	ND		8.3	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Beryllium	ND		4.2	0.35	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Calcium	11000	B	4200	12	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Chromium	2.1	J	8.3	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Cobalt	ND		42	0.67	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Iron	ND		83	49	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Lead	ND		8.3	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Lithium	6.9	J B	42	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Manganese	5.7	J *1	12	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Molybdenum	ND		33	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5
Selenium	ND		8.3	2.9	mg/Kg	☼	11/10/21 08:00	11/16/21 14:56	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3800		11	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Arsenic	1.9		0.55	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Beryllium	0.14	J	0.28	0.013	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Calcium	5700		280	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Chromium	6.9		0.55	0.078	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Cobalt	2.0	J	2.8	0.051	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Iron	6000		5.5	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Lead	2.2		0.55	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Lithium	6.4		2.8	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Manganese	65		0.83	0.28	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Molybdenum	ND		2.2	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1
Selenium	0.45	J	0.55	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 16:59	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		11	1.8	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Arsenic	0.78		0.55	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Beryllium	0.53		0.28	0.018	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Calcium	1500		280	2.9	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Chromium	20		0.55	0.078	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Cobalt	0.69	J	5.5	0.058	mg/Kg	☼	11/11/21 08:00	11/20/21 15:32	2
Iron	4900		5.5	4.5	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Lead	3.6		1.1	0.24	mg/Kg	☼	11/11/21 08:00	11/20/21 15:32	2
Lithium	13		2.8	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Manganese	43		0.83	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-32 (31-36)
Lab Sample ID: 140-24471-8

Date Collected: 08/25/21 15:25
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 90.2

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.2	0.091	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1
Selenium	**0.22**	**J**	0.55	0.19	mg/Kg	☼	11/11/21 08:00	11/20/21 13:45	1

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			11/29/21 12:35	1
Arsenic	**4.5**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**0.85**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**55000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**31**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**5.5**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**14000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**11**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**27**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**470**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	**0.16**	**J**	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**1.2**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**33000**		110	18	mg/Kg	☼	10/28/21 08:00	11/24/21 11:36	10
Arsenic	**4.2**		0.55	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Beryllium	**0.62**		0.28	0.018	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Calcium	**57000**		2800	29	mg/Kg	☼	10/28/21 08:00	11/24/21 11:36	10
Chromium	**23**		0.55	0.078	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Cobalt	**4.6**		2.8	0.029	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Iron	**12000**		5.5	4.5	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Lead	**11**		0.55	0.12	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Lithium	**17**		2.8	0.17	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Manganese	**380**		0.83	0.12	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Molybdenum	**0.36**	**J**	2.2	0.091	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1
Selenium	**0.39**	**J**	0.55	0.19	mg/Kg	☼	10/28/21 08:00	11/24/21 12:51	1

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Client Sample ID: K-SB-03 (19-20)

Date Collected: 08/26/21 08:15
Date Received: 09/03/21 09:45

Lab Sample ID: 140-24471-9
Matrix: Solid
Percent Solids: 88.4

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	44	J B	45	7.2	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Beryllium	ND		1.1	0.35	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Calcium	660	J B	1100	8.6	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Chromium	ND		2.3	0.32	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Cobalt	ND		11	0.20	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Iron	46	B	23	13	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Lead	ND		2.3	0.50	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Lithium	ND		11	0.68	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Manganese	8.4	B	3.4	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Molybdenum	ND		9.1	0.37	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4
Selenium	ND		2.3	0.77	mg/Kg	☼	11/03/21 08:00	11/11/21 17:05	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	63	B	34	5.4	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Arsenic	ND		1.7	0.44	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Beryllium	0.11	J B	0.85	0.054	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Calcium	14000	B	850	7.5	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Chromium	2.2		1.7	0.24	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Cobalt	0.25	J	8.5	0.21	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Iron	190	B	17	9.8	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Lead	2.1	*-	1.7	0.37	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Lithium	ND		8.5	0.51	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Manganese	100		2.5	0.95	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Molybdenum	ND	*-	6.8	0.28	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3
Selenium	ND		1.7	0.58	mg/Kg	☼	11/04/21 08:00	11/11/21 19:08	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	56		11	2.4	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Arsenic	0.18	J	0.57	0.15	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Beryllium	0.017	J	0.28	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Calcium	8.4	J	280	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Chromium	0.54	J	0.57	0.079	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Cobalt	0.25	J	2.8	0.051	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Iron	1400		5.7	3.3	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Lead	ND		0.57	0.12	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Lithium	0.17	J	2.8	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Manganese	52	B	0.85	0.031	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Molybdenum	ND		2.3	0.093	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1
Selenium	0.23	J	0.57	0.19	mg/Kg	☼	11/05/21 08:00	11/12/21 16:43	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	230		11	1.8	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Arsenic	0.53	J B	0.57	0.25	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Beryllium	0.048	J	0.28	0.018	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Calcium	40000		280	2.5	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Chromium	1.3		0.57	0.079	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1

1 2 3 4 5 6 7 8 9 10 11 12 13

Client Sample ID: K-SB-03 (19-20)
Lab Sample ID: 140-24471-9

Date Collected: 08/26/21 08:15
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 88.4

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.0	J	2.8	0.060	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Iron	2400		5.7	3.3	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Lead	3.7		0.57	0.12	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Lithium	0.99	J	2.8	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Manganese	160		0.85	0.15	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Molybdenum	ND		2.3	0.093	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1
Selenium	ND		0.57	0.53	mg/Kg	☼	11/08/21 08:00	11/16/21 12:58	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	160	J	170	27	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Arsenic	ND		8.5	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Beryllium	ND		4.2	0.36	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Calcium	12000	B	4200	12	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Chromium	1.7	J	8.5	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Cobalt	ND		42	0.68	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Iron	ND		85	50	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Lead	ND		8.5	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Lithium	6.5	J B	42	2.5	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Manganese	7.5	J *1	13	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Molybdenum	ND		34	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5
Selenium	ND		8.5	2.9	mg/Kg	☼	11/10/21 08:00	11/16/21 15:01	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2200		11	1.8	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Arsenic	2.5		0.57	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Beryllium	0.088	J	0.28	0.014	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Calcium	9300		280	2.4	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Chromium	4.7		0.57	0.079	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Cobalt	2.4	J	2.8	0.052	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Iron	4300		5.7	3.3	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Lead	1.5		0.57	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Lithium	4.7		2.8	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Manganese	51		0.85	0.28	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Molybdenum	0.32	J	2.3	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1
Selenium	0.38	J	0.57	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 17:04	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000		11	1.8	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Arsenic	0.91		0.57	0.15	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Beryllium	0.51		0.28	0.018	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Calcium	2100		280	2.9	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Chromium	19		0.57	0.079	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Cobalt	0.58	J	2.8	0.029	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Iron	3700		5.7	4.6	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Lead	3.9		0.57	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Lithium	10		2.8	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Manganese	32		0.85	0.12	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-03 (19-20)

Lab Sample ID: 140-24471-9
Date Collected: 08/26/21 08:15 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 88.4**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.3	0.093	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1
Selenium	ND		0.57	0.19	mg/Kg	☼	11/11/21 08:00	11/20/21 14:00	1

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			11/29/21 12:35	1
Arsenic	**4.1**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**0.77**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**77000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**30**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**4.5**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**12000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**11**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**23**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**410**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	**0.32**	**J**	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**0.61**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**15000**		110	18	mg/Kg	☼	10/28/21 08:00	11/24/21 11:41	10
Arsenic	**2.4**		1.1	0.29	mg/Kg	☼	10/28/21 08:00	11/24/21 14:24	2
Beryllium	**0.41**		0.28	0.018	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Calcium	**89000**		2800	29	mg/Kg	☼	10/28/21 08:00	11/24/21 11:41	10
Chromium	**17**		0.57	0.079	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Cobalt	**3.1**		2.8	0.029	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Iron	**12000**		5.7	4.6	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Lead	**9.8**		1.1	0.25	mg/Kg	☼	10/28/21 08:00	11/24/21 14:24	2
Lithium	**13**		2.8	0.17	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Manganese	**470**		0.85	0.12	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Molybdenum	**0.64**	**J**	2.3	0.093	mg/Kg	☼	10/28/21 08:00	11/24/21 12:56	1
Selenium	ND		1.1	0.38	mg/Kg	☼	10/28/21 08:00	11/24/21 14:24	2

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-08 (4-7) Lab Sample ID: 140-24471-10
Date Collected: 08/26/21 09:25 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.4**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41**	**J B**	49	7.9	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Arsenic	ND		2.5	0.64	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Calcium	**2900**	**B**	1200	9.3	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Chromium	ND		2.5	0.34	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Cobalt	**0.27**	**J**	12	0.22	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Iron	**48**	**B**	25	14	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Lead	ND		2.5	0.54	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Lithium	ND		12	0.74	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Manganese	**60**	**B**	3.7	0.15	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Molybdenum	ND		9.8	0.40	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4
Selenium	ND		2.5	0.84	mg/Kg	☼	11/03/21 08:00	11/11/21 17:10	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**59**	**B**	37	5.9	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Arsenic	ND		1.8	0.48	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Beryllium	**0.13**	**J B**	0.92	0.059	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Calcium	**550**	**J B**	920	8.1	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Chromium	ND		1.8	0.26	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Cobalt	ND		9.2	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Iron	**58**	**B**	18	11	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Lead	ND	*-	1.8	0.41	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Lithium	ND		9.2	0.55	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Manganese	**28**		2.8	1.0	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Molybdenum	ND	*-	7.4	0.30	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3
Selenium	ND		1.8	0.63	mg/Kg	☼	11/04/21 08:00	11/11/21 19:13	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**290**		12	2.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Arsenic	**2.0**		0.61	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Beryllium	**0.18**	**J**	0.31	0.018	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Calcium	**10**	**J**	310	1.8	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Chromium	**0.55**	**J**	0.61	0.086	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Cobalt	**3.1**		3.1	0.055	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Iron	**2200**		6.1	3.6	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Lead	**2.9**		0.61	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Lithium	ND		3.1	0.18	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Manganese	**230**	**B**	0.92	0.033	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1
Selenium	**0.33**	**J**	0.61	0.21	mg/Kg	☼	11/05/21 08:00	11/12/21 16:48	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2700**		12	2.0	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Arsenic	**1.9**	**B**	0.61	0.27	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Beryllium	**0.24**	**J**	0.31	0.020	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Calcium	**240**	**J**	310	2.7	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Chromium	**4.4**		0.61	0.086	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1

Client Sample ID: K-SB-08 (4-7) Lab Sample ID: 140-24471-10

Date Collected: 08/26/21 09:25 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.4**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	2.1	J	3.1	0.065	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Iron	4600		6.1	3.6	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Lead	8.9		0.61	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Lithium	2.3	J	3.1	0.18	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Manganese	110		0.92	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Molybdenum	0.15	J	2.5	0.10	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1
Selenium	0.79		0.61	0.58	mg/Kg	☼	11/08/21 08:00	11/16/21 13:03	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170	J	180	29	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Arsenic	ND		9.2	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Beryllium	ND		4.6	0.39	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Calcium	66	J B	4600	14	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Chromium	4.3	J	9.2	1.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Cobalt	ND		46	0.74	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Iron	88	J	92	54	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Lead	2.4	J	9.2	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Lithium	6.3	J B	46	2.7	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Manganese	13	J *1	14	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Molybdenum	ND		37	1.5	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5
Selenium	ND		9.2	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 15:06	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5100		12	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Arsenic	1.5		0.61	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Beryllium	0.084	J	0.31	0.015	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Calcium	100	J	310	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Chromium	4.9		0.61	0.086	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Cobalt	0.73	J	3.1	0.057	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Iron	4800		6.1	3.6	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Lead	1.6		0.61	0.14	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Lithium	2.8	J	3.1	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Manganese	23		0.92	0.31	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1
Selenium	0.52	J	0.61	0.21	mg/Kg	☼	11/10/21 08:00	11/16/21 17:09	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		120	20	mg/Kg	☼	11/11/21 08:00	11/20/21 12:18	10
Arsenic	1.3		0.61	0.16	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Beryllium	0.16	J	0.31	0.020	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Calcium	1800		310	3.2	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Chromium	18		0.61	0.086	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Cobalt	0.35	J	6.1	0.064	mg/Kg	☼	11/11/21 08:00	11/20/21 15:37	2
Iron	4900		6.1	5.0	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Lead	4.6		1.2	0.27	mg/Kg	☼	11/11/21 08:00	11/20/21 15:37	2
Lithium	10		3.1	0.18	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Manganese	55		0.92	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1

Client Sample ID: K-SB-08 (4-7)

Lab Sample ID: 140-24471-10
Date Collected: 08/26/21 09:25
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 81.4

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	0.17	J	2.5	0.10	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1
Selenium	ND		0.61	0.21	mg/Kg	☼	11/11/21 08:00	11/20/21 14:05	1

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			11/29/21 12:35	1
Arsenic	6.8		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	0.78		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	5700		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	32		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	6.6		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	17000		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	20		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	22		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	510		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	0.33	J	2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	1.6		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	48000		120	20	mg/Kg	☼	10/28/21 08:00	11/24/21 11:46	10
Arsenic	7.4		0.61	0.16	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Beryllium	0.73		0.31	0.020	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Calcium	6100		3100	32	mg/Kg	☼	10/28/21 08:00	11/24/21 11:46	10
Chromium	29		0.61	0.086	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Cobalt	6.7		6.1	0.064	mg/Kg	☼	10/28/21 08:00	11/24/21 14:29	2
Iron	16000		6.1	5.0	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Lead	20		1.2	0.27	mg/Kg	☼	10/28/21 08:00	11/24/21 14:29	2
Lithium	15		3.1	0.18	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Manganese	400		0.92	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Molybdenum	0.54	J	2.5	0.10	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1
Selenium	1.7		0.61	0.21	mg/Kg	☼	10/28/21 08:00	11/24/21 13:02	1

Client Sample ID: K-SB-08 (13-17)

Lab Sample ID: 140-24471-11
Date Collected: 08/26/21 09:55
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 81.2

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	51	B	49	7.9	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Arsenic	ND		2.5	0.64	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Calcium	1300	B	1200	9.4	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Chromium	ND		2.5	0.34	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Cobalt	ND		12	0.22	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Iron	48	B	25	14	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Lead	ND		2.5	0.54	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Lithium	ND		12	0.74	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Manganese	29	B	3.7	0.15	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Molybdenum	ND		9.9	0.40	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4
Selenium	ND		2.5	0.84	mg/Kg	☼	11/03/21 08:00	11/11/21 17:15	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	70	B	37	5.9	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Arsenic	ND		1.8	0.48	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Beryllium	0.14	J B	0.92	0.059	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Calcium	1500	B	920	8.1	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Chromium	ND		1.8	0.26	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Cobalt	0.35	J	9.2	0.23	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Iron	62	B	18	11	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Lead	0.55	J *-	1.8	0.41	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Lithium	ND		9.2	0.55	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Manganese	34		2.8	1.0	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Molybdenum	ND	*-	7.4	0.30	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3
Selenium	ND		1.8	0.63	mg/Kg	☼	11/04/21 08:00	11/11/21 19:18	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	160		12	2.6	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Arsenic	0.19	J	0.62	0.16	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Beryllium	0.057	J	0.31	0.018	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Calcium	6.6	J	310	1.8	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Chromium	0.14	J	0.62	0.086	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Cobalt	0.77	J	3.1	0.055	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Iron	220		6.2	3.6	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Lead	ND		0.62	0.14	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Lithium	ND		3.1	0.18	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Manganese	41	B	0.92	0.033	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1
Selenium	ND		0.62	0.21	mg/Kg	☼	11/05/21 08:00	11/12/21 17:02	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2200		12	2.0	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Arsenic	1.7	B	0.62	0.27	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Beryllium	0.20	J	0.31	0.020	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Calcium	4000		310	2.7	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Chromium	4.2		0.62	0.086	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-08 (13-17)

Lab Sample ID: 140-24471-11

Date Collected: 08/26/21 09:55
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 81.2

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	2.4	J	3.1	0.065	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Iron	5900		6.2	3.6	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Lead	4.4		0.62	0.14	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Lithium	2.3	J	3.1	0.18	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Manganese	53		0.92	0.16	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1
Selenium	0.98		0.62	0.58	mg/Kg	☼	11/08/21 08:00	11/16/21 13:08	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	140	J	180	29	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Arsenic	ND		9.2	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Beryllium	ND		4.6	0.39	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Calcium	2200	J B	4600	14	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Chromium	2.7	J	9.2	1.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Cobalt	ND		46	0.74	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Iron	ND		92	54	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Lead	ND		9.2	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Lithium	6.6	J B	46	2.7	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Manganese	ND	*1	14	2.3	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Molybdenum	ND		37	1.5	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5
Selenium	ND		9.2	3.2	mg/Kg	☼	11/10/21 08:00	11/16/21 15:11	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	5900		12	2.0	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Arsenic	1.4		0.62	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Beryllium	0.14	J	0.31	0.015	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Calcium	620		310	2.6	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Chromium	6.9		0.62	0.086	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Cobalt	1.6	J	3.1	0.057	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Iron	5800		6.2	3.6	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Lead	2.2		0.62	0.14	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Lithium	4.7		3.1	0.18	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Manganese	34		0.92	0.31	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1
Selenium	0.53	J	0.62	0.21	mg/Kg	☼	11/10/21 08:00	11/16/21 17:13	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26000		120	20	mg/Kg	☼	11/11/21 08:00	11/20/21 12:23	10
Arsenic	1.0		0.62	0.16	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Beryllium	0.27	J	0.31	0.020	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Calcium	1400		310	3.2	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Chromium	17		0.62	0.086	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Cobalt	0.84	J	6.2	0.064	mg/Kg	☼	11/11/21 08:00	11/20/21 15:42	2
Iron	4500		6.2	5.0	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Lead	4.3		1.2	0.27	mg/Kg	☼	11/11/21 08:00	11/20/21 15:42	2
Lithium	14		3.1	0.18	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Manganese	40		0.92	0.14	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1

Client Sample ID: K-SB-08 (13-17)
Lab Sample ID: 140-24471-11
Date Collected: 08/26/21 09:55
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 81.2

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		2.5	0.10	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1
Selenium	ND		0.62	0.21	mg/Kg	☼	11/11/21 08:00	11/20/21 14:10	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**35000**		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	**4.3**		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	**0.80**		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	**11000**		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	**31**		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	**6.0**		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	**17000**		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	**11**		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	**27**		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	**230**		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	ND		2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	**1.5**		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40000**		120	20	mg/Kg	☼	10/28/21 08:00	11/24/21 11:50	10
Arsenic	**3.2**		0.62	0.16	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Beryllium	**0.68**		0.31	0.020	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Calcium	**11000**		3100	32	mg/Kg	☼	10/28/21 08:00	11/24/21 11:50	10
Chromium	**24**		0.62	0.086	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Cobalt	**4.7**		3.1	0.032	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Iron	**14000**		6.2	5.0	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Lead	**11**		0.62	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Lithium	**16**		3.1	0.18	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Manganese	**210**		0.92	0.14	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Molybdenum	**0.25**	**J**	2.5	0.10	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1
Selenium	**1.2**		0.62	0.21	mg/Kg	☼	10/28/21 08:00	11/24/21 13:07	1

Client Sample Results

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-XPW03 (10-20) Lab Sample ID: 140-24471-12

Date Collected: 08/26/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 87.7**

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41**	**J B**	46	7.3	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Beryllium	ND		1.1	0.35	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Calcium	**520**	**J B**	1100	8.7	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Chromium	ND		2.3	0.32	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Cobalt	ND		11	0.21	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Iron	**46**	**B**	23	13	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Lead	ND		2.3	0.50	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Lithium	ND		11	0.68	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Manganese	**0.39**	**J B**	3.4	0.14	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Molybdenum	ND		9.1	0.37	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4
Selenium	ND		2.3	0.78	mg/Kg	☼	11/03/21 08:00	11/11/21 17:20	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**88**	**B**	34	5.5	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Arsenic	ND		1.7	0.44	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Beryllium	**0.11**	**J B**	0.85	0.055	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Calcium	**890**	**B**	850	7.5	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Chromium	ND		1.7	0.24	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Cobalt	ND		8.5	0.22	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Iron	**76**	**B**	17	9.9	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Lead	ND	*-	1.7	0.38	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Lithium	ND		8.5	0.51	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Manganese	**1.3**	**J**	2.6	0.96	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Molybdenum	ND	*-	6.8	0.28	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3
Selenium	ND		1.7	0.58	mg/Kg	☼	11/04/21 08:00	11/11/21 19:23	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1900**		11	2.4	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Arsenic	**0.84**		0.57	0.15	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Beryllium	**0.088**	**J**	0.28	0.017	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Calcium	**4.6**	**J**	280	1.7	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Chromium	**1.9**		0.57	0.080	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Cobalt	**0.59**	**J**	2.8	0.051	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Iron	**1700**		5.7	3.3	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Lead	ND		0.57	0.13	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Lithium	**0.79**	**J**	2.8	0.17	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Manganese	**8.1**	**B**	0.85	0.031	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Molybdenum	**0.33**	**J**	2.3	0.093	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1
Selenium	**0.35**	**J**	0.57	0.19	mg/Kg	☼	11/05/21 08:00	11/12/21 17:07	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3200**		11	1.8	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Arsenic	**1.2**	**B**	0.57	0.25	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Beryllium	**0.21**	**J**	0.28	0.018	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Calcium	**9100**		280	2.5	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Chromium	**3.9**		0.57	0.080	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1

Eurofins TestAmerica, Knoxville

Client Sample ID: K-SB-XPW03 (10-20) Lab Sample ID: 140-24471-12
Date Collected: 08/26/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 87.7**

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.1	J	2.8	0.060	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Iron	3600		5.7	3.3	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Lead	1.3		0.57	0.13	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Lithium	2.2	J	2.8	0.17	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Manganese	24		0.85	0.15	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Molybdenum	0.96	J	2.3	0.093	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1
Selenium	0.56	J	0.57	0.54	mg/Kg	☼	11/08/21 08:00	11/16/21 13:12	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	70	J	170	27	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Arsenic	ND		8.5	2.2	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Beryllium	ND		4.3	0.36	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Calcium	3500	J B	4300	13	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Chromium	2.0	J	8.5	1.2	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Cobalt	ND		43	0.68	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Iron	ND		85	50	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Lead	ND		8.5	1.9	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Lithium	7.5	J B	43	2.5	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Manganese	ND	*1	13	2.1	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Molybdenum	ND		34	1.4	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5
Selenium	ND		8.5	3.0	mg/Kg	☼	11/10/21 08:00	11/16/21 15:16	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		23	3.6	mg/Kg	☼	11/10/21 08:00	11/16/21 18:40	2
Arsenic	2.2		0.57	0.17	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Beryllium	1.2		0.28	0.014	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Calcium	32000		570	4.8	mg/Kg	☼	11/10/21 08:00	11/16/21 18:40	2
Chromium	18		0.57	0.080	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Cobalt	4.0		2.8	0.052	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Iron	21000		11	6.6	mg/Kg	☼	11/10/21 08:00	11/16/21 18:40	2
Lead	1.5		0.57	0.13	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Lithium	14		5.7	0.34	mg/Kg	☼	11/10/21 08:00	11/16/21 18:40	2
Manganese	110		0.85	0.28	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Molybdenum	2.1	J	2.3	0.11	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1
Selenium	1.5		0.57	0.19	mg/Kg	☼	11/10/21 08:00	11/16/21 17:18	1

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		110	18	mg/Kg	☼	11/11/21 08:00	11/20/21 12:28	10
Arsenic	ND		1.1	0.30	mg/Kg	☼	11/11/21 08:00	11/20/21 15:47	2
Beryllium	2.7		0.28	0.018	mg/Kg	☼	11/11/21 08:00	11/20/21 14:15	1
Calcium	25000		2800	30	mg/Kg	☼	11/11/21 08:00	11/20/21 12:28	10
Chromium	47		0.57	0.080	mg/Kg	☼	11/11/21 08:00	11/20/21 14:15	1
Cobalt	9.0	J	14	0.15	mg/Kg	☼	11/11/21 08:00	11/20/21 15:52	5
Iron	55000		11	9.3	mg/Kg	☼	11/11/21 08:00	11/20/21 15:47	2
Lead	3.4		2.8	0.63	mg/Kg	☼	11/11/21 08:00	11/20/21 15:52	5
Lithium	21		2.8	0.17	mg/Kg	☼	11/11/21 08:00	11/20/21 14:15	1
Manganese	250		0.85	0.13	mg/Kg	☼	11/11/21 08:00	11/20/21 14:15	1

Client Sample ID: K-SB-XPW03 (10-20)

Lab Sample ID: 140-24471-12

Date Collected: 08/26/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 87.7**

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	3.5		2.3	0.093	mg/Kg	☼	11/11/21 08:00	11/20/21 14:15	1
Selenium	4.6		1.1	0.39	mg/Kg	☼	11/11/21 08:00	11/20/21 15:47	2

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	59000		10	1.6	mg/Kg			11/29/21 12:35	1
Arsenic	4.3		0.50	0.13	mg/Kg			11/29/21 12:35	1
Beryllium	4.4		0.25	0.0075	mg/Kg			11/29/21 12:35	1
Calcium	71000		250	0.74	mg/Kg			11/29/21 12:35	1
Chromium	73		0.50	0.070	mg/Kg			11/29/21 12:35	1
Cobalt	15		2.5	0.023	mg/Kg			11/29/21 12:35	1
Iron	81000		5.0	4.1	mg/Kg			11/29/21 12:35	1
Lead	6.2		0.50	0.11	mg/Kg			11/29/21 12:35	1
Lithium	45		2.5	0.15	mg/Kg			11/29/21 12:35	1
Manganese	390		0.75	0.052	mg/Kg			11/29/21 12:35	1
Molybdenum	6.9		2.0	0.082	mg/Kg			11/29/21 12:35	1
Selenium	7.0		0.50	0.17	mg/Kg			11/29/21 12:35	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	80000		110	18	mg/Kg	☼	10/28/21 08:00	11/24/21 11:55	10
Arsenic	1.7	J	2.8	0.74	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Beryllium	3.6		0.57	0.036	mg/Kg	☼	10/28/21 08:00	11/24/21 14:34	2
Calcium	74000		2800	30	mg/Kg	☼	10/28/21 08:00	11/24/21 11:55	10
Chromium	63		1.1	0.16	mg/Kg	☼	10/28/21 08:00	11/24/21 14:34	2
Cobalt	14		14	0.15	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Iron	82000		28	23	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Lead	6.8		2.8	0.63	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Lithium	37		14	0.85	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Manganese	330		1.7	0.25	mg/Kg	☼	10/28/21 08:00	11/24/21 14:34	2
Molybdenum	7.3	J	11	0.47	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5
Selenium	7.1		2.8	0.97	mg/Kg	☼	10/28/21 08:00	11/24/21 14:39	5

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

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
Beryllium	0.25	0.077	mg/Kg
Calcium	250	1.9	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	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
Beryllium	0.25	0.016	mg/Kg
Calcium	250	2.2	mg/Kg
Chromium	0.50	0.070	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
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
Beryllium	0.25	0.015	mg/Kg
Calcium	250	1.5	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4
Prep: 3010A
SEP: Metal Hydroxide

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

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
Beryllium	0.25	0.016	mg/Kg
Calcium	250	2.2	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.47	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
Beryllium	0.75	0.063	mg/Kg
Calcium	750	2.2	mg/Kg
Chromium	1.5	0.21	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
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
Beryllium	0.25	0.012	mg/Kg
Calcium	250	2.1	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Prep: Residual

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Calcium	250	2.6	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	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
Beryllium	0.25	0.0075	mg/Kg
Calcium	250	0.74	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	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
Beryllium	0.25	0.016	mg/Kg
Calcium	250	2.6	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-55231/13-A
Matrix: Solid
Analysis Batch: 56350

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 55231

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Arsenic	ND		0.50	0.13	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Beryllium	ND		0.25	0.016	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Calcium	ND		250	2.6	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Chromium	ND		0.50	0.070	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Cobalt	ND		2.5	0.026	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Iron	ND		5.0	4.1	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Lead	ND		0.50	0.11	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Lithium	ND		2.5	0.15	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Manganese	ND		0.75	0.11	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Molybdenum	ND		2.0	0.082	mg/Kg		10/28/21 08:00	11/24/21 10:28	1
Selenium	ND		0.50	0.17	mg/Kg		10/28/21 08:00	11/24/21 10:28	1

Lab Sample ID: LCS 140-55231/14-A
Matrix: Solid
Analysis Batch: 56350

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 55231

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	98.9		mg/Kg		99	80 - 120
Arsenic	5.00	5.03		mg/Kg		101	80 - 120
Beryllium	2.50	2.59		mg/Kg		104	80 - 120
Calcium	2500	2540		mg/Kg		102	80 - 120
Chromium	10.0	10.4		mg/Kg		104	80 - 120
Cobalt	5.00	5.12		mg/Kg		102	80 - 125
Iron	50.0	52.2		mg/Kg		104	80 - 120
Lead	5.00	5.12		mg/Kg		102	80 - 120
Lithium	5.00	4.94		mg/Kg		99	80 - 120
Manganese	5.00	5.29		mg/Kg		106	80 - 120
Molybdenum	25.0	25.8		mg/Kg		103	80 - 125
Selenium	7.50	7.13		mg/Kg		95	80 - 120

Lab Sample ID: LCSD 140-55231/15-A
Matrix: Solid
Analysis Batch: 56350

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 55231

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.6		mg/Kg		99	80 - 120	0	30
Arsenic	5.00	5.09		mg/Kg		102	80 - 120	1	30
Beryllium	2.50	2.60		mg/Kg		104	80 - 120	0	30
Calcium	2500	2550		mg/Kg		102	80 - 120	0	30
Chromium	10.0	10.4		mg/Kg		104	80 - 120	1	30
Cobalt	5.00	5.11		mg/Kg		102	80 - 125	0	30
Iron	50.0	52.2		mg/Kg		104	80 - 120	0	30
Lead	5.00	5.10		mg/Kg		102	80 - 120	0	30
Lithium	5.00	4.96		mg/Kg		99	80 - 120	0	30
Manganese	5.00	5.33		mg/Kg		107	80 - 120	1	30
Molybdenum	25.0	25.9		mg/Kg		103	80 - 125	0	30
Selenium	7.50	7.28		mg/Kg		97	80 - 120	2	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-55232/18-B ^4
Matrix: Solid
Analysis Batch: 55850

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 55277

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38.6	J	40	6.4	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Arsenic	ND		2.0	0.52	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Beryllium	ND		1.0	0.31	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Calcium	81.5	J	1000	7.6	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Chromium	ND		2.0	0.28	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Cobalt	ND		10	0.18	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Iron	39.3		20	12	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Lead	ND		2.0	0.44	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Lithium	ND		10	0.60	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Manganese	0.340	J	3.0	0.12	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Molybdenum	ND		8.0	0.33	mg/Kg		11/03/21 08:00	11/11/21 16:02	4
Selenium	ND		2.0	0.68	mg/Kg		11/03/21 08:00	11/11/21 16:02	4

Lab Sample ID: MB 140-55232/18-B ^4
Matrix: Solid
Analysis Batch: 55885

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 55277

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Arsenic	ND		2.0	0.52	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Beryllium	ND		1.0	0.31	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Calcium	29.6	J	1000	7.6	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Chromium	ND		2.0	0.28	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Cobalt	ND		10	0.18	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Iron	ND		20	12	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Lead	ND		2.0	0.44	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Lithium	ND		10	0.60	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Manganese	ND		3.0	0.12	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Molybdenum	ND		8.0	0.33	mg/Kg		11/03/21 08:00	11/12/21 15:09	4
Selenium	ND		2.0	0.68	mg/Kg		11/03/21 08:00	11/12/21 15:09	4

Lab Sample ID: LCS 140-55232/19-B ^5
Matrix: Solid
Analysis Batch: 55850

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 55277

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	85.7		mg/Kg		86	80 - 120
Arsenic	5.00	5.01		mg/Kg		100	80 - 120
Beryllium	2.50	2.60		mg/Kg		104	80 - 120
Calcium	2500	2470		mg/Kg		99	80 - 120
Chromium	10.0	9.90		mg/Kg		99	80 - 120
Cobalt	5.00	4.85	J	mg/Kg		97	80 - 120
Iron	50.0	51.7		mg/Kg		103	80 - 120
Lead	5.00	4.86		mg/Kg		97	80 - 120
Lithium	5.00	5.17	J	mg/Kg		103	80 - 120
Manganese	5.00	5.17		mg/Kg		103	80 - 120
Molybdenum	25.0	24.7		mg/Kg		99	80 - 120
Selenium	7.50	8.27		mg/Kg		110	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-55232/20-B ^5 | **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid | **Prep Type: Step 1**
Analysis Batch: 55850 | **Prep Batch: 55277**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	90.9		mg/Kg		91	80 - 120	6	30
Arsenic	5.00	5.05		mg/Kg		101	80 - 120	1	30
Beryllium	2.50	2.63		mg/Kg		105	80 - 120	1	30
Calcium	2500	2480		mg/Kg		99	80 - 120	1	30
Chromium	10.0	9.99		mg/Kg		100	80 - 120	1	30
Cobalt	5.00	4.96	J	mg/Kg		99	80 - 120	2	30
Iron	50.0	52.2		mg/Kg		104	80 - 120	1	30
Lead	5.00	5.02		mg/Kg		100	80 - 120	3	30
Lithium	5.00	5.11	J	mg/Kg		102	80 - 120	1	30
Manganese	5.00	5.32		mg/Kg		106	80 - 120	3	30
Molybdenum	25.0	24.8		mg/Kg		99	80 - 120	1	30
Selenium	7.50	8.15		mg/Kg		109	80 - 120	1	30

Lab Sample ID: MB 140-55278/18-B ^3 | **Client Sample ID: Method Blank**
Matrix: Solid | **Prep Type: Step 2**
Analysis Batch: 55850 | **Prep Batch: 55481**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42.8		30	4.8	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Arsenic	ND		1.5	0.39	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Beryllium	0.0870	J	0.75	0.048	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Calcium	68.1	J	750	6.6	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Chromium	ND		1.5	0.21	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Cobalt	ND		7.5	0.19	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Iron	42.8		15	8.7	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Lead	ND		1.5	0.33	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Lithium	ND		7.5	0.45	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Manganese	ND		2.3	0.84	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Molybdenum	ND		6.0	0.25	mg/Kg		11/04/21 08:00	11/11/21 18:04	3
Selenium	ND		1.5	0.51	mg/Kg		11/04/21 08:00	11/11/21 18:04	3

Lab Sample ID: MB 140-55278/18-B ^3 | **Client Sample ID: Method Blank**
Matrix: Solid | **Prep Type: Step 2**
Analysis Batch: 55885 | **Prep Batch: 55481**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Arsenic	ND		1.5	0.39	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Beryllium	ND		0.75	0.048	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Calcium	11.1	J	750	6.6	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Chromium	ND		1.5	0.21	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Cobalt	ND		7.5	0.19	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Iron	ND		15	8.7	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Lead	ND		1.5	0.33	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Lithium	ND		7.5	0.45	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Manganese	ND		2.3	0.84	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Molybdenum	ND		6.0	0.25	mg/Kg		11/04/21 08:00	11/12/21 15:14	3
Selenium	ND		1.5	0.51	mg/Kg		11/04/21 08:00	11/12/21 15:14	3

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55278/19-B ^5
Matrix: Solid
Analysis Batch: 55850

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 55481

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	87.3		mg/Kg		87	
Arsenic	5.00	3.66		mg/Kg		73	60 - 120
Beryllium	2.50	1.51		mg/Kg		60	40 - 70
Calcium	2500	817	J	mg/Kg		33	10 - 40
Chromium	10.0	8.28		mg/Kg		83	60 - 120
Cobalt	5.00	4.62	J	mg/Kg		92	80 - 120
Iron	50.0	86.8		mg/Kg		174	
Lead	5.00	4.19		mg/Kg		84	70 - 120
Lithium	5.00	4.93	J	mg/Kg		99	80 - 120
Manganese	5.00	5.57		mg/Kg		111	80 - 120
Molybdenum	25.0	19.9		mg/Kg		80	70 - 120
Selenium	7.50	6.63		mg/Kg		88	70 - 120

Lab Sample ID: LCSD 140-55278/20-B ^5
Matrix: Solid
Analysis Batch: 55850

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 55481

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	91.4		mg/Kg		91		5	
Arsenic	5.00	3.02		mg/Kg		60	60 - 120	19	30
Beryllium	2.50	1.32		mg/Kg		53	40 - 70	14	30
Calcium	2500	723	J	mg/Kg		29	10 - 40	12	30
Chromium	10.0	7.07		mg/Kg		71	60 - 120	16	30
Cobalt	5.00	3.98	J	mg/Kg		80	80 - 120	15	30
Iron	50.0	89.2		mg/Kg		178		3	
Lead	5.00	3.37	*-	mg/Kg		67	70 - 120	22	30
Lithium	5.00	4.41	J	mg/Kg		88	80 - 120	11	30
Manganese	5.00	4.85		mg/Kg		97	80 - 120	14	30
Molybdenum	25.0	17.0	*-	mg/Kg		68	70 - 120	16	30
Selenium	7.50	5.57		mg/Kg		74	70 - 120	17	30

Lab Sample ID: MB 140-55482/18-B
Matrix: Solid
Analysis Batch: 55885

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 55544

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Arsenic	ND		0.50	0.13	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Beryllium	ND		0.25	0.015	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Calcium	ND		250	1.5	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Chromium	ND		0.50	0.070	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Cobalt	ND		2.5	0.045	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Iron	ND		5.0	2.9	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Lead	ND		0.50	0.11	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Lithium	ND		2.5	0.15	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Manganese	0.0780	J	0.75	0.027	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Molybdenum	ND		2.0	0.082	mg/Kg		11/05/21 08:00	11/12/21 15:39	1
Selenium	ND		0.50	0.17	mg/Kg		11/05/21 08:00	11/12/21 15:39	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55482/19-B
Client Sample ID: Lab Control Sample
Matrix: Solid
Prep Type: Step 3
Analysis Batch: 55885
Prep Batch: 55544

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	99.1		mg/Kg		99	80 - 120
Arsenic	5.00	5.02		mg/Kg		100	80 - 120
Beryllium	2.50	2.66		mg/Kg		106	80 - 120
Calcium	2500	34.1	J	mg/Kg		1	
Chromium	10.0	10.4		mg/Kg		104	80 - 120
Cobalt	5.00	5.11		mg/Kg		102	80 - 120
Iron	50.0	52.1		mg/Kg		104	80 - 120
Lead	5.00	ND		mg/Kg		0.2	
Lithium	5.00	5.05		mg/Kg		101	80 - 120
Manganese	5.00	5.26		mg/Kg		105	80 - 120
Molybdenum	25.0	25.1		mg/Kg		100	80 - 120
Selenium	7.50	7.34		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 140-55482/20-B
Client Sample ID: Lab Control Sample Dup
Matrix: Solid
Prep Type: Step 3
Analysis Batch: 55885
Prep Batch: 55544

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.3		mg/Kg		98	80 - 120	1	30
Arsenic	5.00	4.94		mg/Kg		99	80 - 120	2	30
Beryllium	2.50	2.68		mg/Kg		107	80 - 120	1	30
Calcium	2500	33.2	J	mg/Kg		1		3	
Chromium	10.0	10.5		mg/Kg		105	80 - 120	1	30
Cobalt	5.00	5.14		mg/Kg		103	80 - 120	1	30
Iron	50.0	51.3		mg/Kg		103	80 - 120	2	30
Lead	5.00	ND		mg/Kg		1		139	
Lithium	5.00	4.97		mg/Kg		99	80 - 120	2	30
Manganese	5.00	5.32		mg/Kg		106	80 - 120	1	30
Molybdenum	25.0	25.1		mg/Kg		100	80 - 120	0	30
Selenium	7.50	7.44		mg/Kg		99	80 - 120	1	30

Lab Sample ID: MB 140-55545/18-B
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Step 4
Analysis Batch: 56028
Prep Batch: 55596

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Arsenic	0.224	J	0.50	0.22	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Beryllium	ND		0.25	0.016	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Calcium	ND		250	2.2	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Chromium	ND		0.50	0.070	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Cobalt	ND		2.5	0.053	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Iron	ND		5.0	2.9	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Lead	ND		0.50	0.11	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Lithium	ND		2.5	0.15	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Manganese	ND		0.75	0.13	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Molybdenum	ND		2.0	0.082	mg/Kg		11/08/21 08:00	11/16/21 11:55	1
Selenium	ND		0.50	0.47	mg/Kg		11/08/21 08:00	11/16/21 11:55	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55545/19-B **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 56028 **Prep Batch: 55596**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	98.9		mg/Kg		99	80 - 120
Arsenic	5.00	5.39		mg/Kg		108	80 - 130
Beryllium	2.50	2.71		mg/Kg		108	80 - 120
Calcium	2500	2530		mg/Kg		101	80 - 120
Chromium	10.0	10.2		mg/Kg		102	80 - 120
Cobalt	5.00	5.16		mg/Kg		103	80 - 120
Iron	50.0	50.7		mg/Kg		101	80 - 120
Lead	5.00	5.26		mg/Kg		105	80 - 120
Lithium	5.00	4.97		mg/Kg		99	80 - 120
Manganese	5.00	5.19		mg/Kg		104	80 - 120
Molybdenum	25.0	26.2		mg/Kg		105	80 - 120
Selenium	7.50	ND		mg/Kg		6	

Lab Sample ID: LCSD 140-55545/20-B **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 56028 **Prep Batch: 55596**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	96.8		mg/Kg		97	80 - 120	2	30
Arsenic	5.00	5.25		mg/Kg		105	80 - 130	3	30
Beryllium	2.50	2.66		mg/Kg		107	80 - 120	2	30
Calcium	2500	2490		mg/Kg		99	80 - 120	2	30
Chromium	10.0	10.1		mg/Kg		101	80 - 120	2	30
Cobalt	5.00	5.04		mg/Kg		101	80 - 120	2	30
Iron	50.0	49.8		mg/Kg		100	80 - 120	2	30
Lead	5.00	5.08		mg/Kg		102	80 - 120	3	30
Lithium	5.00	4.94		mg/Kg		99	80 - 120	0	30
Manganese	5.00	5.10		mg/Kg		102	80 - 120	2	30
Molybdenum	25.0	25.9		mg/Kg		103	80 - 120	1	30
Selenium	7.50	ND		mg/Kg		5		9	

Lab Sample ID: MB 140-55597/18-B ^5 **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 56028 **Prep Batch: 55721**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Arsenic	ND		7.5	1.9	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Beryllium	ND		3.8	0.32	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Calcium	39.3	J	3800	11	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Chromium	ND		7.5	1.1	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Cobalt	ND		38	0.60	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Iron	ND		75	44	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Lead	ND		7.5	1.7	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Lithium	2.65	J	38	2.2	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Manganese	ND		11	1.9	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Molybdenum	ND		30	1.3	mg/Kg		11/10/21 08:00	11/16/21 13:56	5
Selenium	ND		7.5	2.6	mg/Kg		11/10/21 08:00	11/16/21 13:56	5

1 2 3 4 5 6 7 8 9 10 11 12 13

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55597/19-B ^5 **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 56028 **Prep Batch: 55721**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	ND		mg/Kg		5	
Arsenic	15.0	11.8		mg/Kg		79	60 - 100
Beryllium	7.50	3.82		mg/Kg		51	40 - 70
Calcium	7500	2110	J	mg/Kg		28	20 - 50
Chromium	30.0	30.5		mg/Kg		102	80 - 130
Cobalt	15.0	1.26	J	mg/Kg		8	1 - 60
Iron	150	ND		mg/Kg		2	
Lead	15.0	8.65		mg/Kg		58	40 - 80
Lithium	15.0	16.2	J	mg/Kg		108	80 - 150
Manganese	15.0	ND		mg/Kg		8	1 - 60
Molybdenum	75.0	56.4		mg/Kg		75	60 - 100
Selenium	22.5	23.4		mg/Kg		104	80 - 140

Lab Sample ID: LCSD 140-55597/20-B ^5 **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 56028 **Prep Batch: 55721**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	300	ND		mg/Kg		1		133	
Arsenic	15.0	11.8		mg/Kg		79	60 - 100	0	30
Beryllium	7.50	3.86		mg/Kg		51	40 - 70	1	30
Calcium	7500	2090	J	mg/Kg		28	20 - 50	1	30
Chromium	30.0	30.1		mg/Kg		100	80 - 130	1	30
Cobalt	15.0	1.07	J	mg/Kg		7	1 - 60	17	30
Iron	150	ND		mg/Kg		1		42	
Lead	15.0	8.83		mg/Kg		59	40 - 80	2	30
Lithium	15.0	17.5	J	mg/Kg		117	80 - 150	8	30
Manganese	15.0	ND	*1	mg/Kg		11	1 - 60	40	30
Molybdenum	75.0	56.6		mg/Kg		75	60 - 100	0	30
Selenium	22.5	23.4		mg/Kg		104	80 - 140	0	30

Lab Sample ID: MB 140-55729/18-A **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 6**
Analysis Batch: 56028 **Prep Batch: 55729**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Arsenic	ND		0.50	0.15	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Beryllium	ND		0.25	0.012	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Calcium	ND		250	2.1	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Chromium	ND		0.50	0.070	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Cobalt	ND		2.5	0.046	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Iron	ND		5.0	2.9	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Lead	ND		0.50	0.11	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Lithium	ND		2.5	0.15	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Manganese	ND		0.75	0.25	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Molybdenum	ND		2.0	0.099	mg/Kg		11/10/21 08:00	11/16/21 16:01	1
Selenium	ND		0.50	0.17	mg/Kg		11/10/21 08:00	11/16/21 16:01	1

QC Sample Results

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55729/19-A
Matrix: Solid
Analysis Batch: 56028

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 55729

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	95.6		mg/Kg		96	80 - 120
Arsenic	5.00	5.04		mg/Kg		101	80 - 120
Beryllium	2.50	2.63		mg/Kg		105	80 - 120
Calcium	2500	2480		mg/Kg		99	80 - 120
Chromium	10.0	9.97		mg/Kg		100	80 - 120
Cobalt	5.00	4.99		mg/Kg		100	80 - 120
Iron	50.0	48.8		mg/Kg		98	80 - 120
Lead	5.00	5.15		mg/Kg		103	80 - 120
Lithium	5.00	4.71		mg/Kg		94	80 - 120
Manganese	5.00	5.06		mg/Kg		101	80 - 120
Molybdenum	25.0	25.2		mg/Kg		101	80 - 120
Selenium	7.50	7.45		mg/Kg		99	80 - 120

Lab Sample ID: LCSD 140-55729/20-A
Matrix: Solid
Analysis Batch: 56028

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 55729

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	93.1		mg/Kg		93	80 - 120	3	30
Arsenic	5.00	5.03		mg/Kg		101	80 - 120	0	30
Beryllium	2.50	2.58		mg/Kg		103	80 - 120	2	30
Calcium	2500	2420		mg/Kg		97	80 - 120	2	30
Chromium	10.0	9.77		mg/Kg		98	80 - 120	2	30
Cobalt	5.00	4.92		mg/Kg		98	80 - 120	1	30
Iron	50.0	47.7		mg/Kg		95	80 - 120	2	30
Lead	5.00	5.05		mg/Kg		101	80 - 120	2	30
Lithium	5.00	4.62		mg/Kg		92	80 - 120	2	30
Manganese	5.00	4.94		mg/Kg		99	80 - 120	2	30
Molybdenum	25.0	24.9		mg/Kg		100	80 - 120	1	30
Selenium	7.50	7.51		mg/Kg		100	80 - 120	1	30

Lab Sample ID: MB 140-55778/18-A
Matrix: Solid
Analysis Batch: 56176

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 55778

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Arsenic	ND		0.50	0.13	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Beryllium	ND		0.25	0.016	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Calcium	ND		250	2.6	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Chromium	ND		0.50	0.070	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Cobalt	ND		2.5	0.026	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Iron	ND		5.0	4.1	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Lead	ND		0.50	0.11	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Lithium	ND		2.5	0.15	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Manganese	ND		0.75	0.11	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Molybdenum	ND		2.0	0.082	mg/Kg		11/11/21 08:00	11/20/21 11:06	1
Selenium	ND		0.50	0.17	mg/Kg		11/11/21 08:00	11/20/21 11:06	1

1
2
3
4
5
6
7
8
9
10
11
12
13

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-55778/19-A **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 7**
Analysis Batch: 56176 **Prep Batch: 55778**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	102		mg/Kg		102	80 - 120
Arsenic	5.00	5.30		mg/Kg		106	80 - 120
Beryllium	2.50	2.67		mg/Kg		107	80 - 120
Calcium	2500	2610		mg/Kg		105	80 - 120
Chromium	10.0	10.7		mg/Kg		107	80 - 120
Cobalt	5.00	5.26		mg/Kg		105	80 - 125
Iron	50.0	54.3		mg/Kg		109	80 - 120
Lead	5.00	5.37		mg/Kg		107	80 - 120
Lithium	5.00	5.09		mg/Kg		102	80 - 120
Manganese	5.00	5.48		mg/Kg		110	80 - 120
Molybdenum	25.0	26.5		mg/Kg		106	80 - 125
Selenium	7.50	7.56		mg/Kg		101	80 - 120

Lab Sample ID: LCSD 140-55778/20-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 7**
Analysis Batch: 56176 **Prep Batch: 55778**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	101		mg/Kg		101	80 - 120	1	30
Arsenic	5.00	5.21		mg/Kg		104	80 - 120	2	30
Beryllium	2.50	2.63		mg/Kg		105	80 - 120	2	30
Calcium	2500	2590		mg/Kg		104	80 - 120	1	30
Chromium	10.0	10.6		mg/Kg		106	80 - 120	1	30
Cobalt	5.00	5.23		mg/Kg		105	80 - 125	0	30
Iron	50.0	52.8		mg/Kg		106	80 - 120	3	30
Lead	5.00	5.28		mg/Kg		106	80 - 120	2	30
Lithium	5.00	4.95		mg/Kg		99	80 - 120	3	30
Manganese	5.00	5.43		mg/Kg		109	80 - 120	1	30
Molybdenum	25.0	26.4		mg/Kg		106	80 - 125	0	30
Selenium	7.50	7.60		mg/Kg		101	80 - 120	1	30

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Metals

Prep Batch: 55231

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Total/NA	Solid	Total	
140-24471-2	K-SB-02 (14.7-17.5)	Total/NA	Solid	Total	
140-24471-3	K-SB-12 (13-17.3)	Total/NA	Solid	Total	
140-24471-4	K-SB-12 (17.3-21.0)	Total/NA	Solid	Total	
140-24471-5	K-SB-28 (18-21.5)	Total/NA	Solid	Total	
140-24471-6	K-SB-07 (7-10)	Total/NA	Solid	Total	
140-24471-7	K-SB-07 (10-15)	Total/NA	Solid	Total	
140-24471-8	K-SB-32 (31-36)	Total/NA	Solid	Total	
140-24471-9	K-SB-03 (19-20)	Total/NA	Solid	Total	
140-24471-10	K-SB-08 (4-7)	Total/NA	Solid	Total	
140-24471-11	K-SB-08 (13-17)	Total/NA	Solid	Total	
140-24471-12	K-SB-XPW03 (10-20)	Total/NA	Solid	Total	
MB 140-55231/13-A	Method Blank	Total/NA	Solid	Total	
LCS 140-55231/14-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-55231/15-A	Lab Control Sample Dup	Total/NA	Solid	Total	

SEP Batch: 55232

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 1	Solid	Exchangeable	
140-24471-2	K-SB-02 (14.7-17.5)	Step 1	Solid	Exchangeable	
140-24471-3	K-SB-12 (13-17.3)	Step 1	Solid	Exchangeable	
140-24471-4	K-SB-12 (17.3-21.0)	Step 1	Solid	Exchangeable	
140-24471-5	K-SB-28 (18-21.5)	Step 1	Solid	Exchangeable	
140-24471-6	K-SB-07 (7-10)	Step 1	Solid	Exchangeable	
140-24471-7	K-SB-07 (10-15)	Step 1	Solid	Exchangeable	
140-24471-8	K-SB-32 (31-36)	Step 1	Solid	Exchangeable	
140-24471-9	K-SB-03 (19-20)	Step 1	Solid	Exchangeable	
140-24471-10	K-SB-08 (4-7)	Step 1	Solid	Exchangeable	
140-24471-11	K-SB-08 (13-17)	Step 1	Solid	Exchangeable	
140-24471-12	K-SB-XPW03 (10-20)	Step 1	Solid	Exchangeable	
MB 140-55232/18-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-55232/19-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-55232/20-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	

Prep Batch: 55277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 1	Solid	3010A	55232
140-24471-2	K-SB-02 (14.7-17.5)	Step 1	Solid	3010A	55232
140-24471-3	K-SB-12 (13-17.3)	Step 1	Solid	3010A	55232
140-24471-4	K-SB-12 (17.3-21.0)	Step 1	Solid	3010A	55232
140-24471-5	K-SB-28 (18-21.5)	Step 1	Solid	3010A	55232
140-24471-6	K-SB-07 (7-10)	Step 1	Solid	3010A	55232
140-24471-7	K-SB-07 (10-15)	Step 1	Solid	3010A	55232
140-24471-8	K-SB-32 (31-36)	Step 1	Solid	3010A	55232
140-24471-9	K-SB-03 (19-20)	Step 1	Solid	3010A	55232
140-24471-10	K-SB-08 (4-7)	Step 1	Solid	3010A	55232
140-24471-11	K-SB-08 (13-17)	Step 1	Solid	3010A	55232
140-24471-12	K-SB-XPW03 (10-20)	Step 1	Solid	3010A	55232
MB 140-55232/18-B ^4	Method Blank	Step 1	Solid	3010A	55232
LCS 140-55232/19-B ^5	Lab Control Sample	Step 1	Solid	3010A	55232
LCSD 140-55232/20-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	55232

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Metals

SEP Batch: 55278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 2	Solid	Carbonate	
140-24471-2	K-SB-02 (14.7-17.5)	Step 2	Solid	Carbonate	
140-24471-3	K-SB-12 (13-17.3)	Step 2	Solid	Carbonate	
140-24471-4	K-SB-12 (17.3-21.0)	Step 2	Solid	Carbonate	
140-24471-5	K-SB-28 (18-21.5)	Step 2	Solid	Carbonate	
140-24471-6	K-SB-07 (7-10)	Step 2	Solid	Carbonate	
140-24471-7	K-SB-07 (10-15)	Step 2	Solid	Carbonate	
140-24471-8	K-SB-32 (31-36)	Step 2	Solid	Carbonate	
140-24471-9	K-SB-03 (19-20)	Step 2	Solid	Carbonate	
140-24471-10	K-SB-08 (4-7)	Step 2	Solid	Carbonate	
140-24471-11	K-SB-08 (13-17)	Step 2	Solid	Carbonate	
140-24471-12	K-SB-XPW03 (10-20)	Step 2	Solid	Carbonate	
MB 140-55278/18-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-55278/19-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-55278/20-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Prep Batch: 55481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 2	Solid	3010A	55278
140-24471-2	K-SB-02 (14.7-17.5)	Step 2	Solid	3010A	55278
140-24471-3	K-SB-12 (13-17.3)	Step 2	Solid	3010A	55278
140-24471-4	K-SB-12 (17.3-21.0)	Step 2	Solid	3010A	55278
140-24471-5	K-SB-28 (18-21.5)	Step 2	Solid	3010A	55278
140-24471-6	K-SB-07 (7-10)	Step 2	Solid	3010A	55278
140-24471-7	K-SB-07 (10-15)	Step 2	Solid	3010A	55278
140-24471-8	K-SB-32 (31-36)	Step 2	Solid	3010A	55278
140-24471-9	K-SB-03 (19-20)	Step 2	Solid	3010A	55278
140-24471-10	K-SB-08 (4-7)	Step 2	Solid	3010A	55278
140-24471-11	K-SB-08 (13-17)	Step 2	Solid	3010A	55278
140-24471-12	K-SB-XPW03 (10-20)	Step 2	Solid	3010A	55278
MB 140-55278/18-B ^3	Method Blank	Step 2	Solid	3010A	55278
LCS 140-55278/19-B ^5	Lab Control Sample	Step 2	Solid	3010A	55278
LCSD 140-55278/20-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	55278

SEP Batch: 55482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 3	Solid	Non-Crystalline	
140-24471-2	K-SB-02 (14.7-17.5)	Step 3	Solid	Non-Crystalline	
140-24471-3	K-SB-12 (13-17.3)	Step 3	Solid	Non-Crystalline	
140-24471-4	K-SB-12 (17.3-21.0)	Step 3	Solid	Non-Crystalline	
140-24471-5	K-SB-28 (18-21.5)	Step 3	Solid	Non-Crystalline	
140-24471-6	K-SB-07 (7-10)	Step 3	Solid	Non-Crystalline	
140-24471-7	K-SB-07 (10-15)	Step 3	Solid	Non-Crystalline	
140-24471-8	K-SB-32 (31-36)	Step 3	Solid	Non-Crystalline	
140-24471-9	K-SB-03 (19-20)	Step 3	Solid	Non-Crystalline	
140-24471-10	K-SB-08 (4-7)	Step 3	Solid	Non-Crystalline	
140-24471-11	K-SB-08 (13-17)	Step 3	Solid	Non-Crystalline	
140-24471-12	K-SB-XPW03 (10-20)	Step 3	Solid	Non-Crystalline	
MB 140-55482/18-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-55482/19-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-55482/20-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Metals

Prep Batch: 55544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 3	Solid	3010A	55482
140-24471-2	K-SB-02 (14.7-17.5)	Step 3	Solid	3010A	55482
140-24471-3	K-SB-12 (13-17.3)	Step 3	Solid	3010A	55482
140-24471-4	K-SB-12 (17.3-21.0)	Step 3	Solid	3010A	55482
140-24471-5	K-SB-28 (18-21.5)	Step 3	Solid	3010A	55482
140-24471-6	K-SB-07 (7-10)	Step 3	Solid	3010A	55482
140-24471-7	K-SB-07 (10-15)	Step 3	Solid	3010A	55482
140-24471-8	K-SB-32 (31-36)	Step 3	Solid	3010A	55482
140-24471-9	K-SB-03 (19-20)	Step 3	Solid	3010A	55482
140-24471-10	K-SB-08 (4-7)	Step 3	Solid	3010A	55482
140-24471-11	K-SB-08 (13-17)	Step 3	Solid	3010A	55482
140-24471-12	K-SB-XPW03 (10-20)	Step 3	Solid	3010A	55482
MB 140-55482/18-B	Method Blank	Step 3	Solid	3010A	55482
LCS 140-55482/19-B	Lab Control Sample	Step 3	Solid	3010A	55482
LCSD 140-55482/20-B	Lab Control Sample Dup	Step 3	Solid	3010A	55482

SEP Batch: 55545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 4	Solid	Metal Hydroxide	
140-24471-2	K-SB-02 (14.7-17.5)	Step 4	Solid	Metal Hydroxide	
140-24471-3	K-SB-12 (13-17.3)	Step 4	Solid	Metal Hydroxide	
140-24471-4	K-SB-12 (17.3-21.0)	Step 4	Solid	Metal Hydroxide	
140-24471-5	K-SB-28 (18-21.5)	Step 4	Solid	Metal Hydroxide	
140-24471-6	K-SB-07 (7-10)	Step 4	Solid	Metal Hydroxide	
140-24471-7	K-SB-07 (10-15)	Step 4	Solid	Metal Hydroxide	
140-24471-8	K-SB-32 (31-36)	Step 4	Solid	Metal Hydroxide	
140-24471-9	K-SB-03 (19-20)	Step 4	Solid	Metal Hydroxide	
140-24471-10	K-SB-08 (4-7)	Step 4	Solid	Metal Hydroxide	
140-24471-11	K-SB-08 (13-17)	Step 4	Solid	Metal Hydroxide	
140-24471-12	K-SB-XPW03 (10-20)	Step 4	Solid	Metal Hydroxide	
MB 140-55545/18-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-55545/19-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-55545/20-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	

Prep Batch: 55596

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 4	Solid	3010A	55545
140-24471-2	K-SB-02 (14.7-17.5)	Step 4	Solid	3010A	55545
140-24471-3	K-SB-12 (13-17.3)	Step 4	Solid	3010A	55545
140-24471-4	K-SB-12 (17.3-21.0)	Step 4	Solid	3010A	55545
140-24471-5	K-SB-28 (18-21.5)	Step 4	Solid	3010A	55545
140-24471-6	K-SB-07 (7-10)	Step 4	Solid	3010A	55545
140-24471-7	K-SB-07 (10-15)	Step 4	Solid	3010A	55545
140-24471-8	K-SB-32 (31-36)	Step 4	Solid	3010A	55545
140-24471-9	K-SB-03 (19-20)	Step 4	Solid	3010A	55545
140-24471-10	K-SB-08 (4-7)	Step 4	Solid	3010A	55545
140-24471-11	K-SB-08 (13-17)	Step 4	Solid	3010A	55545
140-24471-12	K-SB-XPW03 (10-20)	Step 4	Solid	3010A	55545
MB 140-55545/18-B	Method Blank	Step 4	Solid	3010A	55545
LCS 140-55545/19-B	Lab Control Sample	Step 4	Solid	3010A	55545
LCSD 140-55545/20-B	Lab Control Sample Dup	Step 4	Solid	3010A	55545

QC Association Summary

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Metals

SEP Batch: 55597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 5	Solid	Organic-Bound	
140-24471-2	K-SB-02 (14.7-17.5)	Step 5	Solid	Organic-Bound	
140-24471-3	K-SB-12 (13-17.3)	Step 5	Solid	Organic-Bound	
140-24471-4	K-SB-12 (17.3-21.0)	Step 5	Solid	Organic-Bound	
140-24471-5	K-SB-28 (18-21.5)	Step 5	Solid	Organic-Bound	
140-24471-6	K-SB-07 (7-10)	Step 5	Solid	Organic-Bound	
140-24471-7	K-SB-07 (10-15)	Step 5	Solid	Organic-Bound	
140-24471-8	K-SB-32 (31-36)	Step 5	Solid	Organic-Bound	
140-24471-9	K-SB-03 (19-20)	Step 5	Solid	Organic-Bound	
140-24471-10	K-SB-08 (4-7)	Step 5	Solid	Organic-Bound	
140-24471-11	K-SB-08 (13-17)	Step 5	Solid	Organic-Bound	
140-24471-12	K-SB-XPW03 (10-20)	Step 5	Solid	Organic-Bound	
MB 140-55597/18-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-55597/19-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-55597/20-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	

Prep Batch: 55721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 5	Solid	3010A	55597
140-24471-2	K-SB-02 (14.7-17.5)	Step 5	Solid	3010A	55597
140-24471-3	K-SB-12 (13-17.3)	Step 5	Solid	3010A	55597
140-24471-4	K-SB-12 (17.3-21.0)	Step 5	Solid	3010A	55597
140-24471-5	K-SB-28 (18-21.5)	Step 5	Solid	3010A	55597
140-24471-6	K-SB-07 (7-10)	Step 5	Solid	3010A	55597
140-24471-7	K-SB-07 (10-15)	Step 5	Solid	3010A	55597
140-24471-8	K-SB-32 (31-36)	Step 5	Solid	3010A	55597
140-24471-9	K-SB-03 (19-20)	Step 5	Solid	3010A	55597
140-24471-10	K-SB-08 (4-7)	Step 5	Solid	3010A	55597
140-24471-11	K-SB-08 (13-17)	Step 5	Solid	3010A	55597
140-24471-12	K-SB-XPW03 (10-20)	Step 5	Solid	3010A	55597
MB 140-55597/18-B ^5	Method Blank	Step 5	Solid	3010A	55597
LCS 140-55597/19-B ^5	Lab Control Sample	Step 5	Solid	3010A	55597
LCSD 140-55597/20-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	55597

SEP Batch: 55729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 6	Solid	Acid/Sulfide	
140-24471-2	K-SB-02 (14.7-17.5)	Step 6	Solid	Acid/Sulfide	
140-24471-3	K-SB-12 (13-17.3)	Step 6	Solid	Acid/Sulfide	
140-24471-4	K-SB-12 (17.3-21.0)	Step 6	Solid	Acid/Sulfide	
140-24471-5	K-SB-28 (18-21.5)	Step 6	Solid	Acid/Sulfide	
140-24471-6	K-SB-07 (7-10)	Step 6	Solid	Acid/Sulfide	
140-24471-7	K-SB-07 (10-15)	Step 6	Solid	Acid/Sulfide	
140-24471-8	K-SB-32 (31-36)	Step 6	Solid	Acid/Sulfide	
140-24471-9	K-SB-03 (19-20)	Step 6	Solid	Acid/Sulfide	
140-24471-10	K-SB-08 (4-7)	Step 6	Solid	Acid/Sulfide	
140-24471-11	K-SB-08 (13-17)	Step 6	Solid	Acid/Sulfide	
140-24471-12	K-SB-XPW03 (10-20)	Step 6	Solid	Acid/Sulfide	
MB 140-55729/18-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-55729/19-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-55729/20-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Kincaid Power Station - Illinois

Job ID: 140-24471-1

Metals

Prep Batch: 55778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 7	Solid	Residual	
140-24471-2	K-SB-02 (14.7-17.5)	Step 7	Solid	Residual	
140-24471-3	K-SB-12 (13-17.3)	Step 7	Solid	Residual	
140-24471-4	K-SB-12 (17.3-21.0)	Step 7	Solid	Residual	
140-24471-5	K-SB-28 (18-21.5)	Step 7	Solid	Residual	
140-24471-6	K-SB-07 (7-10)	Step 7	Solid	Residual	
140-24471-7	K-SB-07 (10-15)	Step 7	Solid	Residual	
140-24471-8	K-SB-32 (31-36)	Step 7	Solid	Residual	
140-24471-9	K-SB-03 (19-20)	Step 7	Solid	Residual	
140-24471-10	K-SB-08 (4-7)	Step 7	Solid	Residual	
140-24471-11	K-SB-08 (13-17)	Step 7	Solid	Residual	
140-24471-12	K-SB-XPW03 (10-20)	Step 7	Solid	Residual	
MB 140-55778/18-A	Method Blank	Step 7	Solid	Residual	
LCS 140-55778/19-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-55778/20-A	Lab Control Sample Dup	Step 7	Solid	Residual	

Analysis Batch: 55850

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 1	Solid	6010B SEP	55277
140-24471-1	K-SB-02 (10-14.7)	Step 2	Solid	6010B SEP	55481
140-24471-2	K-SB-02 (14.7-17.5)	Step 1	Solid	6010B SEP	55277
140-24471-2	K-SB-02 (14.7-17.5)	Step 2	Solid	6010B SEP	55481
140-24471-3	K-SB-12 (13-17.3)	Step 1	Solid	6010B SEP	55277
140-24471-3	K-SB-12 (13-17.3)	Step 2	Solid	6010B SEP	55481
140-24471-4	K-SB-12 (17.3-21.0)	Step 1	Solid	6010B SEP	55277
140-24471-4	K-SB-12 (17.3-21.0)	Step 2	Solid	6010B SEP	55481
140-24471-5	K-SB-28 (18-21.5)	Step 1	Solid	6010B SEP	55277
140-24471-5	K-SB-28 (18-21.5)	Step 2	Solid	6010B SEP	55481
140-24471-6	K-SB-07 (7-10)	Step 1	Solid	6010B SEP	55277
140-24471-6	K-SB-07 (7-10)	Step 2	Solid	6010B SEP	55481
140-24471-7	K-SB-07 (10-15)	Step 1	Solid	6010B SEP	55277
140-24471-7	K-SB-07 (10-15)	Step 2	Solid	6010B SEP	55481
140-24471-8	K-SB-32 (31-36)	Step 1	Solid	6010B SEP	55277
140-24471-8	K-SB-32 (31-36)	Step 2	Solid	6010B SEP	55481
140-24471-9	K-SB-03 (19-20)	Step 1	Solid	6010B SEP	55277
140-24471-9	K-SB-03 (19-20)	Step 2	Solid	6010B SEP	55481
140-24471-10	K-SB-08 (4-7)	Step 1	Solid	6010B SEP	55277
140-24471-10	K-SB-08 (4-7)	Step 2	Solid	6010B SEP	55481
140-24471-11	K-SB-08 (13-17)	Step 1	Solid	6010B SEP	55277
140-24471-11	K-SB-08 (13-17)	Step 2	Solid	6010B SEP	55481
140-24471-12	K-SB-XPW03 (10-20)	Step 1	Solid	6010B SEP	55277
140-24471-12	K-SB-XPW03 (10-20)	Step 2	Solid	6010B SEP	55481
MB 140-55232/18-B ^4	Method Blank	Step 1	Solid	6010B SEP	55277
MB 140-55278/18-B ^3	Method Blank	Step 2	Solid	6010B SEP	55481
LCS 140-55232/19-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	55277
LCS 140-55278/19-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	55481
LCSD 140-55232/20-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	55277
LCSD 140-55278/20-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	55481

QC Association Summary

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Metals

Analysis Batch: 55885

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 3	Solid	6010B SEP	55544
140-24471-2	K-SB-02 (14.7-17.5)	Step 3	Solid	6010B SEP	55544
140-24471-3	K-SB-12 (13-17.3)	Step 3	Solid	6010B SEP	55544
140-24471-4	K-SB-12 (17.3-21.0)	Step 3	Solid	6010B SEP	55544
140-24471-5	K-SB-28 (18-21.5)	Step 3	Solid	6010B SEP	55544
140-24471-6	K-SB-07 (7-10)	Step 3	Solid	6010B SEP	55544
140-24471-7	K-SB-07 (10-15)	Step 3	Solid	6010B SEP	55544
140-24471-8	K-SB-32 (31-36)	Step 3	Solid	6010B SEP	55544
140-24471-9	K-SB-03 (19-20)	Step 3	Solid	6010B SEP	55544
140-24471-10	K-SB-08 (4-7)	Step 3	Solid	6010B SEP	55544
140-24471-11	K-SB-08 (13-17)	Step 3	Solid	6010B SEP	55544
140-24471-12	K-SB-XPW03 (10-20)	Step 3	Solid	6010B SEP	55544
MB 140-55232/18-B ^4	Method Blank	Step 1	Solid	6010B SEP	55277
MB 140-55278/18-B ^3	Method Blank	Step 2	Solid	6010B SEP	55481
MB 140-55482/18-B	Method Blank	Step 3	Solid	6010B SEP	55544
LCS 140-55482/19-B	Lab Control Sample	Step 3	Solid	6010B SEP	55544
LCSD 140-55482/20-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	55544

Analysis Batch: 56028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 4	Solid	6010B SEP	55596
140-24471-1	K-SB-02 (10-14.7)	Step 5	Solid	6010B SEP	55721
140-24471-1	K-SB-02 (10-14.7)	Step 6	Solid	6010B SEP	55729
140-24471-2	K-SB-02 (14.7-17.5)	Step 4	Solid	6010B SEP	55596
140-24471-2	K-SB-02 (14.7-17.5)	Step 5	Solid	6010B SEP	55721
140-24471-2	K-SB-02 (14.7-17.5)	Step 6	Solid	6010B SEP	55729
140-24471-3	K-SB-12 (13-17.3)	Step 4	Solid	6010B SEP	55596
140-24471-3	K-SB-12 (13-17.3)	Step 5	Solid	6010B SEP	55721
140-24471-3	K-SB-12 (13-17.3)	Step 6	Solid	6010B SEP	55729
140-24471-4	K-SB-12 (17.3-21.0)	Step 4	Solid	6010B SEP	55596
140-24471-4	K-SB-12 (17.3-21.0)	Step 5	Solid	6010B SEP	55721
140-24471-4	K-SB-12 (17.3-21.0)	Step 6	Solid	6010B SEP	55729
140-24471-5	K-SB-28 (18-21.5)	Step 4	Solid	6010B SEP	55596
140-24471-5	K-SB-28 (18-21.5)	Step 5	Solid	6010B SEP	55721
140-24471-5	K-SB-28 (18-21.5)	Step 6	Solid	6010B SEP	55729
140-24471-6	K-SB-07 (7-10)	Step 4	Solid	6010B SEP	55596
140-24471-6	K-SB-07 (7-10)	Step 5	Solid	6010B SEP	55721
140-24471-6	K-SB-07 (7-10)	Step 6	Solid	6010B SEP	55729
140-24471-7	K-SB-07 (10-15)	Step 4	Solid	6010B SEP	55596
140-24471-7	K-SB-07 (10-15)	Step 5	Solid	6010B SEP	55721
140-24471-7	K-SB-07 (10-15)	Step 6	Solid	6010B SEP	55729
140-24471-8	K-SB-32 (31-36)	Step 4	Solid	6010B SEP	55596
140-24471-8	K-SB-32 (31-36)	Step 5	Solid	6010B SEP	55721
140-24471-8	K-SB-32 (31-36)	Step 6	Solid	6010B SEP	55729
140-24471-9	K-SB-03 (19-20)	Step 4	Solid	6010B SEP	55596
140-24471-9	K-SB-03 (19-20)	Step 5	Solid	6010B SEP	55721
140-24471-9	K-SB-03 (19-20)	Step 6	Solid	6010B SEP	55729
140-24471-10	K-SB-08 (4-7)	Step 4	Solid	6010B SEP	55596
140-24471-10	K-SB-08 (4-7)	Step 5	Solid	6010B SEP	55721
140-24471-10	K-SB-08 (4-7)	Step 6	Solid	6010B SEP	55729
140-24471-11	K-SB-08 (13-17)	Step 4	Solid	6010B SEP	55596

Metals (Continued)

Analysis Batch: 56028 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-11	K-SB-08 (13-17)	Step 5	Solid	6010B SEP	55721
140-24471-11	K-SB-08 (13-17)	Step 6	Solid	6010B SEP	55729
140-24471-12	K-SB-XPW03 (10-20)	Step 4	Solid	6010B SEP	55596
140-24471-12	K-SB-XPW03 (10-20)	Step 5	Solid	6010B SEP	55721
140-24471-12	K-SB-XPW03 (10-20)	Step 6	Solid	6010B SEP	55729
140-24471-12	K-SB-XPW03 (10-20)	Step 6	Solid	6010B SEP	55729
MB 140-55545/18-B	Method Blank	Step 4	Solid	6010B SEP	55596
MB 140-55597/18-B ^5	Method Blank	Step 5	Solid	6010B SEP	55721
MB 140-55729/18-A	Method Blank	Step 6	Solid	6010B SEP	55729
LCS 140-55545/19-B	Lab Control Sample	Step 4	Solid	6010B SEP	55596
LCS 140-55597/19-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	55721
LCS 140-55729/19-A	Lab Control Sample	Step 6	Solid	6010B SEP	55729
LCSD 140-55545/20-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	55596
LCSD 140-55597/20-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	55721
LCSD 140-55729/20-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	55729

Analysis Batch: 56176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Step 7	Solid	6010B SEP	55778
140-24471-1	K-SB-02 (10-14.7)	Step 7	Solid	6010B SEP	55778
140-24471-1	K-SB-02 (10-14.7)	Step 7	Solid	6010B SEP	55778
140-24471-2	K-SB-02 (14.7-17.5)	Step 7	Solid	6010B SEP	55778
140-24471-2	K-SB-02 (14.7-17.5)	Step 7	Solid	6010B SEP	55778
140-24471-3	K-SB-12 (13-17.3)	Step 7	Solid	6010B SEP	55778
140-24471-4	K-SB-12 (17.3-21.0)	Step 7	Solid	6010B SEP	55778
140-24471-5	K-SB-28 (18-21.5)	Step 7	Solid	6010B SEP	55778
140-24471-6	K-SB-07 (7-10)	Step 7	Solid	6010B SEP	55778
140-24471-6	K-SB-07 (7-10)	Step 7	Solid	6010B SEP	55778
140-24471-6	K-SB-07 (7-10)	Step 7	Solid	6010B SEP	55778
140-24471-7	K-SB-07 (10-15)	Step 7	Solid	6010B SEP	55778
140-24471-7	K-SB-07 (10-15)	Step 7	Solid	6010B SEP	55778
140-24471-8	K-SB-32 (31-36)	Step 7	Solid	6010B SEP	55778
140-24471-8	K-SB-32 (31-36)	Step 7	Solid	6010B SEP	55778
140-24471-9	K-SB-03 (19-20)	Step 7	Solid	6010B SEP	55778
140-24471-10	K-SB-08 (4-7)	Step 7	Solid	6010B SEP	55778
140-24471-10	K-SB-08 (4-7)	Step 7	Solid	6010B SEP	55778
140-24471-10	K-SB-08 (4-7)	Step 7	Solid	6010B SEP	55778
140-24471-11	K-SB-08 (13-17)	Step 7	Solid	6010B SEP	55778
140-24471-11	K-SB-08 (13-17)	Step 7	Solid	6010B SEP	55778
140-24471-11	K-SB-08 (13-17)	Step 7	Solid	6010B SEP	55778
140-24471-12	K-SB-XPW03 (10-20)	Step 7	Solid	6010B SEP	55778
140-24471-12	K-SB-XPW03 (10-20)	Step 7	Solid	6010B SEP	55778
140-24471-12	K-SB-XPW03 (10-20)	Step 7	Solid	6010B SEP	55778
140-24471-12	K-SB-XPW03 (10-20)	Step 7	Solid	6010B SEP	55778
MB 140-55778/18-A	Method Blank	Step 7	Solid	6010B SEP	55778
LCS 140-55778/19-A	Lab Control Sample	Step 7	Solid	6010B SEP	55778
LCSD 140-55778/20-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	55778

Analysis Batch: 56350

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Total/NA	Solid	6010B	55231

Metals (Continued)

Analysis Batch: 56350 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Total/NA	Solid	6010B	55231
140-24471-1	K-SB-02 (10-14.7)	Total/NA	Solid	6010B	55231
140-24471-2	K-SB-02 (14.7-17.5)	Total/NA	Solid	6010B	55231
140-24471-2	K-SB-02 (14.7-17.5)	Total/NA	Solid	6010B	55231
140-24471-3	K-SB-12 (13-17.3)	Total/NA	Solid	6010B	55231
140-24471-3	K-SB-12 (13-17.3)	Total/NA	Solid	6010B	55231
140-24471-4	K-SB-12 (17.3-21.0)	Total/NA	Solid	6010B	55231
140-24471-4	K-SB-12 (17.3-21.0)	Total/NA	Solid	6010B	55231
140-24471-4	K-SB-12 (17.3-21.0)	Total/NA	Solid	6010B	55231
140-24471-5	K-SB-28 (18-21.5)	Total/NA	Solid	6010B	55231
140-24471-5	K-SB-28 (18-21.5)	Total/NA	Solid	6010B	55231
140-24471-5	K-SB-28 (18-21.5)	Total/NA	Solid	6010B	55231
140-24471-6	K-SB-07 (7-10)	Total/NA	Solid	6010B	55231
140-24471-6	K-SB-07 (7-10)	Total/NA	Solid	6010B	55231
140-24471-6	K-SB-07 (7-10)	Total/NA	Solid	6010B	55231
140-24471-7	K-SB-07 (10-15)	Total/NA	Solid	6010B	55231
140-24471-7	K-SB-07 (10-15)	Total/NA	Solid	6010B	55231
140-24471-8	K-SB-32 (31-36)	Total/NA	Solid	6010B	55231
140-24471-8	K-SB-32 (31-36)	Total/NA	Solid	6010B	55231
140-24471-9	K-SB-03 (19-20)	Total/NA	Solid	6010B	55231
140-24471-9	K-SB-03 (19-20)	Total/NA	Solid	6010B	55231
140-24471-9	K-SB-03 (19-20)	Total/NA	Solid	6010B	55231
140-24471-10	K-SB-08 (4-7)	Total/NA	Solid	6010B	55231
140-24471-10	K-SB-08 (4-7)	Total/NA	Solid	6010B	55231
140-24471-10	K-SB-08 (4-7)	Total/NA	Solid	6010B	55231
140-24471-11	K-SB-08 (13-17)	Total/NA	Solid	6010B	55231
140-24471-11	K-SB-08 (13-17)	Total/NA	Solid	6010B	55231
140-24471-12	K-SB-XPW03 (10-20)	Total/NA	Solid	6010B	55231
140-24471-12	K-SB-XPW03 (10-20)	Total/NA	Solid	6010B	55231
140-24471-12	K-SB-XPW03 (10-20)	Total/NA	Solid	6010B	55231
MB 140-55231/13-A	Method Blank	Total/NA	Solid	6010B	55231
LCS 140-55231/14-A	Lab Control Sample	Total/NA	Solid	6010B	55231
LCSD 140-55231/15-A	Lab Control Sample Dup	Total/NA	Solid	6010B	55231

Analysis Batch: 56433

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-2	K-SB-02 (14.7-17.5)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-3	K-SB-12 (13-17.3)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-4	K-SB-12 (17.3-21.0)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-5	K-SB-28 (18-21.5)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-6	K-SB-07 (7-10)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-7	K-SB-07 (10-15)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-8	K-SB-32 (31-36)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-9	K-SB-03 (19-20)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-10	K-SB-08 (4-7)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-11	K-SB-08 (13-17)	Sum of Steps 1-7	Solid	6010B SEP	
140-24471-12	K-SB-XPW03 (10-20)	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 53527

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-24471-1	K-SB-02 (10-14.7)	Total/NA	Solid	Moisture	
140-24471-2	K-SB-02 (14.7-17.5)	Total/NA	Solid	Moisture	
140-24471-3	K-SB-12 (13-17.3)	Total/NA	Solid	Moisture	
140-24471-4	K-SB-12 (17.3-21.0)	Total/NA	Solid	Moisture	
140-24471-5	K-SB-28 (18-21.5)	Total/NA	Solid	Moisture	
140-24471-6	K-SB-07 (7-10)	Total/NA	Solid	Moisture	
140-24471-7	K-SB-07 (10-15)	Total/NA	Solid	Moisture	
140-24471-8	K-SB-32 (31-36)	Total/NA	Solid	Moisture	
140-24471-9	K-SB-03 (19-20)	Total/NA	Solid	Moisture	
140-24471-10	K-SB-08 (4-7)	Total/NA	Solid	Moisture	
140-24471-11	K-SB-08 (13-17)	Total/NA	Solid	Moisture	
140-24471-12	K-SB-XPW03 (10-20)	Total/NA	Solid	Moisture	
140-24471-4 DU	K-SB-12 (17.3-21.0)	Total/NA	Solid	Moisture	

Client Sample ID: K-SB-02 (10-14.7)

Lab Sample ID: 140-24471-1

Date Collected: 08/25/21 07:30
Matrix: Solid
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-02 (10-14.7)

Lab Sample ID: 140-24471-1

Date Collected: 08/25/21 07:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 80.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 10:53	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:05	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			56176	11/20/21 11:26	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-02 (10-14.7) Lab Sample ID: 140-24471-1
Date Collected: 08/25/21 07:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 80.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:13	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-02 (14.7-17.5) Lab Sample ID: 140-24471-2
Date Collected: 08/25/21 07:30 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-02 (14.7-17.5) Lab Sample ID: 140-24471-2
Date Collected: 08/25/21 07:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 86.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 10:58	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:14	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-02 (14.7-17.5) Lab Sample ID: 140-24471-2
Date Collected: 08/25/21 07:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 86.4**

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			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:20	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:18	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-12 (13-17.3) Lab Sample ID: 140-24471-3
Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-12 (13-17.3) Lab Sample ID: 140-24471-3
Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 86.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:02	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:27	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:29	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-12 (13-17.3) Lab Sample ID: 140-24471-3

Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 86.3**

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			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:21	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:21	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-12 (17.3-21.0) Lab Sample ID: 140-24471-4

Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-12 (17.3-21.0) Lab Sample ID: 140-24471-4

Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 90.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:07	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:30	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:08	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-12 (17.3-21.0) Lab Sample ID: 140-24471-4

Date Collected: 08/25/21 09:30 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 90.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:34	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:26	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-28 (18-21.5) Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-28 (18-21.5) Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 92.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-28 (18-21.5) Lab Sample ID: 140-24471-5

Date Collected: 08/25/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 92.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:35	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:39	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:34	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:31	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-07 (7-10) Lab Sample ID: 140-24471-6

Date Collected: 08/25/21 13:10 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client: Golder Associates Inc. Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: K-SB-07 (7-10) **Lab Sample ID: 140-24471-6**
Date Collected: 08/25/21 13:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:26	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:41	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:44	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:28	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:34	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			56176	11/20/21 11:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:23	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-07 (10-15)
Lab Sample ID: 140-24471-7
Date Collected: 08/25/21 13:30
Matrix: Solid
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-07 (10-15)
Lab Sample ID: 140-24471-7
Date Collected: 08/25/21 13:30
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 83.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:31	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:33	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:38	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-32 (31-36) Lab Sample ID: 140-24471-8

Date Collected: 08/25/21 15:25 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-32 (31-36) Lab Sample ID: 140-24471-8

Date Collected: 08/25/21 15:25 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 90.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:36	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 17:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 19:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:37	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 13:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-03 (19-20) **Lab Sample ID: 140-24471-9**
Date Collected: 08/26/21 08:15 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-03 (19-20) **Lab Sample ID: 140-24471-9**
Date Collected: 08/26/21 08:15 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 88.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:41	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 12:56	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 17:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 19:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:43	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 15:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 17:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 14:00	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-08 (4-7) Lab Sample ID: 140-24471-10

Date Collected: 08/26/21 09:25 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-08 (4-7) Lab Sample ID: 140-24471-10

Date Collected: 08/26/21 09:25 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:46	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 13:02	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 17:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 19:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 16:48	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 13:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 15:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 17:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			56176	11/20/21 12:18	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-08 (4-7) Lab Sample ID: 140-24471-10

Date Collected: 08/26/21 09:25 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 14:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-08 (13-17) Lab Sample ID: 140-24471-11

Date Collected: 08/26/21 09:55 **Matrix: Solid**
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-08 (13-17) Lab Sample ID: 140-24471-11

Date Collected: 08/26/21 09:55 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 81.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:50	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 13:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 17:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 19:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 17:02	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 13:08	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-08 (13-17)
Lab Sample ID: 140-24471-11
Date Collected: 08/26/21 09:55
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 81.2

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			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 15:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 17:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			56176	11/20/21 12:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 14:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:42	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-XPW03 (10-20)
Lab Sample ID: 140-24471-12
Date Collected: 08/26/21 11:10
Matrix: Solid
Date Received: 09/03/21 09:45

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			56433	11/29/21 12:35	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			53527	09/08/21 10:48	LDP	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: K-SB-XPW03 (10-20)
Lab Sample ID: 140-24471-12
Date Collected: 08/26/21 11:10
Matrix: Solid
Date Received: 09/03/21 09:45
Percent Solids: 87.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			56350	11/24/21 11:55	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			56350	11/24/21 14:34	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		5			56350	11/24/21 14:39	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 17:20	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-XPW03 (10-20) Lab Sample ID: 140-24471-12

Date Collected: 08/26/21 11:10 **Matrix: Solid**
Date Received: 09/03/21 09:45 **Percent Solids: 87.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 19:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 17:07	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 13:12	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 15:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 17:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		2			56028	11/16/21 18:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			56176	11/20/21 12:28	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 14:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			56176	11/20/21 15:47	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		5			56176	11/20/21 15:52	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank Lab Sample ID: MB 140-55231/13-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			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 10:28	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55232/18-B ^4

Date Collected: N/A
Date Received: N/A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55850	11/11/21 16:02	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			55885	11/12/21 15:09	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55278/18-B ^3

Date Collected: N/A
Date Received: N/A

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55850	11/11/21 18:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			55885	11/12/21 15:14	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55482/18-B

Date Collected: N/A
Date Received: N/A

Matrix: Solid

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			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 15:39	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55545/18-B

Date Collected: N/A
Date Received: N/A

Matrix: Solid

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			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 11:55	KNC	TAL KNX
	Instrument ID: DUO									

1 2 3 4 5 6 7 8 9 10 11 12 13

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55597/18-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			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 13:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55729/18-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			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:01	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-55778/18-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			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 11:06	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-55231/14-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			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 10:33	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-55232/19-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			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			55850	11/11/21 16:07	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample **Lab Sample ID: LCS 140-55278/19-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			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			55850	11/11/21 18:09	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample **Lab Sample ID: LCS 140-55482/19-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			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 15:44	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample **Lab Sample ID: LCS 140-55545/19-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			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:00	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample **Lab Sample ID: LCS 140-55597/19-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			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:01	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample **Lab Sample ID: LCS 140-55729/19-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			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:05	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-24471-1
Project/Site: Kincaid Power Station - Illinois

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-55778/19-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			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 11:11	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55231/15-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			1.000 g	50 mL	55231	10/28/21 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			56350	11/24/21 10:38	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55232/20-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			5.000 g	25 mL	55232	10/28/21 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	55277	11/03/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			55850	11/11/21 16:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55278/20-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			5.000 g	25 mL	55278	11/03/21 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	55481	11/04/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			55850	11/11/21 18:14	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55482/20-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			5.000 g	25 mL	55482	11/04/21 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	55544	11/05/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			55885	11/12/21 15:48	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55545/20-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			5.000 g	25 mL	55545	11/05/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	55596	11/08/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			56028	11/16/21 12:05	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55597/20-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			5.000 g	75 mL	55597	11/08/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	55721	11/10/21 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			56028	11/16/21 14:06	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55729/20-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			5.000 g	250 mL	55729	11/10/21 08:00	JMD	TAL KNX
Step 6	Analysis	6010B SEP		1			56028	11/16/21 16:10	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-55778/20-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			1.000 g	50 mL	55778	11/11/21 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			56176	11/20/21 11:16	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: K-SB-12 (17.3-21.0)
Lab Sample ID: 140-24471-4 DU
Date Collected: 08/25/21 09:30
Matrix: Solid
Date Received: 09/03/21 09:45

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			53527	09/08/21 10:48	LDP	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: 140-24471-1
Project/Site: Kincaid 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	06-17-22
California	State	2423	06-30-22
Colorado	State	TN00009	02-28-22
Connecticut	State	PH-0223	02-28-22
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	07-31-22
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	07-31-22
North Carolina (WW/SW)	State	64	12-31-21
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-22
Oregon	NELAP	TNI0189	01-01-22
Pennsylvania	NELAP	68-00576	12-31-21
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-22
Virginia	NELAP	460176	09-14-22
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	08-31-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Method	Method Description	Protocol	Laboratory
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
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

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: Brendan Talbert	Lab PM: Henry, Ryan	Carrier Tracking No(s):	COC No: 140-9426-2833.2
Client Contact: Jeffrey Ingram	Phone: 636-485-8185	E-Mail: williamr.henry@eurofinset.com	State of Origin:	Page: 1 Page 1 of 2
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: ~~Labadie Energy Center - Missouri~~ Kincaid Power Station - Illinois	Project #: ~~14000342~~ 14006484			
Site:	SSOW#:			

Preservation Codes: A - HCL; M - Hexane; None; AsNaO2; Na2O4S; Na2SO3; Na2S2O3; H2SO4; SP Dodecahydrate; Acetone; MCAA; pH 4-5; L - EDA; Z - other (specify); Other:

140-24471 Chain of Custody

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	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	X	
K-SB-02 (10-14.7)	8-25-21	0730	G	S			✓		1 jar
K-SB-02 (14.7-17.5)		0730					✓		1 jar
K-SB-12 (13-17.3)		0930					✓		1 jar
K-SB-12 (17.3-21.0)		0930					✓		1 jar
K-SB-28 (18-21.5)		1110					✓		1 jar
K-SB-07 (7-10)		1310					✓		1 jar
K-SB-07 (10-15)		1330					✓		1 jar
K-SB-32 (31-36)		1525					✓		1 jar
K-SB-03 (19-20)	8-26-21	0815					✓		1 jar
K-SB-08 (4-7)		0925					✓		1 jar
K-SB-08 (13-17)		0955					✓		1 jar

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: Brendan Talbert	Date/Time: 9-2-21 / 1815	Company: Golder	Received by: [signature]	Date/Time: 9-3-21 09:45	Company: ETA Knox
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

Ver: 11/01/2020

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			
Client Contact: Jeffrey Ingram	Sampler: Brendan Talbert	Lab PM: Henry, Ryan	Carrier Tracking No(s):
Company: Golder Associates Inc.	Phone: 636-485-8185	E-Mail: williamr.henry@eurofinset.com	State of Origin:
PWSID:			COC No: 140-9426-2833.1
			Page: Page 2 of 2
			Job #:
Address: 13515 Barrett Parkway Drive Suite 260	Due Date Requested:		
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: ~~Labadie Energy Center - Missouri~~ Kincaid Power Station - Illinois	Project #: ~~14006342~~ 14006434		
Site:	SSOW#:		

Analysis Requested

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	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	X	
K-SB-XPW03 (10-20)	8-26-21	1110	G	S			/		1 jar
CUSTODY SEALS INTACT									
RECEIVED AT RT 2.4/CT 2.5 °C									
BID 9-3-21									
1 COOLER FEDX # 2832 7467 5004 PD									

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)

Other:

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: Brendan Talbert	Date/Time: 9-2-21 / 1815	Company: Golder	Received by: [signature]		Date/Time: 9-3-21 09:45	Company: ETA KNX
Relinquished by:	Date/Time:	Company	Received by:		Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:		Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 11/01/2020

Loc: 140
24471

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 : S071 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: 9-3-21

QA026R32.doc, 062719

ATTACHMENT **2**

SGS Analysis Report (SEP Data)

SGS proposal: IBD
SGS project #: 2267

Sample receipt date: 13-Dec-23
Report date: 18-Apr-23

Version: Final

Customer details

Name:	Lain Glossop
Address:	SGS Mineralogy

Project reference:

P.O. number:

COC:

ANALYSIS REPORT

SGS WO: 4

Report Distribution

Name	Email
Lain Glossop	
Kim Gibbs	

Special notes:

Tessier sequential extraction

Mineralogy LIMS: MI7010-NOV22
Project: CA20I-00000-211-19465-02

3260 Production Way
Burnaby - British Columbia - V5A 4W4
Phone: 604-638-2349 FAX: 604-444-5486

ANALYSIS REPORT

Method Summaries *Test method information available upon request.*

S(T) and C(T): Total sulfur and total carbon by LECO, Method CSA06V
S(SO4): Sulfate by HCl digestion with ICP finish, Method CSA07V
S(S2-): Sulfide by calculation of S(T) - S(SO4)

TIC: Total inorganic carbon by coulometry, Method CSB02V
AP: Acid generating potential based on sulfide sulfur
NP: Modified neutralisation potential by excess acid addition and back titration to pH 8.3
Net NP: Net neutralisation potential = NP - AP
NPR: Neutralisation potential ratio = NP/AP

Metals by Aqua regia digest with ICP-OES/MS finish, Method ICP21B20/ICM21B20
Metals by multi-acid digest with ICP-OES/MS finish, Method ICP40Q12/IMS40Q12
Tessier Sequential Extraction - method available on request

Preliminary Data

Noelene Ahern - Manager: ARD

Final Data Approval

Noelene Ahern - Manager: ARD

3260 Production Way
Burnaby - British Columbia - V5A 4W4
Phone: 604-638-2349 FAX: 604-444-5486

Tessier Extraction

Water Soluble Metals					
Reagent: 15 mL of Nanopure Distilled Water					
Sample			**K-SB-02 (10-15) Water Soluble**	**K-SB-02 (15-20) Water Soluble**	**K-SB-07S (7-11) Water Soluble**
Sample weight (g)			1.0344	1.0203	1.0194
Reagent volume (mL)			15	15	15.0
Volume analysed (after wash dilution and preservation) (mL)			22.5	22.5	22.5
Final diluted solution weight (g)			22.33	22.05	21.89
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	37.8	42.3	18.2
Aluminum Al	mg/L	0.001	2.59	0.653	3.51
Antimony Sb	mg/L	0.0009	< 0.0009	< 0.0009	< 0.0009
Arsenic As	mg/L	0.0002	0.0018	0.0016	0.0015
Barium Ba	mg/L	0.00002	0.0211	0.0125	0.0288
Beryllium Be	mg/L	0.000007	0.000099	0.00002	0.000153
Bismuth Bi	mg/L	0.00001	0.00002	< 0.00001	0.00004
Boron B	mg/L	0.002	0.024	0.027	0.156
Cadmium Cd	mg/L	0.000003	0.000033	0.000016	0.000024
Calcium Ca	mg/L	0.01	9.15	10.3	3.3
Chromium Cr	mg/L	0.00008	0.00457	0.002	0.0064
Cobalt Co	mg/L	0.000004	0.000653	0.000151	0.000812
Copper Cu	mg/L	0.0002	0.0055	0.0035	0.0262
Iron Fe	mg/L	0.007	2.38	0.472	2.97
Lead Pb	mg/L	0.00009	0.00174	0.00074	0.00201
Lithium Li	mg/L	0.0001	0.0082	0.0055	0.0054
Magnesium Mg	mg/L	0.001	3.63	4.02	2.43
Manganese Mn	mg/L	0.00001	0.0204	0.00601	0.0435
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.00414	0.00689	0.00145
Nickel Ni	mg/L	0.0001	0.0022	0.0008	0.003
Phosphorus P	mg/L	0.003	< 0.003	< 0.003	< 0.003
Potassium K	mg/L	0.003	3.35	3.44	1.31
Selenium Se	mg/L	0.00004	0.00143	0.00109	0.00079
Silicon Si	mg/L	0.02	8.99	4.57	10.8
Silver Ag	mg/L	0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium Na	mg/L	0.01	2.25	2.48	3.39
Strontium Sr	mg/L	0.00002	0.0267	0.0318	0.0123
Sulphur (S)	mg/L	1	7	8	12
Thallium Tl	mg/L	0.000005	0.000039	0.00004	0.000024
Tin Sn	mg/L	0.00006	0.00093	0.00393	0.00231
Titanium Ti	mg/L	0.00005	0.0457	0.0109	0.093
Uranium U	mg/L	0.000002	0.000169	0.000464	0.000148
Vanadium V	mg/L	0.00001	0.00634	0.00413	0.00803
Zinc Zn	mg/L	0.002	0.028	0.026	0.026
Zirconium Zr	mg/L	0.002	0.004	< 0.002	0.005

SGS proposal: IBD
SGS project #: 2267

Tessier Extraction

Water Soluble Metals Reagent: 15 mL of Nanopure Distilled Water					
Sample			**K-SB-28 (19-25) Water Soluble**	**K-SB-32 (31-36) Water Soluble**	**Blank**
Sample weight (g)			1.0344	1.0134	0
Reagent volume (mL)			15.0	15.0	15
Volume analysed (after wash dilution and preservation) (mL)			22.5	22.5	22.5
Final diluted solution weight (g)			22.94	22.21	23.18
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	69.5	37.2	2.4
Aluminum Al	mg/L	0.001	0.151	0.194	< 0.01
Antimony Sb	mg/L	0.0009	< 0.0009	< 0.0009	< 0.009
Arsenic As	mg/L	0.0002	0.0014	0.0017	< 0.002
Barium Ba	mg/L	0.00002	0.0116	0.00612	0.0036
Beryllium Be	mg/L	0.000007	< 0.000007	< 0.000007	< 0.00007
Bismuth Bi	mg/L	0.00001	< 0.00001	< 0.00001	< 0.0001
Boron B	mg/L	0.002	0.035	0.047	< 0.02
Cadmium Cd	mg/L	0.000003	0.000016	0.000009	< 0.00003
Calcium Ca	mg/L	0.01	15.3	7.73	< 0.1
Chromium Cr	mg/L	0.00008	0.0016	0.00183	0.0449
Cobalt Co	mg/L	0.000004	0.000035	0.000038	0.00139
Copper Cu	mg/L	0.0002	0.0016	0.0019	0.011
Iron Fe	mg/L	0.007	0.027	0.074	25.4
Lead Pb	mg/L	0.00009	0.00014	0.00019	< 0.0009
Lithium Li	mg/L	0.0001	0.0127	0.0079	< 0.001
Magnesium Mg	mg/L	0.001	7.59	4.35	0.57
Manganese Mn	mg/L	0.00001	0.00269	0.00158	0.174
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.0163	0.00529	0.0047
Nickel Ni	mg/L	0.0001	0.0005	0.0004	0.059
Phosphorus P	mg/L	0.003	< 0.003	< 0.003	< 0.03
Potassium K	mg/L	0.003	13	6.15	0.09
Selenium Se	mg/L	0.00004	0.00292	0.00039	< 0.0004
Silicon Si	mg/L	0.02	2.47	3.9	< 0.2
Silver Ag	mg/L	0.00005	< 0.00005	< 0.00005	< 0.0005
Sodium Na	mg/L	0.01	1.97	2.02	< 0.1
Strontium Sr	mg/L	0.00002	0.051	0.0199	< 0.0008
Sulphur (S)	mg/L	1	23	9	< 1
Thallium Tl	mg/L	0.000005	0.000041	< 0.000005	< 0.00005
Tin Sn	mg/L	0.00006	0.00077	0.00102	0.0018
Titanium Ti	mg/L	0.00005	0.00019	0.00114	0.001
Uranium U	mg/L	0.000002	0.00048	0.000064	0.00002
Vanadium V	mg/L	0.00001	0.00278	0.00321	0.0009
Zinc Zn	mg/L	0.002	0.022	0.023	0.02
Zirconium Zr	mg/L	0.002	< 0.002	< 0.002	< 0.02

Tessier Extraction

Exchangeable Metals					
Reagent: 15 mL of 1 M MgCl2 (pH 7)					
Sample			**K-SB-02 (10-15)**	**K-SB-02 (15-20)**	**K-SB-07S (7-11)**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			27.5	27.5	27.5
Final diluted solution weight (g)			28.695	28.575	28.5
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	52500	53800	51200
Aluminum Al	mg/L	0.001	0.94	0.234	0.468
Antimony Sb	mg/L	0.0009	< 0.0009	< 0.0009	0.0011
Arsenic As	mg/L	0.0002	0.0018	0.0027	0.0021
Barium Ba	mg/L	0.00002	1.11	0.71	1.64
Beryllium Be	mg/L	0.000007	0.00002	0.00001	0.0001
Bismuth Bi	mg/L	0.00001	0.00008	0.00014	0.0001
Boron B	mg/L	0.002	0.013	0.017	0.102
Cadmium Cd	mg/L	0.000003	0.00073	0.0005	0.0008
Calcium Ca	mg/L	0.01	113	118	89.2
Chromium Cr	mg/L	0.00008	0.00835	0.0079	0.00738
Cobalt Co	mg/L	0.000004	0.00253	0.00093	0.00128
Copper Cu	mg/L	0.0002	0.0144	0.0223	0.006
Iron Fe	mg/L	0.007	0.56	0.23	0.364
Lead Pb	mg/L	0.00009	0.00206	0.0008	0.0009
Lithium Li	mg/L	0.0001	0.0113	0.007	0.0106
Magnesium Mg	mg/L	0.001	12700	13000	12400
Manganese Mn	mg/L	0.00001	0.562	0.372	1.13
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.0024	0.00903	0.0106
Nickel Ni	mg/L	0.0001	0.0053	0.0029	0.0128
Phosphorus P	mg/L	0.003	< 0.003	0.09	0.034
Potassium K	mg/L	0.003	13.4	10.1	9.48
Selenium Se	mg/L	0.00004	0.0016	0.00406	0.0001
Silicon Si	mg/L	0.02	4.82	4.11	3.5
Silver Ag	mg/L	0.00005	0.00797	0.006	0.01076
Sodium Na	mg/L	0.01	1.37	1.52	5.55
Strontium Sr	mg/L	0.00002	0.326	0.251	0.281
Sulphur (S)	mg/L	1	19	21	161
Thallium Tl	mg/L	0.000005	0.00008	0.00009	< 0.000005
Tin Sn	mg/L	0.00006	0.00029	< 0.00006	< 0.00006
Titanium Ti	mg/L	0.00005	0.0338	0.00912	0.0104
Uranium U	mg/L	0.000002	0.00051	0.00194	0.000222
Vanadium V	mg/L	0.00001	0.00541	0.00659	0.0025
Zinc Zn	mg/L	0.002	0.034	0.028	0.241
Zirconium Zr	mg/L	0.002	< 0.002	< 0.002	< 0.002

SGS proposal: IBD
SGS project #: 2267

Tessier Extraction

Exchangeable Metals Reagent: 15 mL of 1 M MgCl2 (pH 7)					
Sample			**K-SB-28 (19-25)**	**K-SB-32 (31-36)**	**Blank**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			27.5	27.5	27.5
Final diluted solution weight (g)			28.51	29.28	28.52
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	53100	53800	30600
Aluminum Al	mg/L	0.001	0.514	0.416	0.02
Antimony Sb	mg/L	0.0009	< 0.0009	< 0.0009	< 0.009
Arsenic As	mg/L	0.0002	0.004	0.0024	0.003
Barium Ba	mg/L	0.00002	0.228	0.217	0.0046
Beryllium Be	mg/L	0.000007	0.00002	< 0.000007	< 0.00007
Bismuth Bi	mg/L	0.00001	0.00005	0.00004	< 0.0001
Boron B	mg/L	0.002	0.02	0.046	< 0.02
Cadmium Cd	mg/L	0.000003	0.000473	0.000124	< 0.00003
Calcium Ca	mg/L	0.01	107	88.1	1.7
Chromium Cr	mg/L	0.00008	0.0163	0.00841	0.0599
Cobalt Co	mg/L	0.000004	0.00151	0.000885	0.00094
Copper Cu	mg/L	0.0002	0.0151	0.0122	0.011
Iron Fe	mg/L	0.007	0.791	0.593	20.8
Lead Pb	mg/L	0.00009	0.00065	< 0.00009	0.001
Lithium Li	mg/L	0.0001	0.0128	0.0087	0.001
Magnesium Mg	mg/L	0.001	12800	13000	7420
Manganese Mn	mg/L	0.00001	0.379	0.237	0.149
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.00625	0.00032	0.0071
Nickel Ni	mg/L	0.0001	0.0047	0.0067	0.059
Phosphorus P	mg/L	0.003	< 0.003	0.106	< 0.03
Potassium K	mg/L	0.003	13.2	10.6	1.91
Selenium Se	mg/L	0.00004	0.00193	0.00177	< 0.0004
Silicon Si	mg/L	0.02	3.97	3.81	< 0.2
Silver Ag	mg/L	0.00005	0.00311	0.00806	0.0076
Sodium Na	mg/L	0.01	1.16	0.58	1.3
Strontium Sr	mg/L	0.00002	0.197	0.125	0.003
Sulphur (S)	mg/L	1	20	54	22
Thallium Tl	mg/L	0.000005	0.000213	< 0.000005	< 0.00005
Tin Sn	mg/L	0.00006	< 0.00006	< 0.00006	0.0035
Titanium Ti	mg/L	0.00005	0.0201	0.00944	0.0006
Uranium U	mg/L	0.000002	0.00385	0.00137	0.00003
Vanadium V	mg/L	0.00001	0.00772	0.00664	0.0082
Zinc Zn	mg/L	0.002	0.025	0.15	0.03
Zirconium Zr	mg/L	0.002	< 0.002	< 0.002	< 0.02

Tessier Extraction

Metals Bound to Carbonates					
Reagent: 15 mL of 1 M NaOAc (adjusted to pH 5.0 with Acetic Acid)					
Sample			**K-SB-02 (10-15) Bound to Carbonate**	**K-SB-02 (15-20) Bound to Carbonate**	**K-SB-07S (7-11) Bound to Carbonate**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			32.5	32.5	32.5
Final diluted solution weight (g)			32.93	32.44	32.6
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	1680	4170	953
Aluminum Al	mg/L	0.001	20	16.8	16.7
Antimony Sb	mg/L	0.0009	< 0.0009	0.0023	< 0.0009
Arsenic As	mg/L	0.0002	0.0054	0.0064	0.0065
Barium Ba	mg/L	0.00002	1.18	0.959	1.31
Beryllium Be	mg/L	0.000007	0.0037	0.00296	0.005
Bismuth Bi	mg/L	0.00001	0.00047	0.00031	0.00035
Boron B	mg/L	0.002	0.028	0.043	0.054
Cadmium Cd	mg/L	0.000003	0.00105	0.00122	0.000565
Calcium Ca	mg/L	0.01	247	1050	11.9
Chromium Cr	mg/L	0.00008	1.01	1.72	0.439
Cobalt Co	mg/L	0.000004	0.0257	0.0426	0.0578
Copper Cu	mg/L	0.0002	0.434	0.414	0.225
Iron Fe	mg/L	0.007	26.3	40.5	12.9
Lead Pb	mg/L	0.00009	0.0611	0.16	0.0519
Lithium Li	mg/L	0.0001	0.0176	0.0144	0.0104
Magnesium Mg	mg/L	0.001	257	378	224
Manganese Mn	mg/L	0.00001	2.68	6.94	8.47
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.0125	0.0253	0.0067
Nickel Ni	mg/L	0.0001	0.0657	0.0933	0.0498
Phosphorus P	mg/L	0.003	0.145	0.13	0.025
Potassium K	mg/L	0.003	7.84	7.69	5.68
Selenium Se	mg/L	0.00004	0.00122	0.00091	0.0011
Silicon Si	mg/L	0.02	25.1	20	19.2
Silver Ag	mg/L	0.00005	0.00014	< 0.00005	0.00073
Sodium Na	mg/L	0.01	8610	8600	8410
Strontium Sr	mg/L	0.00002	0.123	0.42	0.0519
Sulphur (S)	mg/L	1	< 1	11	10
Thallium Tl	mg/L	0.000005	0.000046	0.000029	0.00001
Tin Sn	mg/L	0.00006	0.00106	0.00086	0.00089
Titanium Ti	mg/L	0.00005	0.00819	0.0167	0.0111
Uranium U	mg/L	0.000002	0.00243	0.00314	0.00619
Vanadium V	mg/L	0.00001	0.0647	0.0848	0.0274
Zinc Zn	mg/L	0.002	0.16	0.169	0.077
Zirconium Zr	mg/L	0.002	0.003	0.004	0.004

3260 Production Way
Burnaby - British Columbia - V5A 4W4
Phone: 604-638-2349 FAX: 604-444-5486

Tessier Extraction

Metals Bound to Carbonates Reagent: 15 mL of 1 M NaOAc (adjusted to pH 5.0 with Acetic Acid)					
Sample			**K-SB-28 (19-25) Bound to Carbonate**	**K-SB-32 (31-36) Bound to Carbonate**	**Blank**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			32.5	32.5	32.5
Final diluted solution weight (g)			32.46	33.30	33.42
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	5780	5160	1
Aluminum Al	mg/L	0.001	17	16.4	0.02
Antimony Sb	mg/L	0.0009	0.0016	0.001	< 0.009
Arsenic As	mg/L	0.0002	0.01	0.0076	< 0.002
Barium Ba	mg/L	0.00002	0.454	1.06	0.002
Beryllium Be	mg/L	0.000007	0.0026	0.002	< 0.00007
Bismuth Bi	mg/L	0.00001	0.0007	0.00037	< 0.0001
Boron B	mg/L	0.002	0.064	0.054	< 0.02
Cadmium Cd	mg/L	0.000003	0.00171	0.00138	< 0.00003
Calcium Ca	mg/L	0.01	1560	1410	0
Chromium Cr	mg/L	0.00008	1.25	1.6	0.004
Cobalt Co	mg/L	0.000004	0.0377	0.0703	< 0.00004
Copper Cu	mg/L	0.0002	0.341	0.914	< 0.002
Iron Fe	mg/L	0.007	59.1	38.9	0.16
Lead Pb	mg/L	0.00009	0.0519	0.0887	< 0.0009
Lithium Li	mg/L	0.0001	0.0258	0.0162	0.002
Magnesium Mg	mg/L	0.001	459	397	0.18
Manganese Mn	mg/L	0.00001	5.46	10.4	0.0075
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.0498	0.0292	0.002
Nickel Ni	mg/L	0.0001	0.0969	0.135	0.001
Phosphorus P	mg/L	0.003	0.211	0.115	< 0.03
Potassium K	mg/L	0.003	10.9	9.88	2.78
Selenium Se	mg/L	0.00004	0.00222	0.0016	0.0007
Silicon Si	mg/L	0.02	19.6	18.8	0
Silver Ag	mg/L	0.00005	< 0.00005	< 0.00005	0.0065
Sodium Na	mg/L	0.01	8080	8470	9600
Strontium Sr	mg/L	0.00002	0.891	0.625	< 0.0008
Sulphur (S)	mg/L	1	13	11	< 10
Thallium Tl	mg/L	0.000005	0.000142	0.000067	< 0.00005
Tin Sn	mg/L	0.00006	0.00091	0.00086	0.0015
Titanium Ti	mg/L	0.00005	0.021	0.0163	0.0005
Uranium U	mg/L	0.000002	0.00613	0.00294	0.00005
Vanadium V	mg/L	0.00001	0.0698	0.0653	0.0002
Zinc Zn	mg/L	0.002	0.229	0.265	0.02
Zirconium Zr	mg/L	0.002	0.009	0.004	< 0.02

SGS proposal: IBD
SGS project #: 2267

Sample receipt date: 13-Dec-23
Report date: 18-Apr-23

Version: Final

Tessier Extraction

Metals Bound to Fe and Mn Oxides					
Reagent: 15 mL of 0.04M NH2OH. HCl in 25% HOAc					
Sample			**K-SB-02 (10-15) Bound to Fe&Mn Oxides**	**K-SB-02 (15-20) Bound to Fe&Mn Oxides**	**K-SB-07S (7-11) Bound to Fe&Mn Oxides**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			32.5	32.5	32.5
Final diluted solution weight (g)			31.46	31.825	31.3
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	230	835	116
Aluminum Al	mg/L	0.001	25.4	22	27.8
Antimony Sb	mg/L	0.0009	< 0.0009	0.0009	< 0.0009
Arsenic As	mg/L	0.0002	0.0097	0.0092	0.0123
Barium Ba	mg/L	0.00002	0.26	0.203	0.366
Beryllium Be	mg/L	0.000007	0.00552	0.00438	0.0102
Bismuth Bi	mg/L	0.00001	0.00067	0.00061	0.00099
Boron B	mg/L	0.002	0.048	0.051	0.146
Cadmium Cd	mg/L	0.000003	0.00087	0.00034	0.00052
Calcium Ca	mg/L	0.01	41.2	178	5.32
Chromium Cr	mg/L	0.00008	1.08	1.07	0.81
Cobalt Co	mg/L	0.000004	0.0353	0.0307	0.0533
Copper Cu	mg/L	0.0002	0.216	0.146	0.239
Iron Fe	mg/L	0.007	75.8	67	82.2
Lead Pb	mg/L	0.00009	0.0624	0.0978	0.0866
Lithium Li	mg/L	0.0001	0.0601	0.04	0.0569
Magnesium Mg	mg/L	0.001	30.9	95	24.9
Manganese Mn	mg/L	0.00001	1.07	1.45	2.65
Mercury Hg	ug/L	0.01	0.02	0.03	0.06
Molybdenum Mo	mg/L	0.00004	0.0503	0.0807	0.0293
Nickel Ni	mg/L	0.0001	0.116	0.0923	0.113
Phosphorus P	mg/L	0.003	1.02	0.78	0.57
Potassium K	mg/L	0.003	4.74	4.05	3.37
Selenium Se	mg/L	0.00004	0.00204	0.00224	0.00193
Silicon Si	mg/L	0.02	30.6	26.6	35.3
Silver Ag	mg/L	0.00005	0.00659	0.00593	0.00751
Sodium Na	mg/L	0.01	167	51.7	252
Strontium Sr	mg/L	0.00002	0.0472	0.0961	0.0271
Sulphur (S)	mg/L	1	7	7	7
Thallium Tl	mg/L	0.000005	0.00011	0.00015	0.00008
Tin Sn	mg/L	0.00006	0.00086	0.0008	0.00079
Titanium Ti	mg/L	0.00005	0.0103	0.0141	0.0125
Uranium U	mg/L	0.000002	0.00193	0.00238	0.00595
Vanadium V	mg/L	0.00001	0.14	0.134	0.235
Zinc Zn	mg/L	0.002	0.19	0.135	0.148
Zirconium Zr	mg/L	0.002	0.012	0.018	0.024

SGS proposal: IBD
SGS project #: 2267

Tessier Extraction

Metals Bound to Fe and Mn Oxides Reagent: 15 mL of 0.04M NH2OH. HCl in 25% HOAc					
Sample			**K-SB-28 (19-25) Bound to Fe&Mn Oxides**	**K-SB-32 (31-36) Bound to Fe&Mn Oxides**	**Blank**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL)			32.5	32.5	32.5
Final diluted solution weight (g)			33.13	32.30	33.01
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	2530	1260	< 0.5
Aluminum Al	mg/L	0.001	19.3	21.5	0.02
Antimony Sb	mg/L	0.0009	< 0.0009	< 0.0009	< 0.009
Arsenic As	mg/L	0.0002	0.0326	0.0134	< 0.002
Barium Ba	mg/L	0.00002	0.115	0.166	< 0.0008
Beryllium Be	mg/L	0.000007	0.00381	0.00333	< 0.00007
Bismuth Bi	mg/L	0.00001	0.00119	0.00058	< 0.0001
Boron B	mg/L	0.002	0.101	0.087	< 0.02
Cadmium Cd	mg/L	0.000003	0.00032	0.00017	< 0.00003
Calcium Ca	mg/L	0.01	563	275	< 0.1
Chromium Cr	mg/L	0.00008	0.692	1.07	0.0055
Cobalt Co	mg/L	0.000004	0.045	0.018	0.00004
Copper Cu	mg/L	0.0002	0.0661	0.203	0.0013
Iron Fe	mg/L	0.007	119	64.4	0.073
Lead Pb	mg/L	0.00009	0.0851	0.0502	0.00043
Lithium Li	mg/L	0.0001	0.0534	0.0406	0.0058
Magnesium Mg	mg/L	0.001	272	139	0.019
Manganese Mn	mg/L	0.00001	3.98	1.28	0.0005
Mercury Hg	ug/L	0.01	0.03	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.149	0.122	0.00391
Nickel Ni	mg/L	0.0001	0.105	0.0916	0.0023
Phosphorus P	mg/L	0.003	2.63	0.97	0.027
Potassium K	mg/L	0.003	5.41	5.28	< 0.009
Selenium Se	mg/L	0.00004	0.00242	0.00136	0.00082
Silicon Si	mg/L	0.02	23.8	27.6	0.03
Silver Ag	mg/L	0.00005	0.00101	0.0038	0.00014
Sodium Na	mg/L	0.01	24	16.4	0.1
Strontium Sr	mg/L	0.00002	0.249	0.124	0.00026
Sulphur (S)	mg/L	1	9	7	5
Thallium Tl	mg/L	0.000005	0.00031	0.00015	0.00002
Tin Sn	mg/L	0.00006	0.00076	0.00089	0.00175
Titanium Ti	mg/L	0.00005	0.0254	0.018	0.00067
Uranium U	mg/L	0.000002	0.00474	0.00205	0.00014
Vanadium V	mg/L	0.00001	0.119	0.115	0.00021
Zinc Zn	mg/L	0.002	0.17	0.183	0.033
Zirconium Zr	mg/L	0.002	0.03	0.029	0.002

Tessier Extraction

Metals Bound to Organics Reagent: 3 mL of 0.02 M HNO3 + 5 mL 30% H2O2 + 5 mL 1.2 M NH4OAc in 20% HNO3					
Sample			**K-SB-02 (10-15)**	**K-SB-02 (15-20)**	**K-SB-07S (7-11)**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL) (Vol. is approximate)			37.5	37.5	37.5
Final diluted solution weight (g)			36.45	37.575	36.3
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	74.7	79.7	59.7
Aluminum Al	mg/L	0.001	46.5	26.6	55.2
Antimony Sb	mg/L	0.0009	0.0011	0.0012	< 0.0009
Arsenic As	mg/L	0.0002	0.0143	0.0132	0.021
Barium Ba	mg/L	0.00002	0.207	0.103	0.453
Beryllium Be	mg/L	0.000007	0.0016	0.000865	0.00369
Bismuth Bi	mg/L	0.00001	0.00017	0.0001	0.00022
Boron B	mg/L	0.002	0.011	0.011	0.02
Cadmium Cd	mg/L	0.000003	0.000298	0.000192	0.00021
Calcium Ca	mg/L	0.01	14.9	18.2	6.75
Chromium Cr	mg/L	0.00008	0.237	0.193	0.218
Cobalt Co	mg/L	0.000004	0.0137	0.00888	0.0225
Copper Cu	mg/L	0.0002	0.0574	0.0548	0.0766
Iron Fe	mg/L	0.007	15	8.97	21.1
Lead Pb	mg/L	0.00009	0.0595	0.0441	0.0718
Lithium Li	mg/L	0.0001	0.0223	0.0164	0.0251
Magnesium Mg	mg/L	0.001	9.12	8.33	10.4
Manganese Mn	mg/L	0.00001	0.306	0.185	0.864
Mercury Hg	ug/L	0.01	0.02	< 0.01	0.25
Molybdenum Mo	mg/L	0.00004	0.105	0.126	0.0587
Nickel Ni	mg/L	0.0001	0.0479	0.0301	0.0539
Phosphorus P	mg/L	0.003	11	11.7	9.87
Potassium K	mg/L	0.003	1.78	1.4	1.41
Selenium Se	mg/L	0.00004	0.00263	0.00265	0.00246
Silicon Si	mg/L	0.02	23	16.9	24.7
Silver Ag	mg/L	0.00005	0.00446	0.00422	0.0021
Sodium Na	mg/L	0.01	16	13.5	22.6
Strontium Sr	mg/L	0.00002	0.0298	0.0283	0.0266
Sulphur (S)	mg/L	1	< 1	< 1	< 1
Thallium Tl	mg/L	0.000005	0.00012	0.000131	0.000101
Tin Sn	mg/L	0.00006	0.0736	0.117	0.0767
Titanium Ti	mg/L	0.00005	1.56	1.78	0.864
Uranium U	mg/L	0.000002	0.00114	0.00121	0.00168
Vanadium V	mg/L	0.00001	0.0957	0.0709	0.137
Zinc Zn	mg/L	0.002	0.084	0.057	0.08
Zirconium Zr	mg/L	0.002	0.025	0.024	0.074

SGS

SGS proposal: IBD
SGS project #: 2267

Tessier Extraction

Metals Bound to Organics Reagent: 3 mL of 0.02 M HNO3 + 5 mL 30% H2O2 + 5 mL 1.2 M NH4OAc in 20% HNO3					
Sample			**K-SB-28 (19-25)**	**K-SB-32 (31-36)**	**Blank**
Reagent volume (mL)			15	15	15
Volume analysed (after wash dilution and preservation) (mL) (Vol. is approximate)			37.5	37.5	37.5
Final diluted solution weight (g)			37.235	36.98	39.06
Parameter	**Units**	**RDL**			
Hardness CaCO3	mg/L	0.05	88.6	66.4	5.4
Aluminum Al	mg/L	0.001	19.2	19.4	0.073
Antimony Sb	mg/L	0.0009	0.001	< 0.0009	< 0.0009
Arsenic As	mg/L	0.0002	0.103	0.0163	0.0003
Barium Ba	mg/L	0.00002	0.0609	0.0726	0.00219
Beryllium Be	mg/L	0.000007	0.000799	0.000658	0.00001
Bismuth Bi	mg/L	0.00001	0.00027	0.00007	0.00001
Boron B	mg/L	0.002	0.019	0.016	0.008
Cadmium Cd	mg/L	0.000003	0.00123	0.000155	0.00001
Calcium Ca	mg/L	0.01	19.8	14.1	1.54
Chromium Cr	mg/L	0.00008	0.0779	0.126	0.0126
Cobalt Co	mg/L	0.000004	0.0283	0.00642	0.00035
Copper Cu	mg/L	0.0002	0.558	0.0705	0.002
Iron Fe	mg/L	0.007	51.6	8.13	0.07
Lead Pb	mg/L	0.00009	0.0477	0.0169	0.00072
Lithium Li	mg/L	0.0001	0.0305	0.019	0.0002
Magnesium Mg	mg/L	0.001	9.52	7.59	0.37
Manganese Mn	mg/L	0.00001	0.28	0.141	0.0016
Mercury Hg	ug/L	0.01	< 0.01	< 0.01	< 0.01
Molybdenum Mo	mg/L	0.00004	0.0344	0.101	0.00711
Nickel Ni	mg/L	0.0001	0.0675	0.0258	0.0087
Phosphorus P	mg/L	0.003	17.5	12.4	13.3
Potassium K	mg/L	0.003	1.94	1.9	0.19
Selenium Se	mg/L	0.00004	0.00572	0.00111	0.00106
Silicon Si	mg/L	0.02	13.2	13.9	0.11
Silver Ag	mg/L	0.00005	0.00981	0.00465	0.00018
Sodium Na	mg/L	0.01	13.8	14.8	16.7
Strontium Sr	mg/L	0.00002	0.0367	0.0247	0.00848
Sulphur (S)	mg/L	1	51	< 1	< 1
Thallium Tl	mg/L	0.000005	0.00187	0.000147	< 0.000005
Tin Sn	mg/L	0.00006	0.434	0.142	7.69
Titanium Ti	mg/L	0.00005	0.226	1.47	0.00257
Uranium U	mg/L	0.000002	0.00215	0.000704	0.00009
Vanadium V	mg/L	0.00001	0.0293	0.0485	0.00016
Zinc Zn	mg/L	0.002	0.248	0.058	0.025
Zirconium Zr	mg/L	0.002	0.082	0.022	< 0.002

3260 Production Way
Burnaby - British Columbia - V5A 4W4
Phone: 604-638-2349 FAX: 604-444-5486

SGS proposal: IBD
SGS project #: 2267

Sample receipt date: 13-Dec-23
Report date: 18-Apr-23

Version: Final

Metals - Multi-Acid Digestion with ICP-OES/MS Finish

Test Units Method Code	Residual wt g	Aluminum µg/g	Antimony µg/g	Arsenic µg/g	Boron µg/g	Barium µg/g	Beryllium µg/g	Bismuth µg/g	Cadmium µg/g	Calcium µg/g	Chromium µg/g	Cobalt µg/g	Copper µg/g	Iron µg/g	Lead µg/g	Lithium µg/g	Magnesium µg/g
Lower detection		3	0.8	0.5	1	0.01	0.02	0.09	0.02	3	0.5	0.01	0.1	3	0.05	2	3
Sample ID																	
K-SB-02 (10-15)	0.9268	32000	< 0.8	6.1	13	330	0.7	0.22	< 0.02	1700	135	6.6	25	32000	7	22	4100
K-SB-02 (15-20)	0.8159	26000	< 0.8	4.3	6	300	0.6	0.11	< 0.02	2400	52	4.1	21	21000	4	14	2700
K-SB-07S (7-11)	0.9433	43000	< 0.8	5.3	4.8	350	0.8	0.18	0.04	3000	32	5.6	24	27000	6	24	4100
K-SB-28 (19-25)	0.6953	39000	< 0.8	3.9	2	370	1.0	0.12	0.06	3300	56	5.1	13	19000	3	23	5000
K-SB-32 (31-36)	0.7633	29000	< 0.8	6.1	5.6	320	0.7	0.1	0.04	3200	46	3.9	19	19000	2	16	3500

3260 Production Way
Burnaby - British Columbia - V5A 4W4
Phone: 604-638-2349 FAX: 604-444-5486

SGS

Test	Manganese	Molybdenum	Nickel	Phosphorus	Potassium	Selenium	Tin	Silver	Sodium	Strontium	Sulphur	Thallium	Titanium	Uranium	Vanadium	Zinc	Zirconium
Units	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Method Code																	
Lower detection	0.1	0.1	0.1	3	3	0.1	6	0.5	3	0.02	0.03	0.02	0.1	0.002	1	0.7	0.03
Sample ID																	
K-SB-02 (10-15)	130	18	23	340	17000	0.2	200	< 0.5	5600	64	27.0	0.4	2900	1.5	58	39	390
K-SB-02 (15-20)	100	10	16	250	14000	0.3	170	< 0.5	5600	64	32.0	0.2	2100	1.1	34	25	190
K-SB-07S (7-11)	110	6	27	140	15000	0.3	150	< 0.5	6100	74	25.0	0.2	3500	1.7	48	38	330
K-SB-28 (19-25)	140	9.1	20	160	22000	0.3	190	< 0.5	6800	88	100.0	0.3	2900	2.0	46	24	180
K-SB-32 (31-36)	110	7.3	15	240	19000	0.2	180	< 0.5	5800	73	32.0	0.1	2100	1.1	36	31	180

ATTACHMENT **3**
Partitioning Coefficient Memo

TECHNICAL MEMORANDUM

DATE March 30, 2022 **Project No.** 21454831

TO David Mitchell, Stu Cravens, Vic Modeer
Kincaid Generation, LLC

CC Brian Henning - Ramboll

FROM Golder Associates USA Inc. **EMAIL** **Jeffrey_Ingram@golder.com**

EVALUATION OF PARTITION COEFFICIENT RESULTS, KINCAID POWER PLANT ASH POND (CCR UNIT 141), KINCAID POWER PLANT, CHRISTIAN COUNTY, ILLINOIS

1.0 INTRODUCTION

Kincaid Generation, LLC (KG) operates the Kincaid Power Plant (KPP) located in Christian County, Illinois. The Ash Pond (AP or Site), Illinois Environmental Protection Agency [IEPA] ID No. W0218140002 - 01 is a 178-acre unlined surface impoundment used to manage coal combustion residuals (CCRs) at the KPP. The AP is regulated under Part 845 *"Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments"* (State CCR Rule or Part 845) which was promulgated by the Illinois Pollution Control Board (IPCB) on April 21, 2021. WSP Golder (Golder) is assisting KG with Part 845 compliance at the Site.

KG is currently preparing a Construction Permit application for the AP as required under Section 845.220. As a part of the Construction Permit application, groundwater modeling is being conducted for known potential exceedances of groundwater protection standards (GWPS) as outlined in the Operating Permit application for the AP (Burns and McDonnell 2021). In the Operating Permit (October 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) identified potential GWPS exceedances for several compounds potentially associated with the AP, including boron and sulfate. Batch adsorption testing was performed to generate site-specific partition coefficient results for these parameters for use in the groundwater models. This Technical Memorandum summarizes the results of the batch adsorption testing.

2.0 OVERVIEW

In August 2021, Golder conducted a field investigation at the KPP which included the completion of eight (8) soil/rock borings ranging in depth from 20 to 40 feet below ground surface (ft bgs). As a part of that investigation, soil and groundwater samples were submitted to SiREM laboratories (Guelph, ON) for batch solid/liquid partitioning testing. A summary of the soil samples used for the batch testing is provided in Table 1.

Table 1: Batch Attenuation Testing Data Summary

Groundwater Sample ID	Soil Sample ID	Soil: Water Ratio
MW-12S	K-SB-02 (10.0-14.7 ft bgs)	2:1
		1:1

Groundwater Sample ID	Soil Sample ID	Soil: Water Ratio
		1:5
		1:10
		1:20
MW-28	K-SB-02 (14.7-17.5 ft bgs)	2:1
		1:1
		1:5
		1:10
		1:20

Notes:

1) ft bgs – Feet below ground surface

Site-specific partitioning coefficients were determined for constituents of interest (COIs) boron and sulfate, which were identified based on statistical evaluation of potential groundwater exceedances calculated at the Site (Burns and McDonnell 2021). Two groundwater samples (MW-12S and MW-28) and two soil samples (K-SB-02 (10.0-14.7) and K-SB-02 (14.7-17.5)) were used for batch attenuation testing at various ratios (Table 1). For each treatment, 0.1 L of groundwater was brought in contact with an amount of soil (0.003 to 0.17 kg, depending on the ratio) over a seven-day period. Each contact water/soil microcosm was amended (spiked) with meta-arsenite, boric acid, lithium chloride, and sodium sulfate to a target concentration of arsenic, boron, lithium, and sulfate, respectively (Table 2). Arsenic and lithium are not currently COIs at the Site and, therefore, were not evaluated as part of this report. However, arsenic and lithium may be revisited in the future, thus meta-arsenite and lithium chloride were included as additional amendments. After the seven-day contact period, COI concentrations were analyzed in the contact water. The control samples (i.e., groundwater samples MW-12S and MW-28) were only analyzed at the initiation of testing. The oxidation/reduction potential (redox) and pH were measured for each batch test at the beginning and end of the contact period and in the control samples.

Table 2: Microcosm amendment and target concentration for COIs

COI	Groundwater Sample	Amendment	Target Concentration (mg/L)
Arsenic	MW-12S	67.45 µL of a 2 g/L As(III) solution	0.04
	MW-28	68.67 of a 2 g/L As(III) solution	
Boron	MW-12S	17.78 mL of a 10 g/L H_3BO_3 solution	16.8
	MW-28	9.61 mL of a 10 g/L H_3BO_3 solution	
Lithium	MW-12S	2.42 mL of a 1 g/L LiCl solution	0.2

	MW-28	2.39 mL of a 1 g/L LiCl solution	
Sulfate	MW-12S	51.56 mL of a 100 g/L Na_2SO_4 solution	1,748
	MW-28	27.56 mL of a 100 g/L Na_2SO_4 solution	

Notes:
1) g/L – grams per liter
2) mL – milliliter
3) µg/L – micrograms per liter
4) mg/L – miligrams per liter
5) As(III) – arsenite
6) H_3BO_3 – boric acid
7) LiCl – lithium chloride
8) Na_2SO_4 — sodium sulfate

The results of batch attenuation testing (Tables 3 and 4) were used to calculate the following adsorption isotherms for each COI:

- Linear: $q_e = K_D * C_e$
- Langmuir: $C_e/q_e = 1/(K_L * q_m) + C_e/q_m$
- Freundlich: $\log(q_e) = \log(K_F) + (1/n)\log(C_e)$

Where

K_D, K_L, and K_F = the linear, Langmuir, and Freundlich partition coefficients, respectively (in liters per kilogram; L/kg).

q_e = concentration of the adsorbate in soil

C_e = aqueous concentration of the adsorbate

q_m = 1/slope in the linear expression of the isotherm

n = non-linearity constant

3.0 SUMMARY OF RESULTS

Figures that show the linear, Langmuir, and Freundlich isotherms for the two COIs are provided in Appendix A. The partition coefficient values for MW-12S and MW-28 are presented in Tables 5 and 6, respectively. The results of the batch adsorption testing can be summarized as follows:

- **Boron**: Calculated K_D values for MW-12S and MW-28 were 0.05 and 1.81 L/kg, respectively, K_L values -1.4E+6 and -1.5E+4 L/kg, respectively, and K_F values 112 and 27.5 L/kg, respectively. For comparison, in Strenge and Peterson (1989), partition coefficients for boron range from 0.19 to 1.3 L/kg, depending on pH conditions and the amount of sorbent (i.e. clay, organic matter, and iron and aluminum oxyhydroxide) present.
- **Sulfate**: Calculated K_D values for MW-12S and MW-28 were 0.23 and 15.5 L/kg, respectively, K_L values -454 and -750 L/kg, respectively, and K_F values 1.87 and 0.13 L/kg, respectively. In Strenge and Peterson (1989), partition coefficients for sulfate are 0.0 L/kg, regardless of pH conditions and the amount of sorbent present.

- **pH and Redox**: Generally, after the seven-day contact time, the pH of each contact water was consistent with the pH of the control samples (6.94 for MW-12S and 6.90 for MW-28, respectively), ranging from 6.93 to 6.97 across the batch tests. The redox values of the control samples after the seven-day contact time were -54 mV and 116 mV for MW-12S and MW-28, respectively. The redox value of contact water ranged from -131 to +236 mV across treatments.

4.0 REFERENCES

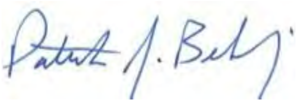
Burns and McDonnell, 2021. Initial Operating Permit Kincaid Power Plant Ash Pond.

Strenge, D. and Peterson, S. 1989. Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS) (No. PNL-7145). Pacific Northwest Lab., Richland, WA (USA).

5.0 CLOSING

Golder appreciates the opportunity to serve as your consultant on this project. If you have any questions concerning this technical memorandum or need additional information, please contact the undersigned.

Golder Associates USA Inc.



Jeffrey Ingram
Senior Consultant, Geologist

Pat Behling
Practice Leader

CK/JSI/PJB

Attachments Appendix A – Partition Coefficient Graphs

Table 3: Batch Attenuation Testing Results, MW-12S

Geologic Material Sample ID	Treatment	Date	Day	Replicate	Dissolved Boron	Dissolved Sulfate	pH	ORP
					mg/L	mg/L	SU	mV
	Groundwater Only Control	2/10/2022	0	MW-12S-1a	17	1,700	6.96	13
				MW-12S-2a	18	1,513	6.95	8
				Average Concentration (mg/L)	17	1,606	6.96	11
		2/17/2022	7	MW-12S-1	16	964	6.94	-59
				MW-12S-2	17	1,059	6.94	-48
				Average Concentration (mg/L)	16	1,012	6.94	-54
MW-12S K-SB-02 (10.0-14.7)	2:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 2:1-1	8.9	878	6.94	-110
				K-SB-02-(10.0-14.7) :MW-12S 2:1-2	8.0	921	6.92	-127
				Average Concentration (mg/L)	8.4	899	6.93	-119
	1:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:1-1	12	1,137	6.92	-131
				K-SB-02-(10.0-14.7) :MW-12S 1:1-2	12	1,284	7.01	--
				Average Concentration (mg/L)	12	1,211	6.97	-131
	1:5 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:5-1	16	1,268	6.95	-4
				K-SB-02-(10.0-14.7) :MW-12S 1:5-2	15	1,568	6.94	16
				Average Concentration (mg/L)	16	1,418	6.95	6
	1:10 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:10-1	16	1,216	6.93	53
				K-SB-02-(10.0-14.7) :MW-12S 1:10-2	17	1,527	6.95	22
				Average Concentration (mg/L)	17	1,372	6.94	38
	1:20 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(10.0-14.7) :MW-12S 1:20-1	19	981	6.96	42
				K-SB-02-(10.0-14.7) :MW-12S 1:20-2	18	1,381	6.95	53
				Average Concentration (mg/L)	19	1,181	6.96	48

Notes:
1) mg/L- Miligrams per liter
2) SU - Standard Units
3) mV - milivolts
4) ORP - Oxidation Reduction Potential
5) ND - non-detect

Table 4: Batch Attenuation Testing Results, MW-28

Geologic Material Sample ID	Treatment	Date	Day	Replicate	Dissolved Boron	Dissolved Sulfate	pH	ORP
					mg/L	mg/L	SU	mV
	Groundwater Only Control	2/10/2022	0	MW-28-1a	18	1,515	6.92	-3
				MW-28-2a	17	1,582	6.93	3
				Average Concentration (mg/L)	18	1,549	6.93	0
		2/17/2022	7	MW-28-1	16	1,397	6.88	183
				MW-28-2	17	624	6.91	48
				Average Concentration (mg/L)	17	1,010	6.90	116
MW-12S K-SB-02 (14.7-17.5)	2:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 2:1-1	8.5	546	6.94	239
				K-SB-02-(14.7-17.5):MW-28 2:1-2	9.2	<1.4	6.92	232
				Average Concentration (mg/L)	8.8	546	6.93	236
	1:1 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:1-1	12	761	6.96	139
				K-SB-02-(14.7-17.5):MW-28 1:1-2	12	1,026	6.95	89
				Average Concentration (mg/L)	12	893	6.96	114
	1:5 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:5-1	17	1,023	6.99	106
				K-SB-02-(14.7-17.5):MW-28 1:5-2	16	999	6.95	107
				Average Concentration (mg/L)	16	1,011	6.97	107
	1:10 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:10-1	16	1,182	6.94	70
				K-SB-02-(14.7-17.5):MW-28 1:10-2	16	949	6.95	79
				Average Concentration (mg/L)	16	1,066	6.95	75
	1:20 Soil:Water Ratio	2/10/2022	0					
		2/17/2022	7	K-SB-02-(14.7-17.5):MW-28 1:20-1	17	1,112	6.94	73
				K-SB-02-(14.7-17.5):MW-28 1:20-2	17	915	6.93	41
				Average Concentration (mg/L)	17	1,013	6.94	57

Notes:
1) mg/L- Miligrams per liter
2) SU - Standard Units
3) mV - milivolts
4) ORP - Oxidation Reduction Potential
5) ND - non-detect

Table 5: Partition Coefficient Results, MW-12S

Analyte	Isotherm	Variable	With Soil Mass
Boron	Raw Data R^2		0.01
	Linear K_D (L/kg)		0.05
	Langmuir	R^2	0.63
		q_m (mg/g)	0.007
		K_L (L/kg)	-1.43E+06
	Freundlich	R^2	0.01
		1/n	0.049
		K_F (L/kg)	111.65
Sulfate	Raw Data R^2		0.00
	Linear K_D (L/kg)		0.23
	Langmuir	R^2	0.08
		q_m (mg/g)	-0.883
		K_L (L/kg)	-4.54E+02
	Freundlich	R^2	0.08
		1/n	2.111
		K_F (L/kg)	1.87

Note(s):

K_D: linear partition coefficient

K_L: Langmuir partition coefficient

K_F: Freundlich partition coefficient

q_m: 1/slope in the linear expression of the isotherm

n: non-linearity constant

Table 6: Partition Coefficient Results, MW-28

Analyte	Isotherm	Variable	With Soil Mass
Boron	Raw Data R^2		0.41
	Linear K_D (L/kg)		1.81
	Langmuir	R^2	0.02
		q_m (mg/g)	-0.043
		K_L (L/kg)	-1.54E+04
	Freundlich	R^2	0.43
		1/n	1.495
		K_F (L/kg)	27.53
Sulfate	Raw Data R^2		0.26
	Linear K_D (L/kg)		15.50
	Langmuir	R^2	0.34
		q_m (mg/g)	-1.013
		K_L (L/kg)	-7.50E+02
	Freundlich	R^2	0.50
		1/n	3.198
		K_F (L/kg)	0.13

Note(s):

K_D: linear partition coefficient

K_L: Langmuir partition coefficient

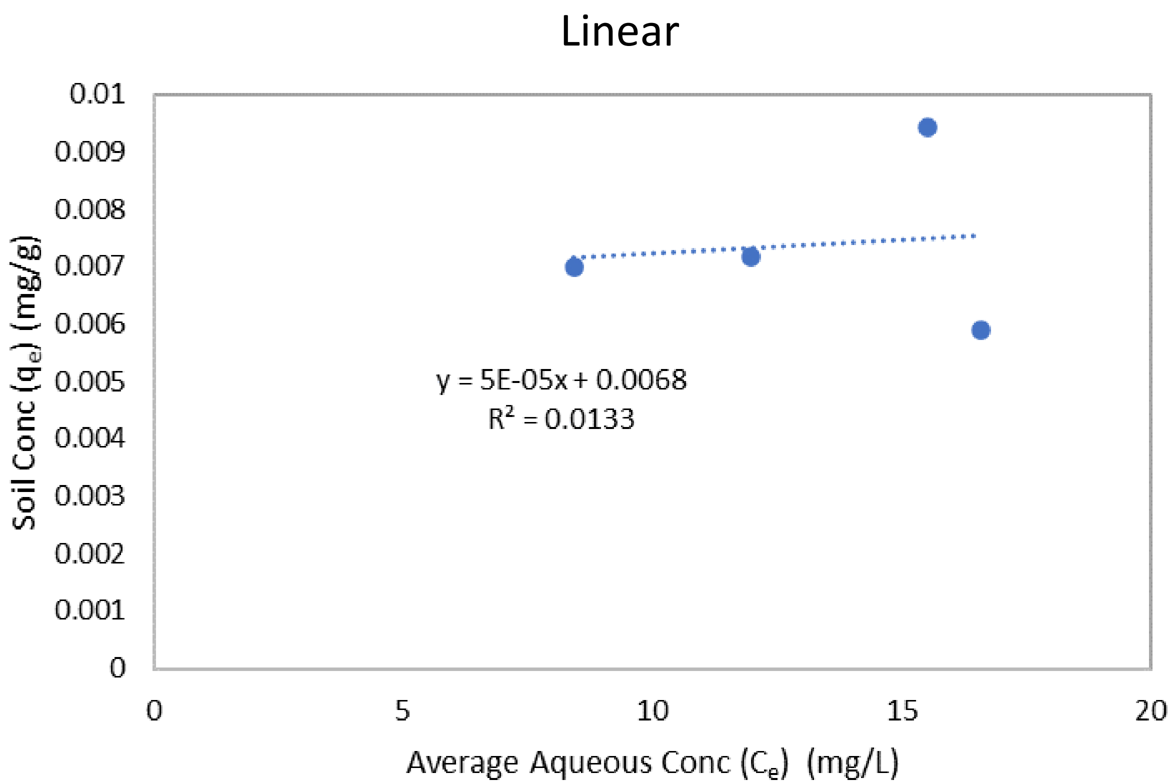
K_F: Freundlich partition coefficient

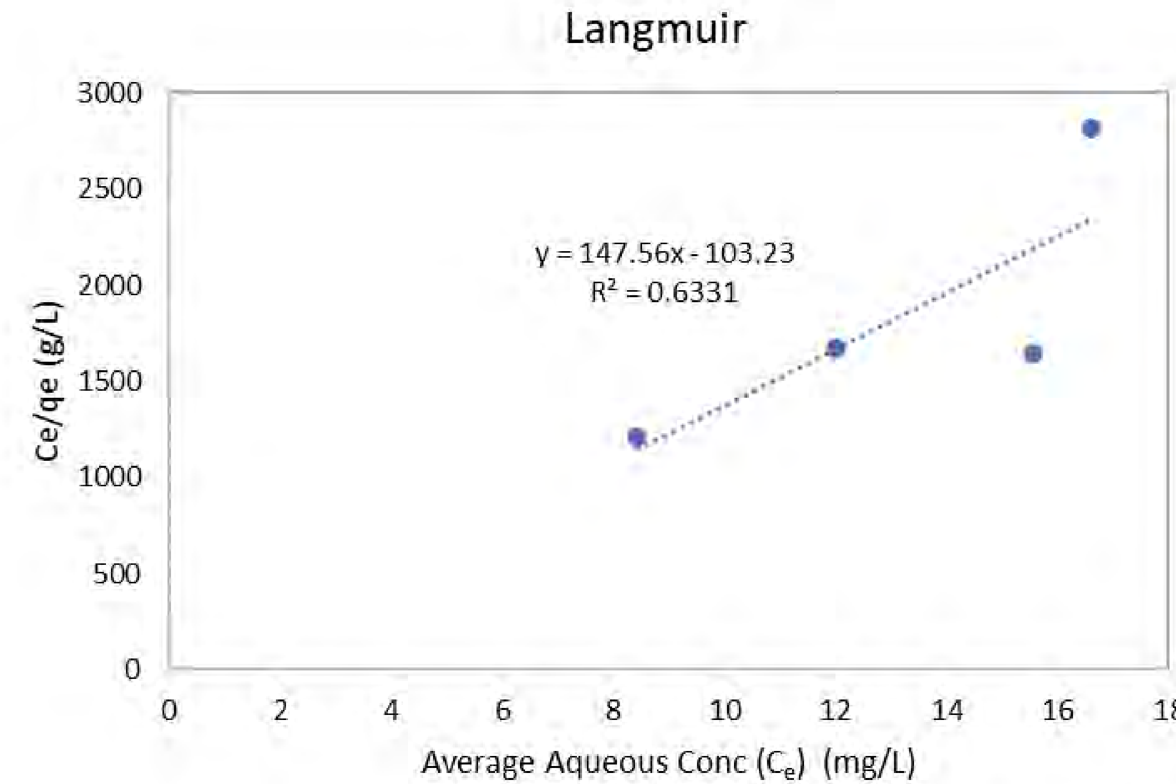
q_m: 1/slope in the linear expression of the isotherm

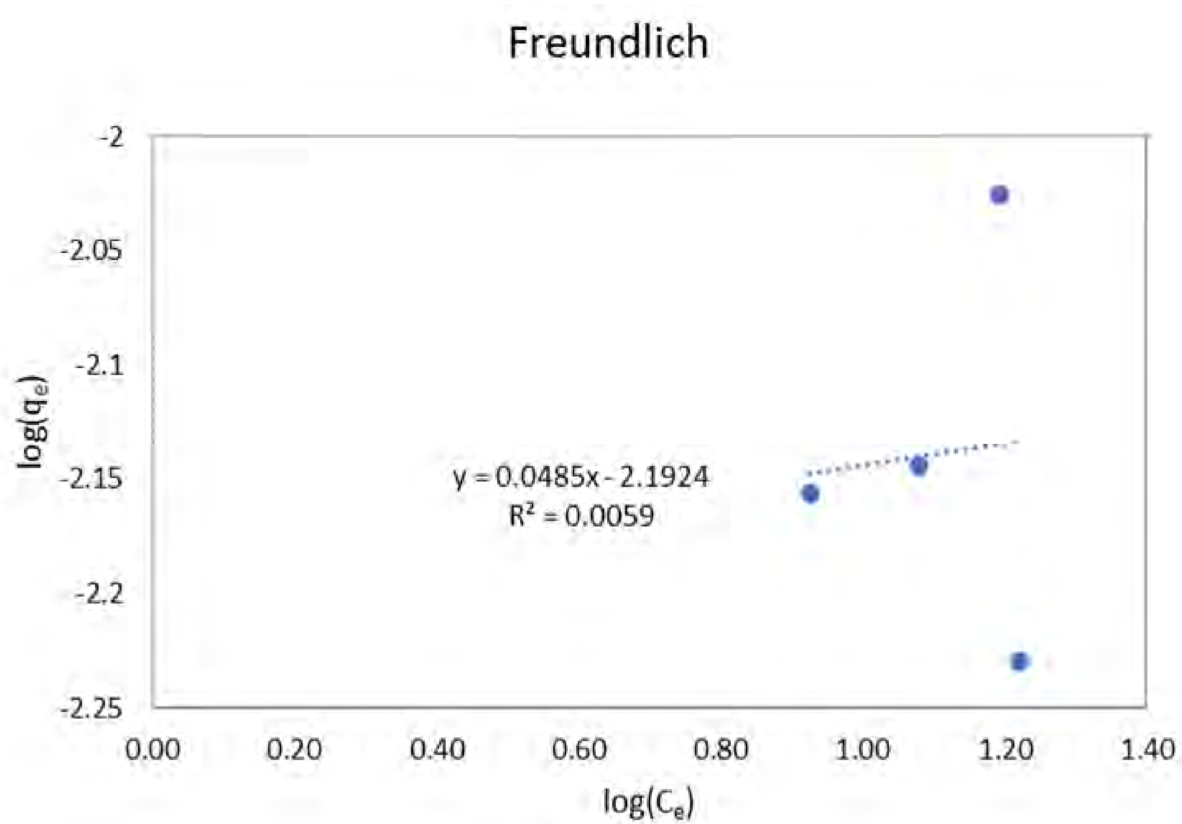
n: non-linearity constant

APPENDIX A

Partition Coefficient Graphs







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

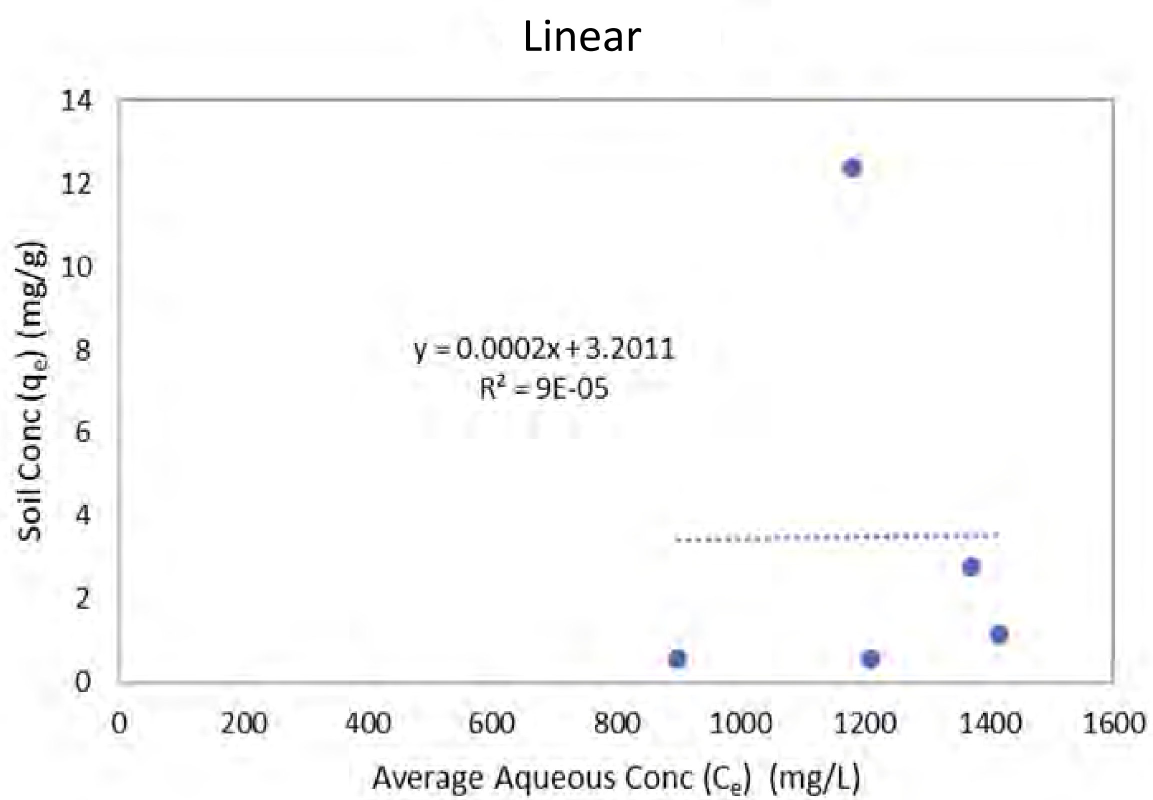
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

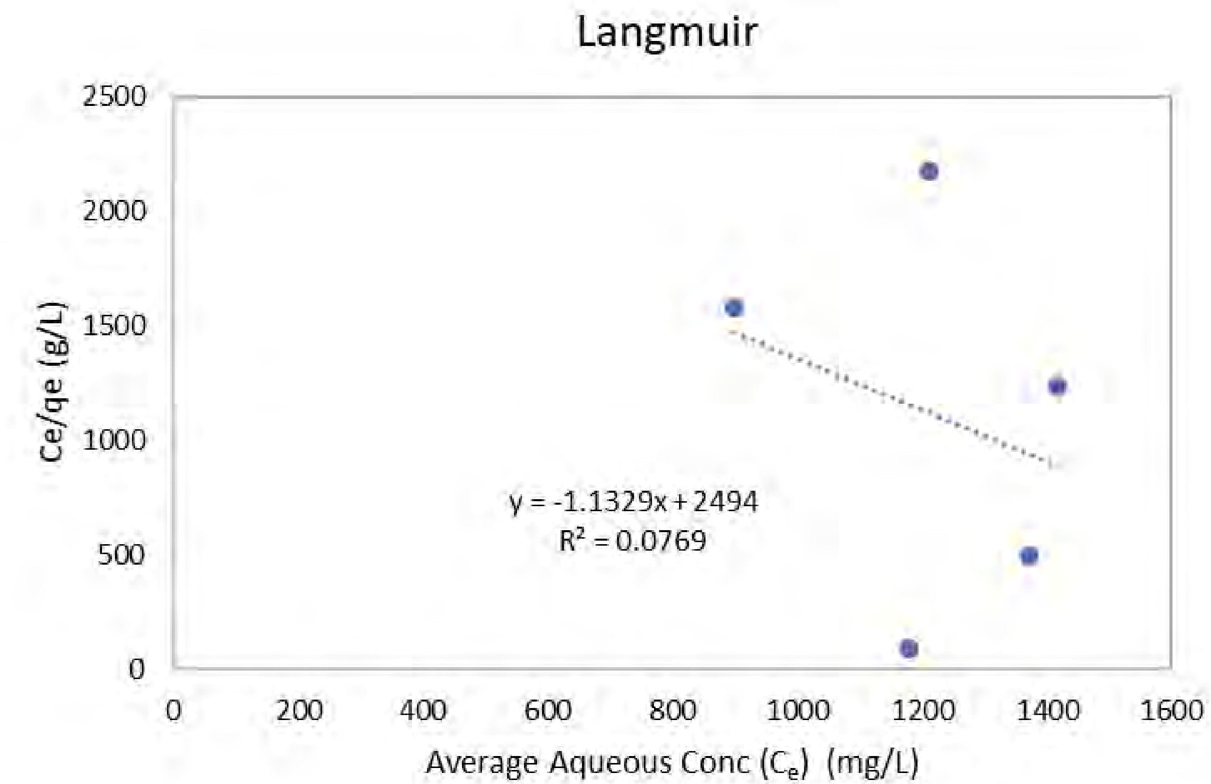
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

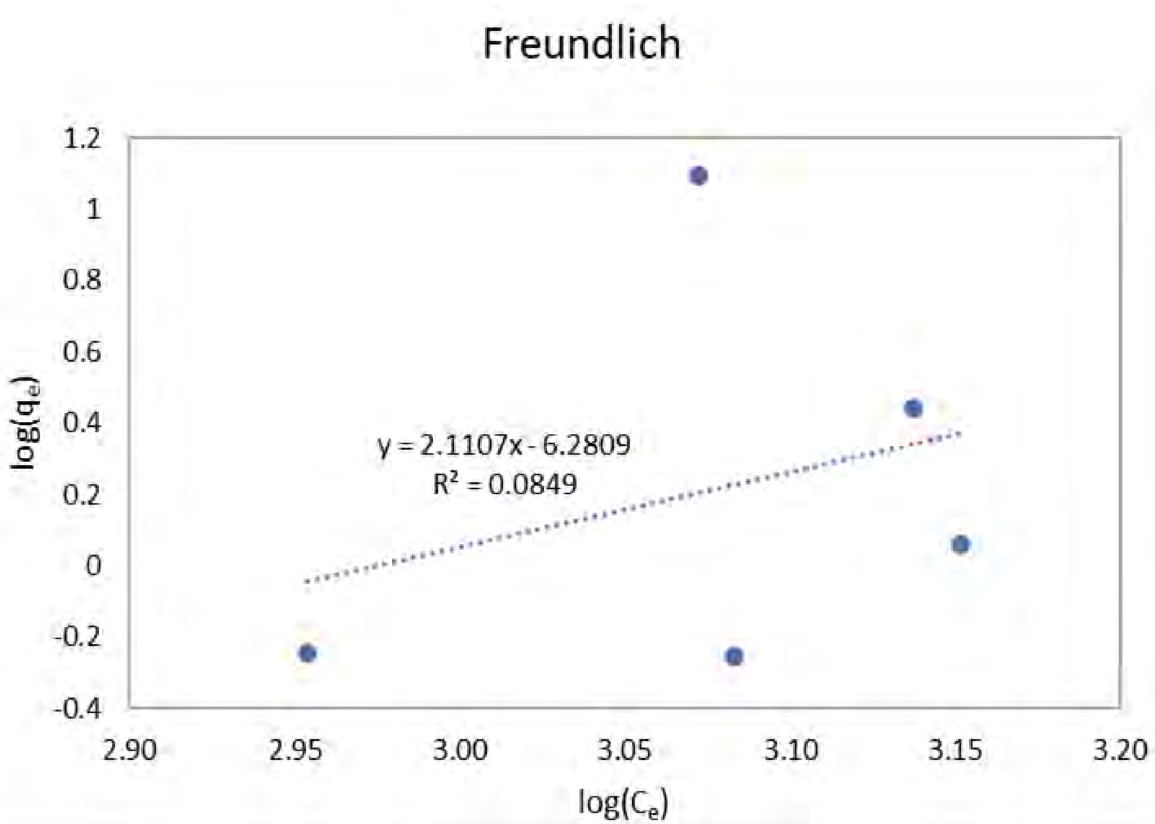
CONSULTANT
WSP GOLDER

TITLE
MW-12S BORON PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-1







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

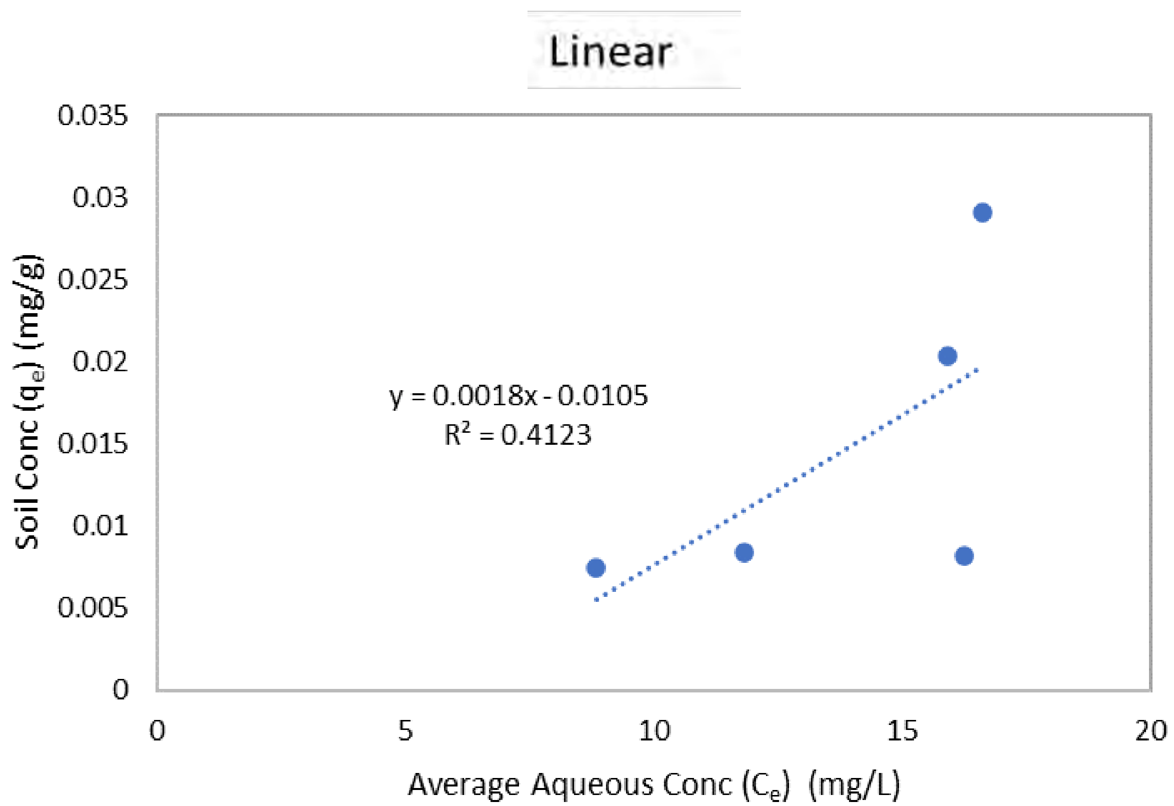
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

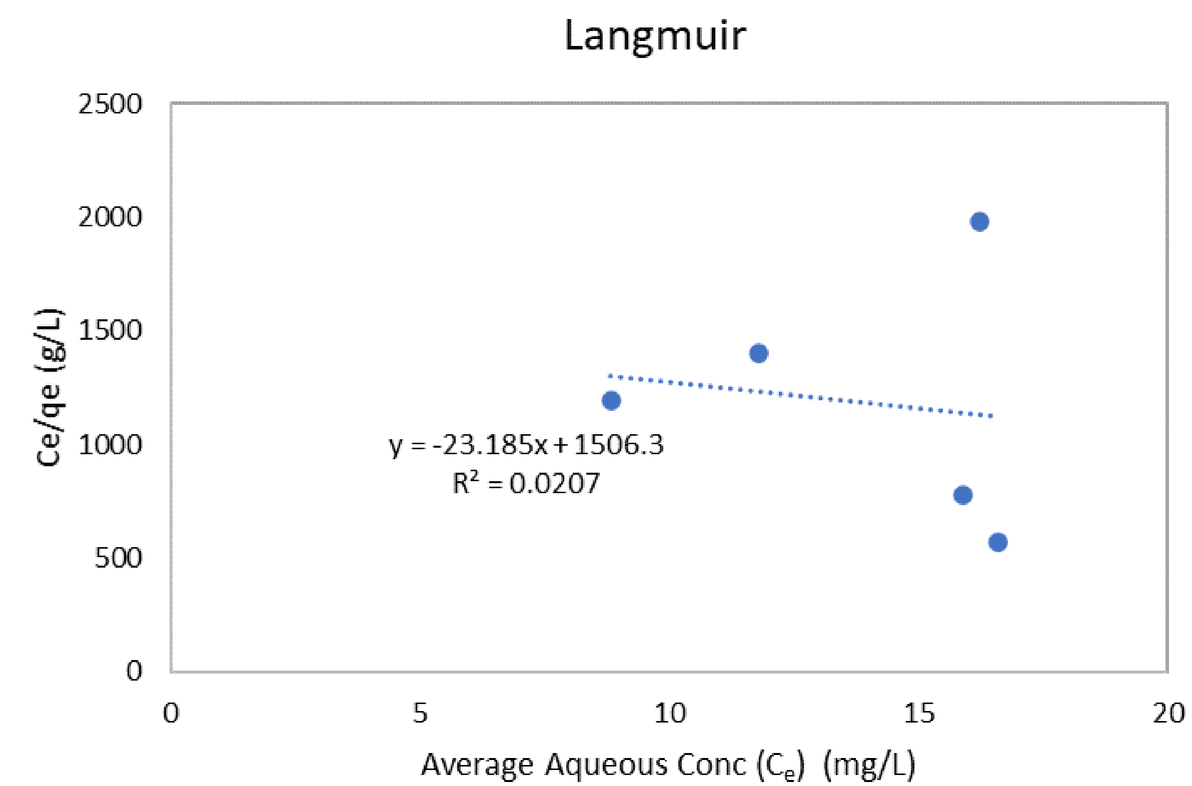
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

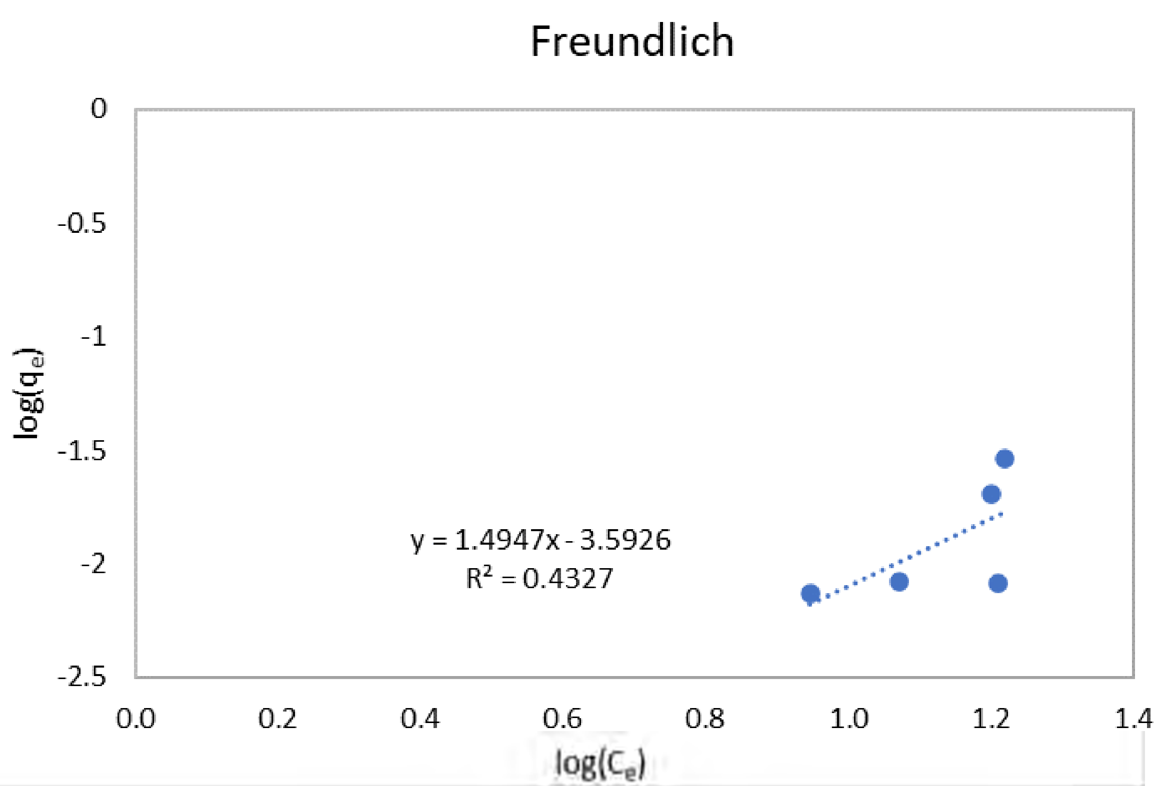
CONSULTANT
WSP GOLDER

TITLE
MW-12S SULFATE PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-2







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

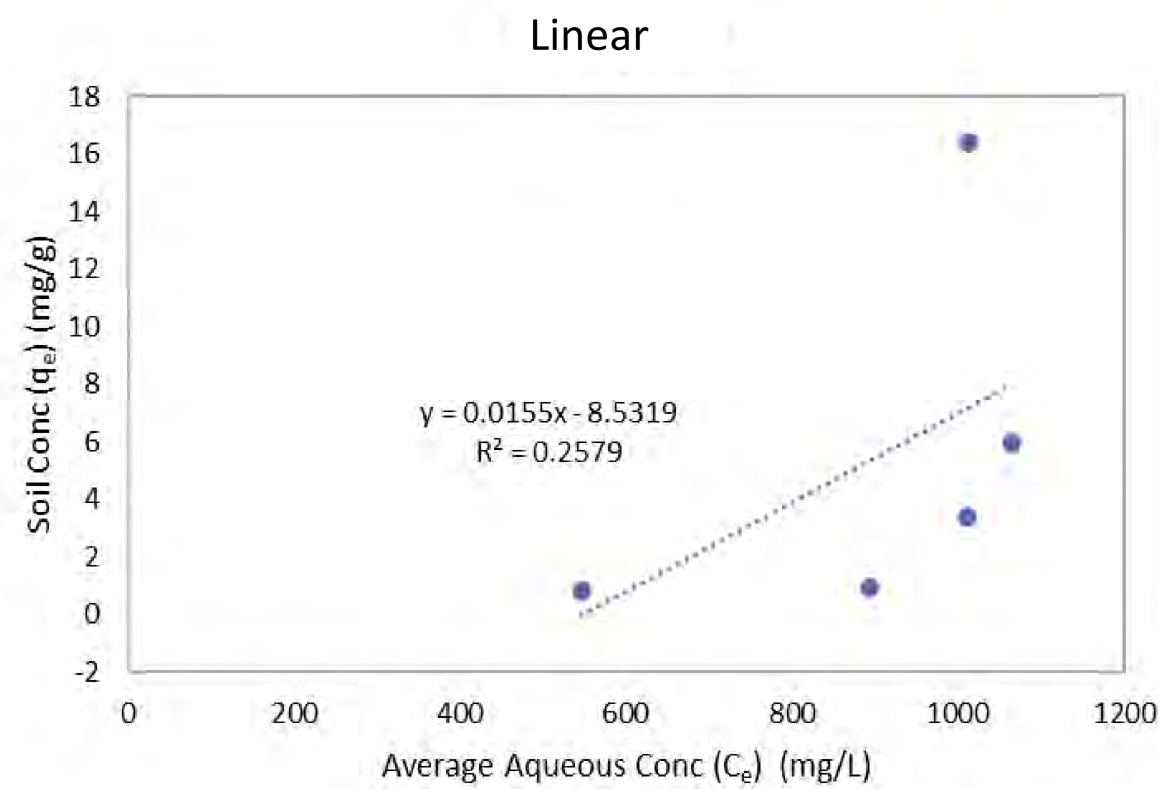
CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

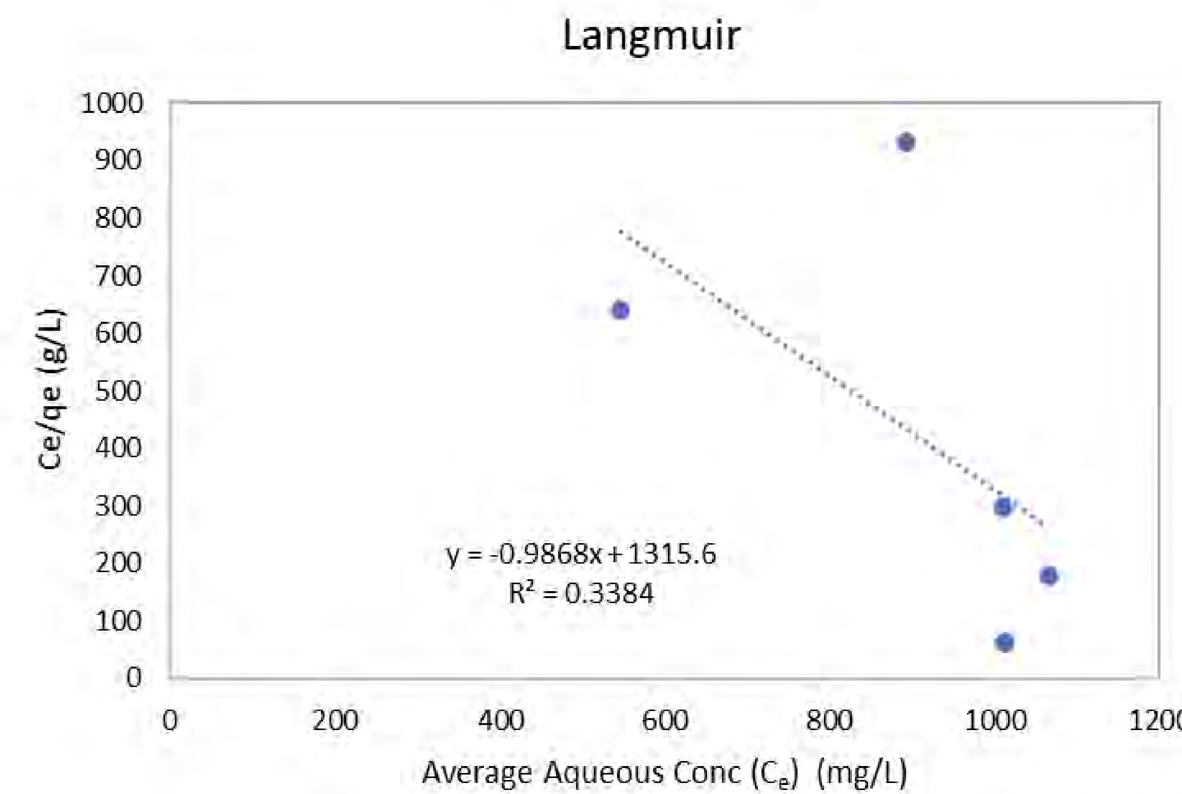
PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

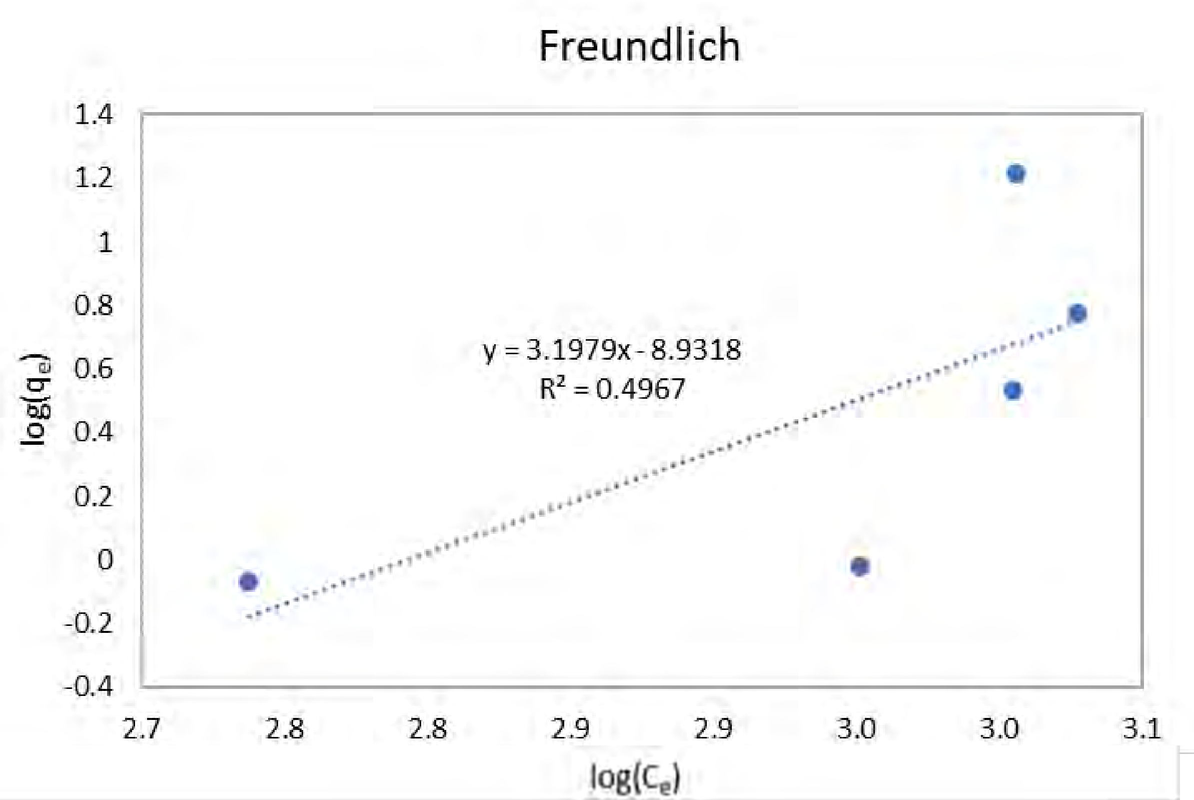
CONSULTANT
WSP GOLDER

TITLE
MW-28 BORON PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-3







Note(s):
mg/L: milligrams per liter
mg/g: milligrams per gram
g/L: grams per liter
Ce: aqueous concentration of the adsorbate
qe: concentration of the adsorbate in soil

CLIENT
KINCAID GENERATION, LLC
KINCAID POWER PLANT ASH POND (CCR UNIT 141)

CONSULTANT
WSP GOLDER

PROJECT
EVALUATION OF PARTITION COEFFICIENT RESULTS AP

TITLE
MW-28 SULFATE PARTITION COEFFICIENTS

PROJECT NO.	PHASE	REV.	FIGURE
21454831	0003	0	A-4

NATURE & EXTENT REPORT ADDENDUM

Intended for
Kincaid Generation, LLC
199 IL 104
Kincaid, IL 62540

Date
May 8, 2025

Project No.
1940110241-007

NATURE AND EXTENT REPORT ADDENDUM

KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

NATURE AND EXTENT REPORT ADDENDUM
KINCAID POWER PLANT, ASH POND, IEPA ID NO. W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940110241-007**
Recipient	**Kincaid Generation, LLC**
Document type	**Nature and Extent Report**
Revision	**FINAL**
Date	**May 8, 2025**
Prepared by	**Nathaniel Keller and Alison O'Connor**
Checked by	**Cathy Huss**
Approved by	**Brian G. Hennings, PG**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Alison O'Connor, PhD
Geochemist

Nathaniel R. Keller
Senior Technical Manager, Hydrogeology

Brian G. Hennings, PG
Project Officer, Hydrogeology

CONTENTS

TABLES (ATTACHED)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
BCU	bedrock confining unit
CCR	coal combustion residuals
CMA	Corrective Measures Assessment
CSM	conceptual site model
E001	Event 1, or initial event
E003	Event 3
GCSM	geochemical conceptual site model
GWPS	groundwater protection standard(s)
ID	Identification
IEPA	Illinois Environmental Protection Agency
KPP	Kincaid Power Plant
LCU	lower confining unit
mg/L	milligrams per liter
NAVD88	North American Vertical Datum 1988
NE Report	Nature and Extent Report
ORP	oxidation reduction potential
PMP	potential migration pathway
redox	oxidation and reduction
SEP	sequential extraction process
SI	surface impoundment
TDS	total dissolved solids
UA	uppermost aquifer
USCU	upper semi-confining unit

1. INTRODUCTION

Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(d)(1) requires the owner or operator of a coal combustion residuals (CCR) surface impoundment (SI) to characterize the nature and extent of a release and relevant site conditions that may affect the remedy ultimately selected for a CCR SI if any constituent regulated under 35 I.A.C. § 845 is found to exceed the groundwater protection standard (GWPS). A report documenting the nature and extent of constituents detected above the GWPS that are attributable to the Kincaid Power Plant (KPP) Ash Pond (AP) was prepared and submitted to the Illinois Environmental Protection Agency (IEPA) dated May 12, 2024 (Nature and Extent Report [NE Report]) [1]. Additional investigation to further characterize the nature and extent as described in the NE Report was collected in June 2024 following the submittal of the Report.

The additional investigation included the following (**Figure 1-1**):

- Installation and development of three monitoring wells (MW-33S, MW-34S, and MW-35S) downgradient of MW-20S, to further define the nature and extent of sulfate.
- Collection of soil samples from the screened interval of each additional well and from the material just above the screen interval (in cases where the lithology of this material was different than the material in the screened interval) to characterize soils that interact with groundwater in support of groundwater polishing evaluations.

The documentation regarding the well installation and well maintenance activities performed during the June 2024 field work is included as **Appendix A**. Groundwater elevations were measured and samples were collected following installation of the wells. This NE Report Addendum supplements the existing NE Report with the results from the additional investigation and initial groundwater monitoring completed in 2024, and results from supplemental groundwater monitoring completed at an existing well (PZ-4A) in 2023-2024.

2. ADDITIONAL INVESTIGATION RESULTS

2.1 Geology

As previously described [1], there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU)/Potential Migration Pathway (PMP):** Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU are more likely to facilitate contaminant migration and these materials are referred to as the PMPs.
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations (referenced to North American Vertical Datum 1988 [NAVD88]) ranging from approximately 570 to 583.5 feet. The LCU is comprised of low permeability silt and clay with minor sand, silt layers, and occasional discontinuous sand lenses (more frequently near the top of the unit) identified as the Vandalia Till.
- **Bedrock Confining Unit (BCU)**: This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and is present beneath the entire AP. Using locations where bedrock was encountered, the elevation of the top of bedrock is highest at MW-20 (548.02 feet) beneath the eastern portion of the AP and declines in elevation to the west toward MW-12D (540.68 feet) and to the south toward KIN-B005 (520 feet).

Monitoring wells installed to further define the nature and extent of sulfate in MW-20S were advanced and screened within the USCU. Materials encountered in the borings included clay and silt with minor amounts of sand, consistent with the previous descriptions for the USCU.

2.2 Hydrogeology

Consistent with previous reporting [1] there is a groundwater divide that occurs in the UA beneath the AP running from approximately the southwestern corner to the northeastern corner. Generally, this divide results in horizontal groundwater flow in the UA to the northwest and southeast toward the lobes of Sangchris Lake. Localized flow toward historic drainage features that were present prior to construction of the AP (*i.e.*, near MW-7/7S and MW-27, MW-28, and MW-31) is also observed on the western and northern side of the unit (**Figure 2-1**).

Within the USCU, groundwater flows radially from the AP. Monitoring wells installed to evaluate the extent of sulfate in MW-20S support radial flow and suggest that flow directions in the USCU may be similar to the UA (*i.e.*, southeast toward a lobe of Sangchris Lake, **Figure 2-1**).

3. UPDATES TO THE OCCURRENCE AND DISTRIBUTION OF GROUNDWATER EXCEEDANCES (EXTENT)

Field sampling forms and groundwater analytical reports for sampling from additional locations are presented in **Appendix B** (laboratory reports for sampling the existing monitoring network are posted quarterly).[1]

3.1 Extents in the Uppermost Aquifer

The NE Report [1] described boron, sulfate, and total dissolved solids (TDS) exceedances[2] within the UA. Exceedances reported in the UA since submittal of that report are consistent except for sulfate at MW-32 (**Figure 3-1**). Exceedances of sulfate have not occurred at MW-32 since submittal of the NE Report (**Table 3-1**).

3.1.1 Boron

Boron concentrations in UA monitoring wells MW-12 and MW-28 continue to exceed the GWPS (2 milligrams per liter [mg/L]) (**Table 3-2**; **Figure 3-1**). Concentrations are consistent with previous reporting [1] and the extents continue to be defined as follows:

- The extents of exceedances above the GWPS are defined laterally in the UA to the northeast by monitoring well MW-30 (**Figure 3-1**), and to the southwest by monitoring well MW-6. Well MW-29, which is located between these two locations, had reported concentrations between 1.57 and 2.01 mg/L in 2021. The west fork of Sangchris Lake is located approximately 30 feet downgradient of MW-12 and 220 feet downgradient of MW-28, and comparison of water elevations indicate that groundwater in the northwest of the AP migrates toward the west lobe of Sangchris Lake. The extent of boron is defined downgradient by surface water samples collected historically near MW-12 and MW-28 [1].
- Downward migration of boron in the UA is inhibited by the underlying the LCU, which includes the lithologic layers of the Vandalia Till. Downward migration of boron is also limited by the upward gradients observed between BCU monitoring well MW-12D and UA monitoring well MW-12. In addition, lack of vertical migration is also supported by the absence of concentrations above the GWPS in historical boron samples at MW-12D, ranging from 0.71 to 1.08 mg/L [1].

3.1.2 Sulfate

Concentrations of sulfate at UA monitoring wells MW-28 and MW-32 resulted in reported exceedances of the GWPS (400 mg/L) as discussed in the NE Report [1] (**Table 3-1**). Concentrations have remained consistent at MW-28, but concentrations at MW-32 have declined and have not resulted in an exceedance since September 2023 (**Figure 3-1**). The extent of sulfate at MW-28 continues to be defined as follows:

[1] https://www.luminant.com/ccr/illinois/?dir=Illinois%2FKincaid
[2] Throughout this document, "exceedance" or "exceedances" is intended to refer only to potential exceedances of proposed applicable background statistics or GWPSs as described in the proposed groundwater monitoring program, which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC's operating permit application for the KPP AP. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and, therefore, Kincaid Generation, LLC has not identified any actual exceedances.

- The extent of sulfate is defined laterally in the UA to the northeast by monitoring well MW-12, which did not have identified sulfate exceedances, and to the southwest by monitoring well MW-6 (**Figure 3-1**). The west fork of Sangchris Lake is located approximately 220 feet downgradient of MW-28 and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of sulfate is defined downgradient by surface water samples collected near MW-28, which indicate concentrations of sulfate are 32 mg/L [1].
- Downward migration of sulfate in the UA at MW-28 is inhibited by the underlying the LCU, as discussed above. In addition, lack of vertical migration is also supported by historical sulfate concentrations at nearby MW-12D, which have been below the laboratory reporting limit of 10 mg/L (method detection limit of 6 mg/L) and consistent upward gradients observed between BCU monitoring well MW-12D and UA monitoring well MW-12D [1].

The sulfate concentrations at MW-32 between 2021 and 2024 range from 335 to 477 mg/L (**Table 3-2**). Monitoring well MW-32 is located northeast of the unit. Data starting in September 2023 through August 2024 following submittal of the NE Report [1] indicates that sulfate concentrations have declined with no exceedances reported in the last 5 quarters. However, the former exceedances continue to be delineated by surrounding monitoring wells (MW-5 to the west, and MW-4 to the southeast), and downgradient by Sangchris Lake as discussed above. Downward migration of sulfate in the UA at MW-32 is inhibited by the underlying the LCU, which includes the lithologic layers of the Vandalia Till as discussed in the NE Report [1].

3.1.3 Total Dissolved Solids

TDS results indicate the mass of dissolved material in the groundwater and is a representation of multiple constituents present in the groundwater. Typically, major ions (such as sulfate) represent the primary contributors to TDS. TDS concentrations in UA monitoring well MW-28 resulted in exceedances of the GWPS (1,200 mg/L; **Table 3-1**). Concentrations in MW-28 are consistent with historical results and the extents of concentrations above the GWPS are defined laterally in the UA to the northeast by monitoring well MW-12 and to the southwest by MW-6. The west fork of Sangchris Lake is located approximately 220 feet downgradient of MW-28, and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of TDS is defined downgradient by surface water samples collected from K-B-1 near MW-28, which indicate concentrations of TDS are 198 mg/L [1].

Downward migration of sulfate in the UA at MW-28 is inhibited by the underlying LCU, as discussed above. In addition, lack of vertical migration is also supported by historical sulfate concentrations at nearby MW-12D [1].

3.2 Extent in the Upper Semi-Confining Unit/Potential Migration Pathway

The NE Report [1] identified boron and sulfate as exceedances within the USCU/PMP units. Exceedances reported in the USCU/PMP since submittal of that report are consistent except for sulfate at MW-20S (**Figure 3-2**). Exceedances of sulfate have not occurred at this location since submittal of the NE Report (**Table 3-1**).

3.2.1 Boron

Boron concentrations in USCU/PMP monitoring well MW-7S were first reported as an exceedance of the GWPS (2 mg/L; **Table 3-1**; **Figure 3-2**) during the third monitoring event (E003;

Quarter 4, 2023). Concentrations of boron at MW-7S since the NE Report continue to exceed the GWPS (**Table 3-2**). Monitoring well MW-7S is located west of the unit, between the AP and the west fork of Sangchris Lake. The west fork of Sangchris Lake is located approximately 200 feet downgradient of MW-7S and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extents of boron exceedances are defined laterally in the USCU to the southeast by monitoring well MW-27 and to the northeast by monitoring well MW-12S, which had no reported exceedances of boron (**Table 3-1**; **Figure 3-2**). The extent of boron is defined downgradient by surface water samples collected near MW-7S, which indicate boron concentrations are less than 0.05 mg/L [1].

Vertically, the extent of boron is defined by monitoring well MW-7, which is nested with MW-7S and screened in the underlying UA, with boron concentrations below the GWPS (**Table 3-2**). Additionally, calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-7 and MW-7S are predominantly upward [1].

3.2.2 Sulfate

Concentrations of sulfate at USCU/PMP wells MW-7S and MW-20S were reported as exceedances of the GWPS (400 mg/L; **Table 3-1**; **Figure 3-2**) in the NE Report [1]. Recent concentrations and the extent of sulfate at these locations are summarized as follows:

- MW-7S - Concentrations of sulfate at MW-7S range from 343 to 577 mg/L (**Table 3-2**). Monitoring well MW-7S is located west of the unit, between the AP and the west fork of Sangchris Lake. The west fork of Sangchris Lake is located approximately 200 feet downgradient of MW-7S and comparison of water elevations indicates that groundwater in this location migrates toward the west fork of Sangchris Lake. The extent of sulfate exceedances is defined laterally in the USCU by wells without reported exceedances to the southeast by monitoring well MW-27, and to the northeast by monitoring well MW-12S (**Table 3-2**; **Figure 3-2**). The extent of sulfate is defined downgradient by surface water samples collected from K-F-1 near MW-7S, which indicate sulfate concentrations are 31 mg/L [1].

  Vertically, the extent of sulfate is defined by monitoring well MW-7, which is nested with MW-7S, screened in the underlying UA, and did not have identified exceedances (**Table 3-2**). Additionally, as described in the NE Report [1] calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-7 and MW-7S are predominantly upward.

- MW-20S - Concentrations of sulfate at MW-20S range from 243 to 519 mg/L (**Table 3-2**). Monitoring well MW-20S is located east of the unit. The extent of sulfate exceedances is defined laterally in the USCU to the south by monitoring well PZ-4A, and to the north, and downgradient to the east, by the recently installed monitoring wells MW-33S, MW-34S, and MW-35S (**Table 3-2**).

  Vertically, the extent of sulfate is defined by monitoring well MW-20, which is nested with MW-20S, screened in the underlying UA, and did not have identified exceedances (**Table 3-2**). Additionally, as described in the NE Report calculated vertical hydraulic gradients between the USCU and UA at paired monitoring wells MW-20 and MW-20S are mostly upward [1].

4. UPDATES TO THE GEOCHEMICAL CONCEPTUAL SITE MODEL (NATURE)

A geochemical conceptual site model (GCSM) was developed to describe the conditions of the groundwater in the vicinity of the KPP AP and is summarized here (full analysis presented in Appendix F of the NE Report to which this addendum is attached). The GCSM describes the geochemical processes that contribute to the mobilization, distribution, and attenuation of chemicals in the environment. Only parameters that have exceeded the GWPS in AP groundwater and will be addressed in the corrective action plan are included in the GCSM. As discussed in previous sections, the exceedances observed at the AP include boron, sulfate, and TDS. The effects of additional and ongoing data collection on the GCSM are summarized below and described in detail in **Appendix C**.

Solid phase data collected from borings at MW-33S, MW-34S, and MW-35S were largely consistent with previous results, although carbonate minerals were not detected in x-ray diffraction analysis of the recent samples. All laboratory reports for additional solid phase characterization are presented in **Appendix D**.

Groundwater geochemical data collected from wells PZ4-A, MW-33S, MW-34S, and MW-35S were consistent with previous results for the site. Results from the aquifer solids and groundwater investigation wells at KPP AP are similar to those previously collected. Therefore, the additional investigation into the nature and extent of the exceedances at KIN AP found results largely consistent with the existing GCSM as summarized below.

CCR porewater is water "collected from the interstitial water between waste particles in SIs as it occurs in the field" [2] and represents the material potentially leached from impoundments. The CCR materials are the primary source of constituent loading to the CCR porewater (*i.e.*, CCR source water). Over an extended period (*e.g.*, months to years), the CCR porewater (*i.e.*, water contained within the interstitial pore spaces of the CCR that can be sampled by low-flow groundwater sampling methods) reaches equilibrium with the CCR materials. The porewater is therefore representative of the mobile phase constituents capable of migrating into the underlying materials and potentially downgradient in groundwater. The AP CCR source water is, therefore, the primary indicator of constituents *available* to the groundwater and is considered the primary source term for environmental investigation and fate and transport modeling.

Boron and sulfate are assessed as indicators of influence from the CCR materials. Sulfate is the major contributor to TDS and is therefore used as a proxy for TDS. Where observed in shallow groundwater at concentrations above the GWPS, concentrations of boron and sulfate are similar to the concentrations measured in CCR porewater. The uneven distribution of sulfate in the shallow UA/PMP groundwater is attributed to the observed chemical heterogeneity in the AP porewater and physical or chemical heterogeneity along the groundwater flow path.

Geochemical attenuation of constituents in groundwater is a function of groundwater pH, oxidation and reduction (redox) potential, availability of adsorbent, and presence of competing ions, among other factors. Groundwater pH exerts a major control on constituent mobility and reflects a neutral and generally stable condition in the range of 6 to 7.5 standard units, independent of location, lithology, or exceedance status. The stability of pH in groundwater is an indication that groundwater is well buffered, likely due to the widespread (although heterogeneous) presence of carbonate minerals in the aquifer solids which buffer pH within this range. Neutral groundwater pH is generally favorable to attenuation of constituents in groundwater, such that it promotes the precipitation of the mineral phases that adsorb constituents from the aqueous phase. Groundwater pH additionally controls the tendency of various constituents to adsorb to the mineral surface. CCR porewater pH is generally similar to groundwater pH.

The redox potential of groundwater exerts another major control on constituent mobility in groundwater. Specifically, in the context of CCR, the iron hydroxide minerals that facilitate attenuation of many constituents, including boron and sulfate, tend towards dissolution under anoxic conditions (also known as reducing, or low oxygen). These same iron hydroxide minerals tend towards precipitation under oxic conditions. Porewater oxidation reduction potential (ORP) is generally reducing, while background groundwater ORP is more oxidized. Exceedance wells oscillate between reducing and oxidizing conditions. It appears that the groundwater measured at the exceedance wells is under some influence of the reducing condition from the CCR porewater, which may in turn have implications for the stability of attenuating mineral phases under the pre-closure condition.

The key finding from the aquifer solids assessment is that adsorptive minerals are present in the aquifer solids and have currently bound both boron and sulfate within the reactive fraction of the solid matrix. The inference follows that some degree of attenuation of the exceedance constituents by the aquifer solids has occurred in the past, most notably through adsorption to both iron and aluminum hydroxide minerals.

5. COMBINED GEOCHEMICAL AND HYDROGEOLOGIC CONCEPTUAL SITE MODELS

5.1 Boron Conceptual Site Model

The conceptual site model (CSM) describing current conditions at the AP combining the hydrogeologic and geochemical CSMs for boron is as follows. Water that may come into contact with CCR in the AP becomes porewater within the unlined CCR unit. Sluicing of CCR elevates heads in the unit and results in radial flow, likely causing porewater impacted with boron to migrate downward and outward into the USCU, PMP, and UA. In the PMP and UA, porewater mixes with groundwater and migrates toward the lobes of Sangchris Lake, primarily in soils where the sandy materials are present and have higher hydraulic conductivity. In addition to physical attenuation mechanisms of dilution and dispersion, sequential extraction process (SEP) results indicate boron has been attenuated via adsorption onto iron and manganese hydroxides.

5.2 Sulfate and TDS Conceptual Site Model

Consistent with the boron CSM, water that may come into contact with CCR in the AP becomes porewater within the unlined CCR unit. Sluicing of CCR elevates heads in the unit and results in radial flow, likely causing porewater impacted with sulfate (and TDS) to migrate downward and outward into the USCU, PMP, and UA. In the PMP and UA, porewater mixes with groundwater and migrates toward lobes of Sangchris Lake, with concentrations attenuating due to physical mechanisms (dilution and dispersion) and adsorption onto iron and manganese oxides as observed in SEP results. Ion exchange is also a potential attenuation mechanism as SEP results indicate a substantial proportion of sulfur was associated with the exchangeable fraction.

Sulfate concentrations at two locations within the UA (MW-32) and USCU/PMP (MW-20S) following submittal of the NE Report [1] have declined and exceedances have not been reported in 2024 at these locations. There were no significant changes in operation of the AP during this time, so the changing concentrations may provide evidence of chemical attenuation mechanisms.

6. CONCLUSIONS AND FUTURE ACTIVITIES

In accordance with 35 I.A.C. § 845.650(d)(1), the nature and extent of GWPS exceedances of boron, sulfate, and TDS have been described in sufficient detail to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the AP.

The lateral extents of exceedances are illustrated in **Figures 3-1** and **3-2**. Boron was selected for modeling source control presented in the Final Closure Plan and was identified as a surrogate for the exceedances of sulfate and TDS, as described in the Groundwater Modeling Report [3].[3] For modeling purposes, it was assumed that boron would not significantly sorb or chemically react with aquifer solids (soil adsorption coefficient was set to 0 milliliters per gram), which is a conservative estimate for predicting contaminant transport times in the model. Additional geochemical modeling was completed to evaluate how sorption to solid phases may affect boron and sulfate mobility and therefore the time to reach the GWPS for these parameters.[4]

[3] The Groundwater Modeling Technical Memorandum is provided as Appendix B to the Corrective Action Alternatives Analysis. The Corrective Action Alternatives Analysis is provided as Appendix B to the Corrective Action Alternatives Analysis to which this report is also attached.

[4] Presented in the Groundwater Polishing Report provided as Appendix E to the Corrective Action Alternatives Analysis to which this report is also attached.

7. REFERENCES

[1] Ramboll Americas Engineering Solutions, Nature and Extent Report, Kincaid Power Plant, Ash Pond, IEPA ID No. W0218140002-01, May 2024.

[2] United States Environmental Protection Agency, "Human and Ecological Risk Assessment of Coal Combustion Residuals (2050-AE81)," December 2014.

[3] Ramboll Americas Engineering Solutions, Inc., "Groundwater Modeling Report, Ash Pond, Kincaid Power Plant, Kincaid, Illinois," July 28, 2022.

TABLES

Table 3-1. Exceedance Parameter Statistical Results
Nature and Extent Report Addendum
Kincaid Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Well Type	HSU	Event	Parameter	Unit	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance
MW-7S	C	USCU	2023 Q4	Boron, total	mg/L	02/24/21 - 11/27/23	10	0	CI around mean	3.73	2	MCL/HBL	YES
MW-7S	C	USCU	2024 Q1	Boron, total	mg/L	02/24/21 - 03/04/24	11	0	CI around mean	3.81	2	MCL/HBL	YES
MW-7S	C	USCU	2024 Q2	Boron, total	mg/L	02/24/21 - 05/20/24	12	0	CI around mean	3.90	2	MCL/HBL	YES
MW-7S	C	USCU	2024 Q3	Boron, total	mg/L	02/24/21 - 08/20/24	13	0	CI around mean	3.91	2	MCL/HBL	YES
MW-7S	C	USCU	2023 Q4	Sulfate, total	mg/L	02/24/21 - 11/27/23	10	0	CI around mean	408	400	MCL/HBL	YES
MW-7S	C	USCU	2024 Q1	Sulfate, total	mg/L	02/24/21 - 03/04/24	11	0	CI around mean	416	400	MCL/HBL	YES
MW-7S	C	USCU	2024 Q2	Sulfate, total	mg/L	02/24/21 - 05/20/24	12	0	CI around mean	423	400	MCL/HBL	YES
MW-7S	C	USCU	2024 Q3	Sulfate, total	mg/L	02/24/21 - 08/20/24	13	0	CI around mean	432	400	MCL/HBL	YES
MW-7S	C	USCU	2023 Q4	Total Dissolved Solids	mg/L	02/24/21 - 11/27/23	9	0	CI around median	1,010	1,200	MCL/HBL	NO
MW-7S	C	USCU	2024 Q1	Total Dissolved Solids	mg/L	02/24/21 - 03/04/24	10	0	CI around median	1,010	1,200	MCL/HBL	NO
MW-7S	C	USCU	2024 Q2	Total Dissolved Solids	mg/L	02/24/21 - 05/20/24	11	0	CI around median	1,010	1,200	MCL/HBL	NO
MW-7S	C	USCU	2024 Q3	Total Dissolved Solids	mg/L	02/24/21 - 08/20/24	12	0	CI around median	486	1,200	MCL/HBL	NO
MW-12	C	UA	2023 Q2	Boron, total	mg/L	12/15/15 - 06/13/23	28	0	CI around mean	2.64	2	MCL/HBL	YES
MW-12	C	UA	2023 Q3	Boron, total	mg/L	12/15/15 - 09/07/23	29	0	CI around mean	2.68	2	MCL/HBL	YES
MW-12	C	UA	2023 Q4	Boron, total	mg/L	12/15/15 - 11/28/23	30	0	CI around mean	2.68	2	MCL/HBL	YES
MW-12	C	UA	2024 Q1	Boron, total	mg/L	12/15/15 - 03/05/24	31	0	CI around mean	2.68	2	MCL/HBL	YES
MW-12	C	UA	2024 Q2	Boron, total	mg/L	12/15/15 - 05/20/24	32	0	CI around mean	2.71	2	MCL/HBL	YES
MW-12	C	UA	2024 Q3	Boron, total	mg/L	12/15/15 - 08/20/24	33	0	CI around mean	2.72	2	MCL/HBL	YES
MW-12	C	UA	2023 Q2	Sulfate, total	mg/L	12/15/15 - 06/13/23	28	0	CI around mean	363	400	MCL/HBL	NO
MW-12	C	UA	2023 Q3	Sulfate, total	mg/L	12/15/15 - 09/07/23	29	0	CI around mean	363	400	MCL/HBL	NO
MW-12	C	UA	2023 Q4	Sulfate, total	mg/L	12/15/15 - 11/28/23	30	0	CI around mean	363	400	MCL/HBL	NO
MW-12	C	UA	2024 Q1	Sulfate, total	mg/L	12/15/15 - 03/05/24	31	0	CI around mean	362	400	MCL/HBL	NO
MW-12	C	UA	2024 Q2	Sulfate, total	mg/L	12/15/15 - 05/20/24	32	0	CI around mean	363	400	MCL/HBL	NO
MW-12	C	UA	2024 Q3	Sulfate, total	mg/L	12/15/15 - 08/20/24	33	0	CI around mean	363	400	MCL/HBL	NO
MW-12	C	UA	2023 Q2	Total Dissolved Solids	mg/L	12/15/15 - 06/13/23	28	0	CB around linear reg	981	1,200	MCL/HBL	NO
MW-12	C	UA	2023 Q3	Total Dissolved Solids	mg/L	12/15/15 - 09/07/23	29	0	CI around mean	1,080	1,200	MCL/HBL	NO
MW-12	C	UA	2023 Q4	Total Dissolved Solids	mg/L	12/15/15 - 11/28/23	30	0	CB around linear reg	1,000	1,200	MCL/HBL	NO
MW-12	C	UA	2024 Q1	Total Dissolved Solids	mg/L	12/15/15 - 03/05/24	31	0	CB around linear reg	990	1,200	MCL/HBL	NO
MW-12	C	UA	2024 Q2	Total Dissolved Solids	mg/L	12/15/15 - 05/20/24	32	0	CI around mean	1,080	1,200	MCL/HBL	NO
MW-12	C	UA	2024 Q3	Total Dissolved Solids	mg/L	12/15/15 - 08/20/24	33	0	CI around mean	1,080	1,200	MCL/HBL	NO
MW-20S	C	USCU	2023 Q2	Boron, total	mg/L	02/26/21 - 06/13/23	10	0	CB around T-S line	1.60	2	MCL/HBL	NO
MW-20S	C	USCU	2023 Q3	Boron, total	mg/L	02/26/21 - 09/06/23	11	0	CB around T-S line	1.70	2	MCL/HBL	NO
MW-20S	C	USCU	2023 Q4	Boron, total	mg/L	02/26/21 - 11/28/23	12	0	CB around T-S line	1.60	2	MCL/HBL	NO
MW-20S	C	USCU	2024 Q1	Boron, total	mg/L	02/26/21 - 03/04/24	13	0	CB around linear reg	1.22	2	MCL/HBL	NO
MW-20S	C	USCU	2024 Q2	Boron, total	mg/L	02/26/21 - 05/21/24	14	0	CB around linear reg	1.31	2	MCL/HBL	NO
MW-20S	C	USCU	2024 Q3	Boron, total	mg/L	02/26/21 - 08/20/24	15	0	CB around linear reg	1.37	2	MCL/HBL	NO
MW-20S	C	USCU	2023 Q2	Sulfate, total	mg/L	02/26/21 - 06/13/23	10	0	CB around linear reg	404	400	MCL/HBL	YES
MW-20S	C	USCU	2023 Q3	Sulfate, total	mg/L	02/26/21 - 09/06/23	11	0	CB around linear reg	330	400	MCL/HBL	NO
MW-20S	C	USCU	2023 Q4	Sulfate, total	mg/L	02/26/21 - 11/28/23	12	0	CB around linear reg	313	400	MCL/HBL	NO
MW-20S	C	USCU	2024 Q1	Sulfate, total	mg/L	02/26/21 - 03/04/24	13	0	CB around linear reg	305	400	MCL/HBL	NO
MW-20S	C	USCU	2024 Q2	Sulfate, total	mg/L	02/26/21 - 05/21/24	14	0	CB around linear reg	320	400	MCL/HBL	NO
MW-20S	C	USCU	2024 Q3	Sulfate, total	mg/L	02/26/21 - 08/20/24	15	0	CB around linear reg	328	400	MCL/HBL	NO
MW-20S	C	USCU	2023 Q2	Total Dissolved Solids	mg/L	02/26/21 - 06/13/23	9	0	CB around linear reg	1,100	1,200	MCL/HBL	NO
MW-20S	C	USCU	2023 Q3	Total Dissolved Solids	mg/L	02/26/21 - 09/06/23	10	0	CB around linear reg	997	1,200	MCL/HBL	NO
MW-20S	C	USCU	2023 Q4	Total Dissolved Solids	mg/L	02/26/21 - 11/28/23	11	0	CB around linear reg	905	1,200	MCL/HBL	NO
MW-20S	C	USCU	2024 Q1	Total Dissolved Solids	mg/L	02/26/21 - 03/04/24	12	0	CB around linear reg	902	1,200	MCL/HBL	NO
MW-20S	C	USCU	2024 Q2	Total Dissolved Solids	mg/L	02/26/21 - 05/21/24	13	0	CB around linear reg	943	1,200	MCL/HBL	NO
MW-20S	C	USCU	2024 Q3	Total Dissolved Solids	mg/L	02/26/21 - 08/20/24	14	0	CB around linear reg	961	1,200	MCL/HBL	NO

Table 3-1. Exceedance Parameter Statistical Results
Nature and Extent Report Addendum
Kincaid Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Well Type	HSU	Event	Parameter	Unit	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance
MW-28	C	UA	2023 Q2	Boron, total	mg/L	02/24/21 - 06/13/23	10	0	CI around mean	8.58	2	MCL/HBL	YES
MW-28	C	UA	2023 Q3	Boron, total	mg/L	02/24/21 - 09/06/23	11	0	CI around mean	8.71	2	MCL/HBL	YES
MW-28	C	UA	2023 Q4	Boron, total	mg/L	02/24/21 - 11/28/23	12	0	CI around mean	8.62	2	MCL/HBL	YES
MW-28	C	UA	2024 Q1	Boron, total	mg/L	02/24/21 - 03/06/24	13	0	CI around mean	8.73	2	MCL/HBL	YES
MW-28	C	UA	2024 Q2	Boron, total	mg/L	02/24/21 - 05/20/24	14	0	CI around mean	8.83	2	MCL/HBL	YES
MW-28	C	UA	2024 Q3	Boron, total	mg/L	02/24/21 - 08/20/24	15	0	CI around mean	8.73	2	MCL/HBL	YES
MW-28	C	UA	2023 Q2	Sulfate, total	mg/L	02/24/21 - 06/13/23	10	0	CI around mean	808	400	MCL/HBL	YES
MW-28	C	UA	2023 Q3	Sulfate, total	mg/L	02/24/21 - 09/06/23	11	0	CI around mean	817	400	MCL/HBL	YES
MW-28	C	UA	2023 Q4	Sulfate, total	mg/L	02/24/21 - 11/28/23	12	0	CI around mean	824	400	MCL/HBL	YES
MW-28	C	UA	2024 Q1	Sulfate, total	mg/L	02/24/21 - 03/06/24	13	0	CI around mean	816	400	MCL/HBL	YES
MW-28	C	UA	2024 Q2	Sulfate, total	mg/L	02/24/21 - 05/20/24	14	0	CI around mean	823	400	MCL/HBL	YES
MW-28	C	UA	2024 Q3	Sulfate, total	mg/L	02/24/21 - 08/20/24	15	0	CI around mean	827	400	MCL/HBL	YES
MW-28	C	UA	2023 Q2	Total Dissolved Solids	mg/L	02/24/21 - 06/13/23	9	0	CI around mean	1,610	1,200	MCL/HBL	YES
MW-28	C	UA	2023 Q3	Total Dissolved Solids	mg/L	02/24/21 - 09/06/23	10	0	CI around mean	1,620	1,200	MCL/HBL	YES
MW-28	C	UA	2023 Q4	Total Dissolved Solids	mg/L	02/24/21 - 11/28/23	11	0	CI around mean	1,640	1,200	MCL/HBL	YES
MW-28	C	UA	2024 Q1	Total Dissolved Solids	mg/L	02/24/21 - 03/06/24	12	0	CI around mean	1,630	1,200	MCL/HBL	YES
MW-28	C	UA	2024 Q2	Total Dissolved Solids	mg/L	02/24/21 - 05/20/24	13	0	CI around mean	1,630	1,200	MCL/HBL	YES
MW-28	C	UA	2024 Q3	Total Dissolved Solids	mg/L	02/24/21 - 08/20/24	14	0	CI around mean	1,650	1,200	MCL/HBL	YES
MW-32	C	UA	2023 Q2	Boron, total	mg/L	02/25/21 - 06/13/23	10	0	CI around mean	1.50	2	MCL/HBL	NO
MW-32	C	UA	2023 Q3	Boron, total	mg/L	02/25/21 - 09/06/23	11	0	CI around mean	1.52	2	MCL/HBL	NO
MW-32	C	UA	2023 Q4	Boron, total	mg/L	02/25/21 - 11/27/23	12	0	CI around mean	1.53	2	MCL/HBL	NO
MW-32	C	UA	2024 Q1	Boron, total	mg/L	02/25/21 - 03/06/24	13	0	CI around mean	1.53	2	MCL/HBL	NO
MW-32	C	UA	2024 Q2	Boron, total	mg/L	02/25/21 - 05/20/24	14	0	CI around mean	1.53	2	MCL/HBL	NO
MW-32	C	UA	2024 Q3	Boron, total	mg/L	02/25/21 - 08/20/24	15	0	CI around mean	1.53	2	MCL/HBL	NO
MW-32	C	UA	2023 Q2	Sulfate, total	mg/L	02/25/21 - 06/13/23	10	0	CI around mean	429	400	MCL/HBL	YES
MW-32	C	UA	2023 Q3	Sulfate, total	mg/L	02/25/21 - 09/06/23	11	0	CI around mean	407	400	MCL/HBL	YES
MW-32	C	UA	2023 Q4	Sulfate, total	mg/L	02/25/21 - 11/27/23	12	0	CI around mean	397	400	MCL/HBL	NO
MW-32	C	UA	2024 Q1	Sulfate, total	mg/L	02/25/21 - 03/06/24	13	0	CI around mean	391	400	MCL/HBL	NO
MW-32	C	UA	2024 Q2	Sulfate, total	mg/L	02/25/21 - 05/20/24	14	0	CB around linear reg	314	400	MCL/HBL	NO
MW-32	C	UA	2024 Q3	Sulfate, total	mg/L	02/25/21 - 08/20/24	15	0	CB around linear reg	307	400	MCL/HBL	NO
MW-32	C	UA	2023 Q2	Total Dissolved Solids	mg/L	02/25/21 - 06/13/23	9	0	CI around median	1,100	1,200	MCL/HBL	NO
MW-32	C	UA	2023 Q3	Total Dissolved Solids	mg/L	02/25/21 - 09/06/23	10	0	CI around median	1,050	1,200	MCL/HBL	NO
MW-32	C	UA	2023 Q4	Total Dissolved Solids	mg/L	02/25/21 - 11/27/23	11	0	CB around linear reg	1,020	1,200	MCL/HBL	NO
MW-32	C	UA	2024 Q1	Total Dissolved Solids	mg/L	02/25/21 - 03/06/24	12	0	CB around linear reg	1,000	1,200	MCL/HBL	NO
MW-32	C	UA	2024 Q2	Total Dissolved Solids	mg/L	02/25/21 - 05/20/24	13	0	CB around linear reg	998	1,200	MCL/HBL	NO
MW-32	C	UA	2024 Q3	Total Dissolved Solids	mg/L	02/25/21 - 08/20/24	14	0	CB around linear reg	987	1,200	MCL/HBL	NO
MW-33S	NE	USCU	2024 Q3	Boron, total	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	0.183	2	MCL/HBL	NO
MW-33S	NE	USCU	2024 Q3	Sulfate, total	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	169	400	MCL/HBL	NO
MW-33S	NE	USCU	2024 Q3	Total Dissolved Solids	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	796	1,200	MCL/HBL	NO
MW-34S	NE	USCU	2024 Q3	Boron, total	mg/L	08/20/24 - 08/20/24	1	0	Most recent sample	0.297	2	MCL/HBL	NO
MW-34S	NE	USCU	2024 Q3	Sulfate, total	mg/L	08/20/24 - 08/20/24	1	0	Most recent sample	247	400	MCL/HBL	NO
MW-34S	NE	USCU	2024 Q3	Total Dissolved Solids	mg/L	08/20/24 - 08/20/24	1	0	Most recent sample	942	1,200	MCL/HBL	NO
MW-35S	NE	USCU	2024 Q3	Boron, total	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	0.142	2	MCL/HBL	NO
MW-35S	NE	USCU	2024 Q3	Sulfate, total	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	133	400	MCL/HBL	NO
MW-35S	NE	USCU	2024 Q3	Total Dissolved Solids	mg/L	08/21/24 - 08/21/24	1	0	Most recent sample	774	1,200	MCL/HBL	NO

Table 3-1. Exceedance Parameter Statistical Results
Nature and Extent Report Addendum
Kincaid Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Well Type	HSU	Event	Parameter	Unit	Date Range	Sample Count	Percent ND	Statistical Calculation	Statistical Result	GWPS	GWPS Source	Exceedance
PZ-4A	NE	USCU	2024 Q3	Boron, total	mg/L	11/29/23 - 08/21/24	4	0	CI around mean	0.492	2	MCL/HBL	NO
PZ-4A	NE	USCU	2024 Q3	Sulfate, total	mg/L	11/29/23 - 08/21/24	4	0	CI around mean	76.4	400	MCL/HBL	NO
PZ-4A	NE	USCU	2024 Q3	Total Dissolved Solids	mg/L	11/29/23 - 08/21/24	4	0	CI around mean	598	1,200	MCL/HBL	NO

Notes:
GWPS = groundwater protection standard
HSU = hydrostratigraphic unit
UA = uppermost aquifer
USCU = upper semi-confining unit
mg/L = milligrams per liter
ND = non-detect
Standard = GWPSs listed in 35 I.A.C. § 845.600(a)(1)
Statistical Calculation:
CB around T-S line = Confidence band around Thiel-Sen line
CB around linear reg = Confidence band around linear regression
CI around mean = Confidence interval around the mean
CI around median = Confidence interval around the median
Most recent sample = Result for the most recently collected sample used due to insufficient data.
Well Type:
C = Compliance
NE = Nature and Extent

Table 3-2. Summary of Groundwater Data
Nature and Extent Report Addendum
Kincaid Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Well Type	HSU	Parameter	Unit	Sample Count	Non-Detect Results	Percent Non-Detect Results	First Sample	Last Sample	Minimum	Median	Mean	Maximum
MW-12	C	UA	Boron, total	mg/L	33	0	0	12/15/2015	08/20/2024	1.95	3.0	3.0	4.42
MW-12	C	UA	Sulfate, total	mg/L	33	0	0	12/15/2015	08/20/2024	295	380	380	426
MW-12	C	UA	Total Dissolved Solids	mg/L	33	0	0	12/15/2015	08/20/2024	908	1100	1100	1,280
MW-28	C	UA	Boron, total	mg/L	15	0	0	02/24/2021	08/20/2024	7.96	9.4	9.4	10.9
MW-28	C	UA	Sulfate, total	mg/L	15	0	0	02/24/2021	08/20/2024	771	890	880	1,070
MW-28	C	UA	Total Dissolved Solids	mg/L	14	0	0	02/24/2021	08/20/2024	1,570	1700	1800	2,080
MW-32	C	UA	Boron, total	mg/L	15	0	0	02/25/2021	08/20/2024	1.38	1.6	1.7	2.33
MW-32	C	UA	Sulfate, total	mg/L	15	0	0	02/25/2021	08/20/2024	335	420	420	477
MW-32	C	UA	Total Dissolved Solids	mg/L	14	0	0	02/25/2021	08/20/2024	1,010	1100	1100	1,190
MW-7S	C	USCU	Boron, total	mg/L	13	0	0	02/24/2021	08/20/2024	3.56	4.3	4.4	5.54
MW-7S	C	USCU	Sulfate, total	mg/L	13	0	0	02/24/2021	08/20/2024	343	480	490	577
MW-7S	C	USCU	Total Dissolved Solids	mg/L	12	0	0	02/24/2021	08/20/2024	414	1100	1000	1,300
MW-20S	C	USCU	Boron, total	mg/L	15	0	0	02/26/2021	08/20/2024	0.0611	1.6	1.5	2.19
MW-20S	C	USCU	Sulfate, total	mg/L	15	0	0	02/26/2021	08/20/2024	243	350	350	519
MW-20S	C	USCU	Total Dissolved Solids	mg/L	14	0	0	02/26/2021	08/20/2024	842	1000	1000	1,250
MW-33S	NE	USCU	Boron, total	mg/L	1	0	0	08/21/2024	08/21/2024	0.183	0.183	0.18	0.183
MW-33S	NE	USCU	Sulfate, total	mg/L	1	0	0	08/21/2024	08/21/2024	169	169	170	169
MW-33S	NE	USCU	Total Dissolved Solids	mg/L	1	0	0	08/21/2024	08/21/2024	796	796	800	796
MW-34S	NE	USCU	Boron, total	mg/L	1	0	0	08/20/2024	08/20/2024	0.297	0.297	0.30	0.297
MW-34S	NE	USCU	Sulfate, total	mg/L	1	0	0	08/20/2024	08/20/2024	247	247	250	247
MW-34S	NE	USCU	Total Dissolved Solids	mg/L	1	0	0	08/20/2024	08/20/2024	942	942	940	942
MW-35S	NE	USCU	Boron, total	mg/L	1	0	0	08/21/2024	08/21/2024	0.142	0.142	0.14	0.142
MW-35S	NE	USCU	Sulfate, total	mg/L	1	0	0	08/21/2024	08/21/2024	133	133	130	133
MW-35S	NE	USCU	Total Dissolved Solids	mg/L	1	0	0	08/21/2024	08/21/2024	774	774	770	774
PZ-4A	NE	USCU	Boron, total	mg/L	4	0	0	11/29/2023	08/21/2024	0.672	0.76	0.79	0.963
PZ-4A	NE	USCU	Sulfate, total	mg/L	4	0	0	11/29/2023	08/21/2024	102	130	130	145
PZ-4A	NE	USCU	Total Dissolved Solids	mg/L	4	0	0	11/29/2023	08/21/2024	655	730	720	785

Notes:
HSU = hydrostratigraphic unit
UA = uppermost aquifer
USCU = upper semi-confining unit
mg/L = milligrams per liter
Well Type:
C = Compliance
NE = Nature and Extent

FIGURES

Y:\Mapping\Projects\22\2285\MXD\Nature_and_Extent\KIN\Nature_and_Extent_Addendum\NE_Addendum.aprx

PROJECT: 169000XXXX | DATED: 12/20/2024 | DESIGNER: GALARNMC

- MONITORING WELL
- PORE WATER WELL
- STAFF GAGE, LAKE
- STAFF GAGE, CCR UNIT
- RAIN GAGE
- VIBRATING WIRE PIEZOMETER
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY

0 250 500
Feet

MONITORING WELL LOCATION MAP

FIGURE 1-1

NATURE AND EXTENT REPORT ADDENDUM
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE (SG-02). ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. THE AVERAGE ELEVATION FROM AUGUST 19, 2024 WAS ESTIMATED TO THE NEAREST 0.01 FOOT.
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

- COMPLIANCE MONITORING WELL
- BACKGROUND MONITORING WELL
- PORE WATER WELL
- MONITORING WELL
- STAFF GAGE, CCR UNIT
- STAFF GAGE, LAKE
- REGULATED UNIT (SUBJECT UNIT)
- PROPERTY BOUNDARY
- GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

0 250 500 Feet

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP AUGUST 19, 2024

NATURE AND EXTENT REPORT ADDENDUM
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\Nature_and_Extent\KIN\Nature_and_Extent_Addendum\NE_Addendum.aprx

PROJECT: 169000XXXX | DATED: 12/20/2024 | DESIGNER: GALARNMC

Y:\Mapping\Projects\22\2285\MXD\Nature_and_Extent\KIN\Nature_and_Extent_Addendum\NE_Addendum.aprx

PROJECT: 169000XXXX | DATED: 12/20/2024 | DESIGNER: GALARNMC

TOTAL BORON EXCEEDANCE
TOTAL SULFATE EXCEEDANCE
TOTAL DISSOLVED SOLIDS EXCEEDANCE
COMPLIANCE WELL WITHOUT EXCEEDANCE
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

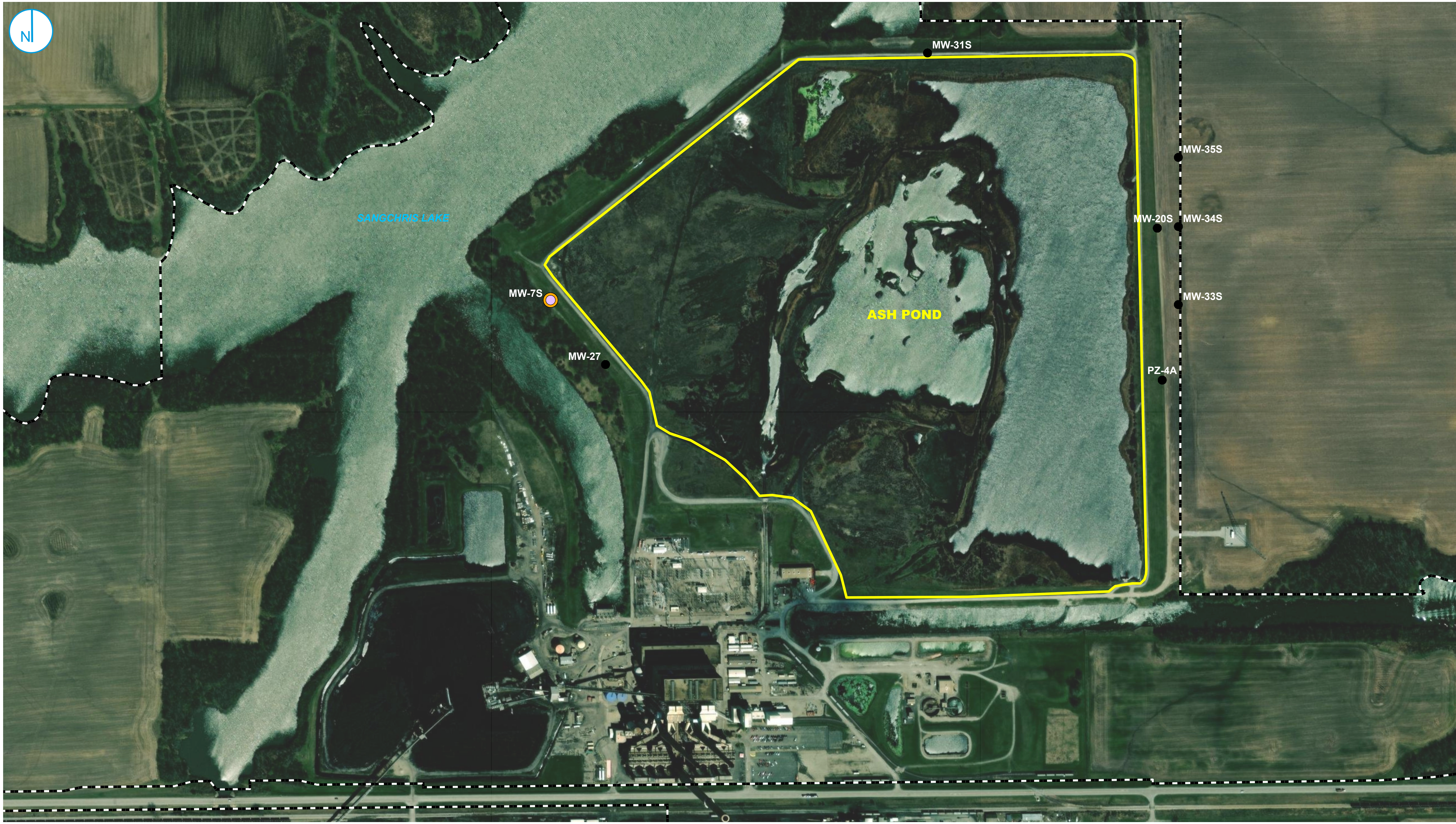
GWPS EXCEEDANCE MAP
UPPERMOST AQUIFER - QUARTERS 1-3, 2024

NATURE AND EXTENT REPORT ADDENDUM
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 3-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



TOTAL BORON EXCEEDANCE
TOTAL SULFATE EXCEEDANCE
COMPLIANCE WELL WITHOUT EXCEEDANCE
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

GWPS EXCEEDANCE MAP
UPPER SEMI-CONFINING UNIT - QUARTERS 1-3, 2024

NATURE AND EXTENT REPORT ADDENDUM
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 3-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

APPENDICES

APPENDIX A
TECHNICAL MEMORANDUM -
SUMMARY OF SITE WORK COMPLETED IN JUNE 2024

RAMBOLL

ENVIRONMENT
& HEALTH

TECHNICAL MEMORANDUM

To: Ms. Sam Davies, Environmental Manager, Vistra Corp

CC: Mr. Brian Voelker, Environmental Manger, Vistra Corp

From: Nikki Pagano and Michael Davis

Re: Summary of Site Work Completed in June 2024
Kincaid Power Plant
Kincaid, Illinois

October 15, 2024

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

T 414-837-3607
F 414-837-3608
www.ramboll.com

Ref. 1940108210

INTRODUCTION

This Technical Memorandum (Tech Memo) was prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) for Kincaid Generation, LLC to document the monitoring network maintenance performed at Kincaid Power Plant (KPP) in June 2024.

OBJECTIVES

The objectives of the field event were to: (1) install and develop three monitoring wells (MW-33S, MW-34S, and MW-35S) downgradient of MW-20S to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(d)(1); (2) collect soil samples from each new monitoring well's respective screen interval to characterize soils that interact with groundwater in the potential migration pathway (PMP) in support of groundwater polishing evaluations; (3) install additional bollards at select well locations with fewer than three bollards present; and (4) replace concrete well pads at select locations.

Based on observations made during site activities, Ramboll made the following adjustments to the original scope of work:

- The well locations identified for well pad replacement in the Proposal were observed to be in good condition and not requiring replacement. However, additional well locations were observed to be missing well pads; therefore, well pads were installed at these locations.
- Bollards at select well locations were observed to have been set in soil only and without concrete when originally installed; therefore, the bollards at these locations were reinstalled in concrete.
- Based on review of groundwater sampling field forms from previous sampling events prior to mobilization, select existing monitoring well locations were redeveloped by Ramboll.

SITE WORK ACTIVITIES

At the request of Vistra, Ramboll oversaw completion of the on-site work activities on June 3 through June 12, 2024 in accordance with Ramboll's *Proposal for Nature and Extent Investigation and Repairs and Improvements at Select Monitoring Wells, Kincaid Power Plant* (Ramboll, 2024a) and *Proposal for Nature and Extent Investigation and Repairs and Improvements at Select Monitoring Wells Change Order 1, Kincaid Power Plant* (Ramboll, 2024b). Well installation and well improvements and repairs were performed by Geotechnology Exploration, LLC (Geotechnology) with oversight from Ramboll.

The following sections discuss site work methods and documentation of completed work.

UTILITY CLEARANCE

Prior to drilling, the proposed locations (see **Figure 1**) for monitoring wells MW-33S, MW-34S, and MW-35S were cleared by Ground Penetrating Radar Systems (GPRS). GPRS utilized a ground penetrating radar antenna to scan a 10-foot radius around the proposed well locations. Ramboll completed a subsurface clearance checklist, confirming all locations requiring intrusive work were cleared by GPRS and safe for drilling.

MONITORING WELL INSTALLATION

Geotechnology used a Geoprobe 3230DT track mounted drill rig to advance the MW-33S, MW-34S, and MW-35S borings to 15 feet below ground surface (bgs). The soil lithology was logged continuously using the Unified Soil Classification System (USCS). The boring logs are provided in **Attachment A**. Based on observations in the field, four soil samples were collected by Ramboll for laboratory analysis from within the screened interval of each well as summarized in **Table A** below. Soil samples were submitted by Ramboll for total metals by 7-step sequential extraction procedure, bulk mineralogy and clay mineralogy by x-ray diffraction, loss on ignition, and cation exchange capacity.

Table A. Soil Analytical Sample Summary – June 2024

Well Location	Top of Sample Interval (feet bgs)	Bottom of Sample Interval (feet bgs)	General Lithology
MW-33S	9	11	Clay
MW-33S	14	15	Sand
MW-34S	9	11	Clay
MW-35S	9	11	Clay

The monitoring wells were constructed using 2-inch diameter schedule 40 polyvinyl chloride (PVC) casing and installed with a 10-foot PVC screen with a slot diameter of 0.010-inches. Filter sand was placed in the annular space surrounding the PVC extending to approximately one foot above the PVC screen. The remaining annular space was sealed with 3/8-inch bentonite chips. At each well a steel protective stick-up was installed to approximately three feet above the ground surface and set in a concrete pad extending horizontally approximately 2 feet by 2 feet and approximately 9 inches bgs. In addition, four 3.5-inch diameter concrete-filled steel bollards were installed around each well. Well construction logs are provided in **Attachment B**.

The monitoring wells were developed by Ramboll using a pump and surge technique, following installation of the wells. The wells were surged and pumped until the wells went dry at least three times. The volume of water removed and the depth to water in the wells before and after development are recorded on the well development logs provided in **Attachment C**

Pressure transducers and associated external housing, padlocks, and 6-foot visibility poles were also installed at each location. The monitoring wells were temporarily identified on the exterior of the protective cover until permanent identification markers are installed at each location. The soil boring and monitoring well construction activities were completed on June 7, 2024. **Attachment D** includes a photographic log of the soil boring and monitoring well installation. The locations of the new monitoring wells are depicted on **Figure 1**. The monitoring wells were surveyed by IngenAE, LLC in August 2024.

MONITORING WELL REDEVELOPMENT

In addition to developing the newly installed monitoring wells, Ramboll redeveloped seven existing monitoring wells based on priority wells identified during review of groundwater sampling field forms from prior sampling events (MW-02, MW-05, MW-20, MW-20S, MW-27, PZ4A, and PZ4C). The wells were surged and pumped until the wells went dry at least three times. The volume of water removed and the depth to water in the wells before and after development are recorded on the well development logs provided in **Attachment D**.

WELL PAD INSTALLATION

Concrete wells pads were installed at ten locations: MW-01, MW-02, MW-03, MW-04, MW-05, MW-06, MW-07, MW-08, MW-09, MW-10. The concrete pads were installed around the existing protective covers of the above wells and extended horizontally approximately 2 feet by 2 feet and approximately 9 inches bgs. **Attachment E** includes a photographic log of well pad installation.

BOLLARD INSTALLATION AND REPAIR

Concrete-filled, 3.5-inch diameter, 4- or 6-foot-tall bollards were installed or replaced at 21 well locations that had fewer than three bollards present or where existing bollards were in poor condition and needed to be replaced. Locations were identified from the investigation performed by Ramboll in spring 2023 and modified based on updated observations during site work. **Attachment E** includes a photographic log of bollard installation. The number of bollards installed at each location is summarized in **Table B**.

In addition to the bollard installations summarized in the table below, bollards at nine existing well locations that had been set in soil without concrete when originally installed were reinstalled in concrete. These well locations included the following: MW-07S, MW-08S, MW-12S, MW-12D, MW-25, MW-26, MW-27, MW-28, and MW-29.

Table B. Bollard Installation Summary – June 2024

Well Location	Number of Bollards Present Prior to June 2024 Field Event	Number of Bollards Installed During June 2024 Field Event	Notes
MW-01	0	4	--
MW-02	0	4	--
MW-03	0	4	--
MW-04	0	4	--
MW-05	0	4	--
MW-06	0	4	--
MW-07	0	4	--
MW-08	0	4	--
MW-09	0	4	--
MW-10	0	4	--
MW-11/11S	5	0	Five bollards shared between two adjacent wells. Too near road for additional bollard.

Well Location	Number of Bollards Present Prior to June 2024 Field Event	Number of Bollards Installed During June 2024 Field Event	Notes
MW-12	2	1	Adequate protection provided by three bollards.
MW-20/20S	3	3	Six bollards shared between two adjacent wells.
MW-22	2	0	Bollards not installed due to proximity to buried electrical utility line.
MW-23	2	2	--
MW-30	2	2	--
MW-31/31S	3	3	Six bollards shared between two adjacent wells.
MW-32	2	2	--
PZ4A/B/C	4	6	Six bollards shared between three adjacent wells. Four bollards replaced; two bollards installed.
Total Installed		**59**	

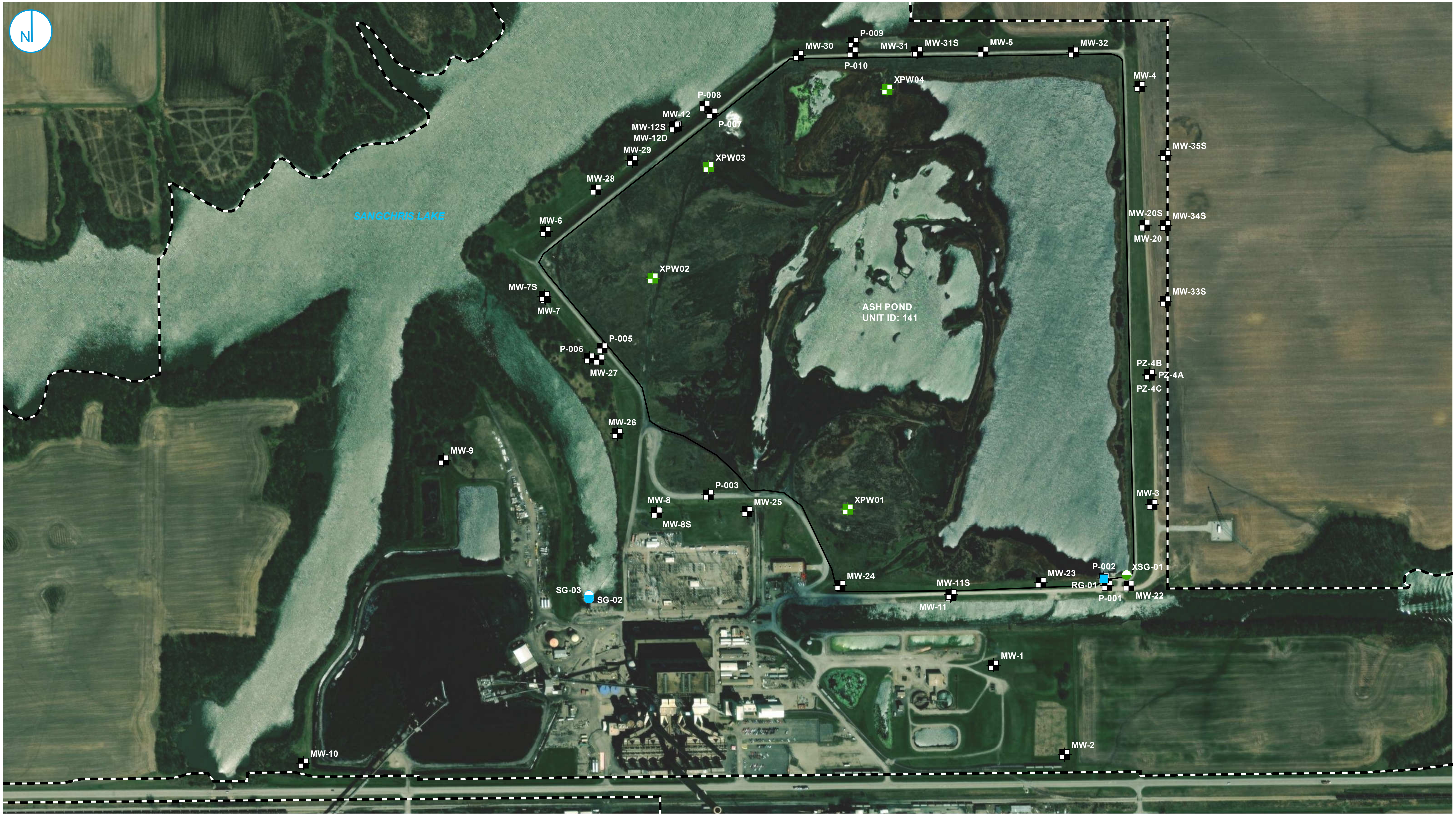
FIGURES

Figure 1 – Monitoring Well Location Map

ATTACHMENTS

Attachment A Soil Boring Logs
Attachment B Monitoring Well Construction Logs
Attachment C Monitoring Well Development Logs
Attachment D Soil Boring and Well Installation Photographic Log
Attachment E Bollard and Pad Installation Photographic Log

FIGURES



PORE WATER WELL
MONITORING WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
RAIN GAGE

SITE FEATURE
PROPERTY BOUNDARY

0 250 500 Feet

MONITORING WELL LOCATION MAP

FIGURE 1

ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

ATTACHMENTS

ATTACHMENT A
SOIL BORING LOGS

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Plant		MW-33S

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Nick Urban Geotechnology Exploration, LLC	6/3/2024	6/3/2024	Geoprobe/HSA

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-33S	Feet (NAVD88)	597.77 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,067,984.26 N, 2,488,137.37 E E/Ⓦ
1/4 of 1/4 of Section 1, T 13 N, R 4 W

Lat 39° 35' 51.0576"
Long -89° 29' 12.7896"

Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 / 32		0	0 - 0.5' **ORGANIC SOIL:** OL/OH, very dark gray (10YR 3/1), roots (0-5%), moist.	OL/OH									
			0.5	0.5 - 4.5' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), silt (15-25%), medium plasticity, soft to medium, moist.	CL				1.5					
			3						0.5					
2 CS	60 / 35		4.5	4.5 - 5.5' **SILT:** ML, gray (10YR 6/1) with reddish yellow (7.5YR 6/8) mottling (15-25%), clay (5-10%), low plasticity, very soft.	ML									
			5.5	5.5 - 14' **LEAN CLAY:** CL, yellowish brown (10YR 5/6) with reddish yellow (7.5YR 6/8) mottling (15-25%), silt (5-10%), sand (0-5%), medium plasticity, very soft, moist.	CL									
			7						0.5					
3 CS	60 / 16		10						0.5					Soil sample collected from 9-11 ft bgs

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

Signature	Firm	
Michael Dorie (signature)	Ramboll 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

Boring Number MW-33S

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13	5.5 - 14' **LEAN CLAY:** CL, yellowish brown (10YR 5/6) with reddish yellow (7.5YR 6/8) mottling (15-25%), silt (5-10%), sand (0-5%), medium plasticity, very soft, moist. *(continued)*	CL				0.5					
			14	14 - 15' **WELL-GRADED SAND WITH CLAY:** SW-SC, dark yellowish brown (10YR 4/6) and gray (10YR 5/1), fine to coarse, subangular to subrounded, clay (15-25%), wet.	SW-SC									Soil sample collected from 14-15 ft bgs
			15	15' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Plant		MW-34S

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Nick Urban Geotechnology Exploration, LLC	6/6/2024	6/6/2024	Geoprobe/HSA

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-34S	Feet (NAVD88)	597.51 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒		Local Grid Location
State Plane 1,068,407.96 N, 2,488,137.94 E E/W(circled W)	Lat 39° 35' 55.2444"	☐N ☐E
1/4 of 1/4 of Section 1, T 13 N, R 4 W	Long -89° 29' 12.7428"	Feet ☐S Feet ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 37			0 - 0.5' **ORGANIC SOIL:** OL/OH, very dark gray (10YR 3/1), roots (0-5%), moist.	OL/OH									
			1	0.5 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) with reddish yellow (7.5YR 6/8) mottling (15-25%), very dark gray (10YR 3/1) mottling (0-5%), roots (15-25%), low plasticity, soft, moist to wet.					2					
			2											
			3	3' roots end.					0.5					
			4											
2 CS	60 38		5											
			6	5.5' gray (10YR 6/1) and no mottling.	CL									
			7						0.5					
			8											
			9	9' medium plasticity, trace gravel (0-5%).										Soil sample collected from 9-11 ft bgs
3 CS	60 32		10						0.5					
			11											
			12											

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

Signature	Firm	
Michael Fanie (signature)	Ramboll 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

RAMBOLL

Boring Number MW-34S

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13 14 15	0.5 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) with reddish yellow (7.5YR 6/8) mottling (15-25%), very dark gray (10YR 3/1) mottling (0-5%), roots (15-25%), low plasticity, soft, moist to wet. *(continued)*	CL				0.5					
				15' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Kincaid Power Plant		MW-35S	
Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Nick Urban Geotechnology Exploration, LLC	6/4/2024	6/4/2024	Geoprobe/HSA
Common Well Name: MW-35S	Final Static Water Level: Feet (NAVD88)	Surface Elevation: 597.79 Feet (NAVD88)	Borehole Diameter: 8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,783.82 N, 2,488,137.64 E E/Ⓦ
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 35' 58.9596"
Long -89° 29' 12.7104"
Local Grid Location: Feet ☐N ☐S Feet ☐E ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 58		0 - 1	0 - 1' **ORGANIC SOIL:** OL/OH, very dark gray (10YR 3/1), roots (0-5%), moist.	OL/OH									
			1 - 4	1 - 4' **LEAN CLAY:** CL, pale brown (10YR 6/3) with reddish yellow (7.5YR 6/8) mottling (15-25%), very dark gray (10YR 3/1) mottling (0-5%), roots (15-25%), medium plasticity, soft, moist.	CL				2.5 1.5					
2 CS	60 33		4 - 15	4 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) to light brownish gray (10YR 6/2) with reddish yellow (7.5YR 6/8) mottling (5-10%), low plasticity, very soft, wet.	CL				0.5 1.5					Soil sample collected from 9-11 ft bgs
3 CS	60 27		10	10' No mottling, silt (15-25%), sand (5-10%), gravel (0-5%), medium plasticity.										

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

Signature	Firm	
Michael Fauie	Ramboll 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			13 14 15	4 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) to light brownish gray (10YR 6/2) with reddish yellow (7.5YR 6/8) mottling (5-10%), low plasticity, very soft, wet. *(continued)*	CL				1.5					
				15' End of Boring.										

ATTACHMENT B
MONITORING WELL CONTRUCTION LOGS

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Plant	______ft. ☐ N. ☐ S. ______ft. ☐ E. ☐ W.	MW-33S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 51.1" Long. -89° 29' 12.8" or	
Facility ID	St. Plane 1,067,984 ft. N, 2,488,137 ft. E. S / C / N	Date Well Installed 06/03/2024
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Nick Urban, Geotechnology Exploration, LLC
Distance from Waste/Source ft. — State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known — Gov. Lot Number	

A. Protective pipe, top elevation 600.87 ft. (NAVD88)

B. Well casing, top elevation 600.32 ft. (NAVD88)

C. Land surface elevation 597.8 ft. (NAVD88)

D. Surface seal, bottom 596.8 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☒ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ Other ☐

15. Drilling fluid used: Water ☐ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒

Describe ______

17. Source of water (attach analysis, if required):
N/A

E. Bentonite seal, top 596.8 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ______ ft. (NAVD88) or ______ ft.

G. Filter pack, top 593.8 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 592.8 ft. (NAVD88) or 5.0 ft.

I. Well bottom 582.8 ft. (NAVD88) or 15.0 ft.

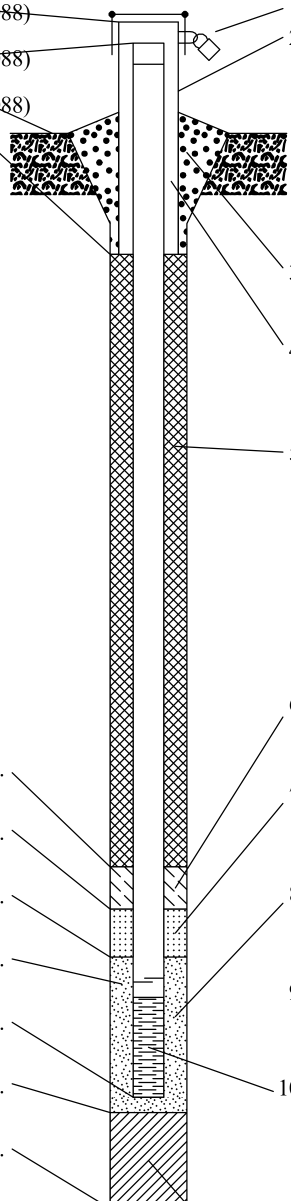
J. Filter pack, bottom 582.8 ft. (NAVD88) or 15.0 ft.

K. Borehole, bottom 582.8 ft. (NAVD88) or 15.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: 4 Bollards and 6' visibility pole w/ flag
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.694 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. P. W. Gillibrand Co., Inc. Industrial Sand
   b. Volume added 2.5 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

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

Date Modified: 10/11/2024

Signature	Firm	
Michael Pauic	Ramboll, 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

RAMBOLL

MONITORING WELL CONSTRUCTION

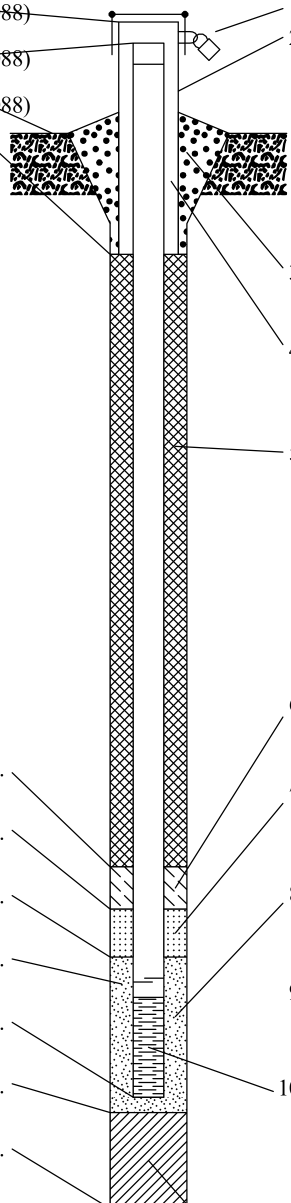
Facility/Project Name: Kincaid Power Plant	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name: MW-34S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 55.2" Long. -89° 29' 12.7" or	
Facility ID	St. Plane 1,068,408 ft. N, 2,488,138 ft. E. S / C / N	Date Well Installed: 06/06/2024
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Nick Urban, Geotechnology Exploration, LLC
Distance from Waste/ Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 601.03 ft. (NAVD88)

B. Well casing, top elevation 600.59 ft. (NAVD88)

C. Land surface elevation 597.5 ft. (NAVD88)

D. Surface seal, bottom 596.5 ft. (NAVD88) or 1.0 ft.



12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ Other ☐

15. Drilling fluid used: Water ☐ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒
Describe ____

17. Source of water (attach analysis, if required): N/A

E. Bentonite seal, top 596.5 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 593.5 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 592.5 ft. (NAVD88) or 5.0 ft.

I. Well bottom 582.5 ft. (NAVD88) or 15.0 ft.

J. Filter pack, bottom 582.5 ft. (NAVD88) or 15.0 ft.

K. Borehole, bottom 582.5 ft. (NAVD88) or 15.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: 4 Bollards and 6' visibility pole w/ flag
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.694 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. P. W. Gillibrand Co., Inc. Industrial Sand
   b. Volume added 3 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

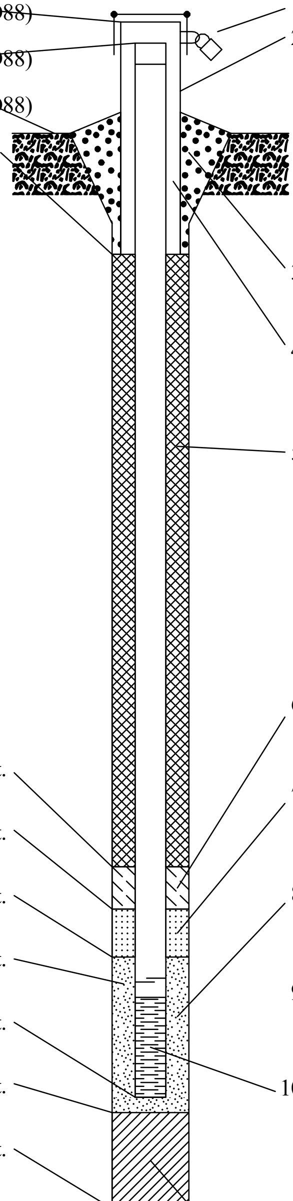
I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 10/11/2024

Signature	Firm	
Michael Davie	Ramboll, 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Plant	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 59.0" Long. -89° 29' 12.7" or	MW-35S
Facility ID	St. Plane 1,068,784 ft. N, 2,488,138 ft. E. S / C / N	Date Well Installed: 06/04/2024
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Nick Urban, Geotechnology Exploration, LLC
Distance from Waste/Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	



A. Protective pipe, top elevation 600.84 ft. (NAVD88)

B. Well casing, top elevation 600.52 ft. (NAVD88)

C. Land surface elevation 597.8 ft. (NAVD88)

D. Surface seal, bottom 596.8 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐; Hollow Stem Auger ☒; Other ☐

15. Drilling fluid used: Water ☐ 0 2; Air ☐; Drilling Mud ☐ 0 3; None ☒

16. Drilling additives used? ☐ Yes ☒
Describe ____

17. Source of water (attach analysis, if required): N/A

E. Bentonite seal, top 596.8 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 593.8 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 592.8 ft. (NAVD88) or 5.0 ft.

I. Well bottom 582.8 ft. (NAVD88) or 15.0 ft.

J. Filter pack, bottom 582.8 ft. (NAVD88) or 15.0 ft.

K. Borehole, bottom 582.8 ft. (NAVD88) or 15.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.

1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒; Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: 4 Bollards and 6' visibility pole w/ flag
3. Surface seal: Bentonite ☐; Concrete ☒; Other ☐
4. Material between well casing and protective pipe: Bentonite ☐; Sand — Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.694 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐; Tremie pumped ☐; Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. P. W. Gillibrand Co., Inc. Industrial Sand
   b. Volume added 3 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒; Flush threaded PVC schedule 80 ☐; Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒; Continuous slot ☐; Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒; Other ☐

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

Date Modified: 10/11/2024

Signature: Michael Panic (signed)

Firm: Ramboll, 333 W. Wacker Drive Suite 1050, Chicago IL, 60640

Tel:
Fax:

ATTACHMENT C
MONITORING WELL DEVELOPMENT LOGS

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-2

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
- surged with bailer and bailed ☐
- surged with bailer and pumped ☐
- surged with block and bailed ☐
- surged with block and pumped ☐
- surged with block, bailed, and pumped ☐
- compressed air ☐
- bailed only ☐
- pumped and surged ☒
- pumped slowly ☐
- other ________ ☐

3. Time spent developing well 30 min.

4. Depth of well (from top of well casing) 23.67 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing gal.

7. Volume of water removed from well 7.5 gal.

8. Volume of water added (if any) gal.

9. Source of water added ________

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	8.56	ft.	(dry)	ft.
Date	b.	6/11/2024			
Time	c.	15:40	☐ a.m. ☒ p.m.	16:15	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Dark gray to brown; Fine sand removed		Clear ☐ Turbid ☒ (Describe) Gray to brown; Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 3 times.
Dedicated pump and transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name: ________

Firm: ________

Street: ________

City/State/Zip: ________

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-5

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well 30 min.

4. Depth of well (from top of well casing) 43.66 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing gal.

7. Volume of water removed from well 17 gal.

8. Volume of water added (if any) gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	38.25	ft.	(dry)	ft.
Date	b.	6/11/2024			
Time	c.	14:15	☐ a.m. ☒ p.m.	14:55	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Tan / Very turbid / Fine sand removed		Clear ☐ Turbid ☒ (Describe) Tan / Slightly turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

	Before		After	
14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 4 times.
Dedicated pump and transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-20

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ________ ☐

3. Time spent developing well 15 min.

4. Depth of well (from top of well casing) 26.85 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 7 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added ________

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	7.75	ft.	(dry)	ft.
Date	b.	6/6/2024			
Time	c.	14:33	☐ a.m. ☒ p.m.	14:55	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Brown, Very turbid		Clear ☐ Turbid ☒ (Describe) Light brown, Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 4 times.
Dedicated pump and transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name: ________

Firm: ________

Street: ________

City/State/Zip: ________

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-20S

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well: 10 min.

4. Depth of well (from top of well casing): 12.77 ft.

5. Inside diameter of well: 2 in.

6. Volume of water in filter pack and well casing: gal.

7. Volume of water removed from well: 3 gal.

8. Volume of water added (if any): gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	6.35	ft.	(dry)	ft.
Date	b.	6/6/2024			
Time	c.	15:00	☐ a.m. ☒ p.m.	15:20	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Brown, Very turbid		Clear ☐ Turbid ☒ (Describe) Light brown, Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

	Before		After	
14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 3 times.
Transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-27

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well 20 min.

4. Depth of well (from top of well casing) 18.22 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing gal.

7. Volume of water removed from well 1.25 gal.

8. Volume of water added (if any) gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	14.42	ft.	(dry)	ft.
Date	b.	6/12/2024			
Time	c.	09:50	☒ a.m. ☐ p.m.	10:15	☒ a.m. ☐ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Black, Very turbid, Ants in water, Swampy odor		Clear ☐ Turbid ☒ (Describe) Dark gray, Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

	Before		After	
14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 4 times.
Dedicated transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-33S

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well 20 min.

4. Depth of well (from top of well casing) 17.69 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 5.5 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	7.18	ft.	(dry)	ft.
Date	b.	6/6/2024			
Time	c.	12:35	☐ a.m. ☒ p.m.	13:02	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Brown		Clear ☐ Turbid ☒ (Describe) Light brown, Slightly turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	mg/l		mg/l
15. COD	mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 5 times.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-34S

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well: 20 min.

4. Depth of well (from top of well casing): 18.58 ft.

5. Inside diameter of well: 2 in.

6. Volume of water in filter pack and well casing: gal.

7. Volume of water removed from well: 1.5 gal.

8. Volume of water added (if any): gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	15.48	ft.	(dry)	ft.
Date	b.	6/10/2024			
Time	c.	14:00	☐ a.m. ☒ p.m.	14:30	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Brown		Clear ☒ Turbid ☐ (Describe) Very light brown, Mostly clear	

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 3 times.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	MW-35S

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ____________ ☐

3. Time spent developing well: 20 min.

4. Depth of well (from top of well casing): 18.30 ft.

5. Inside diameter of well: 2 in.

6. Volume of water in filter pack and well casing: gal.

7. Volume of water removed from well: 5.5 gal.

8. Volume of water added (if any): gal.

9. Source of water added ____________

10. Analysis performed on water added? ☐ Yes ☐ No
   (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	6.97	ft.	(dry)	ft.
Date	b.	6/6/2024			
Time	c.	13:15	☐ a.m. ☒ p.m.	13:45	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Light brown		Clear ☒ Turbid ☐ (Describe)	

Fill in if drilling fluids were used and well is at solid waste facility:

		Before		After
14. Total suspended solids		mg/l		mg/l
15. COD		mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 5 times.

Facility Address or Owner/Responsible Party Address

Name: ____________

Firm: ____________

Street: ____________

City/State/Zip: ____________

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

RAMBOLL

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	PZ4A

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well 20 min.

4. Depth of well (from top of well casing) 12.40 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing ___ gal.

7. Volume of water removed from well 3 gal.

8. Volume of water added (if any) ___ gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	7.85	ft.	(dry)	ft.
Date	b.	6/12/2024			
Time	c.	11:10	☒ a.m. ☐ p.m.	11:35	☒ a.m. ☐ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Gray; Ants in water; Swampy odor		Clear ☐ Turbid ☒ (Describe) Light gray; Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	mg/l		mg/l
15. COD	mg/l		mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 4 times.

Facility Address or Owner/Responsible Party Address

Name: ______

Firm: ______

Street: ______

City/State/Zip: ______

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

MONITORING WELL DEVELOPMENT

Facility/Project Name	State	Well Name
Kincaid Power Plant - N&E	Illinois	PZ4C

Facility License, Permit or Monitoring Number

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method:
   - surged with bailer and bailed ☐
   - surged with bailer and pumped ☐
   - surged with block and bailed ☐
   - surged with block and pumped ☐
   - surged with block, bailed, and pumped ☐
   - compressed air ☐
   - bailed only ☐
   - pumped and surged ☒
   - pumped slowly ☐
   - other ______ ☐

3. Time spent developing well 20 min.

4. Depth of well (from top of well casing) 20.40 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing gal.

7. Volume of water removed from well 5 gal.

8. Volume of water added (if any) gal.

9. Source of water added ______

10. Analysis performed on water added? ☐ Yes ☐ No
    (If yes, attach results)

		Before Development		After Development	
11. Depth to Water (from top of well casing)	a.	7.10	ft.	(dry)	ft.
Date	b.	6/12/2024			
Time	c.	11:20	☒ a.m. ☐ p.m.	12:00	☐ a.m. ☒ p.m.
12. Sediment in well bottom			inches		inches
13. Water clarity		Clear ☐ Turbid ☒ (Describe) Very dark gray		Clear ☐ Turbid ☒ (Describe) Light gray, Moderately turbid	

Fill in if drilling fluids were used and well is at solid waste facility:

	Before	After
14. Total suspended solids	mg/l	mg/l
15. COD	mg/l	mg/l

16. Well developed by: Person's Name and Firm
Michael Davis - Ramboll

17. Additional comments on development:

Well purged dry 3 times.
Dedicated transducer removed prior to well development and reinstalled after development.

Facility Address or Owner/Responsible Party Address

Name:

Firm:

Street:

City/State/Zip:

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

Signature: Michael Davis

Print Name: Michael Davis

Firm: Ramboll Americas Engineering Solutions, Inc.

ATTACHMENT D
SOIL BORING AND WELL INSTALLATION
PHOTOGRAPHIC LOG

ENVIRONMENT
& HEALTH

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 1	DATE: 06/03/2024		
DESCRIPTION: General site conditions during site work.			

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 2	DATE: 06/03/2024		
DESCRIPTION: Soil samples were collected from lithologies within the screened interval for analytical testing. Soil boring MW-33S was sampled from approximately 9-11 feet below ground surface (bgs) and approximately and 14-15 feet bgs.			

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 3	**DATE:** 06/03/2024		

DESCRIPTION:

Soil samples were collected from lithologies within the screened interval for analytical testing. Soil boring MW-33S was sampled from approximately 9-11 feet bgs and approximately and 14-15 feet bgs.

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 4	**DATE:** 06/06/2024		

DESCRIPTION:

Soil samples were collected from lithologies within the screened interval for analytical testing. Soil boring MW-34S was sampled from approximately 9-11 feet bgs.

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 5	**DATE:** 06/04/2024		
DESCRIPTION: Soil samples were collected from lithologies within the screened interval for analytical testing. Soil boring MW-35S was sampled from approximately 9-11 feet bgs.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 6	**DATE:** 06/11/2024		
DESCRIPTION: Surface completion of monitoring well MW-33S, including protective well cover, concrete well pad, four bollards, visibility flag, and pressure transducer.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 7	**DATE:** 06/11/2024		
DESCRIPTION: Surface completion of monitoring well MW-34S, including protective well cover, concrete well pad, four bollards, visibility flag, and pressure transducer.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 8	**DATE:** 06/11/2024		
DESCRIPTION: Surface completion of monitoring well MW-35S, including protective well cover, concrete well pad, four bollards, visibility flag, and pressure transducer.			

ATTACHMENT E
BOLLARD AND PAD INSTALLATION PHOTOGRAPHIC LOG

RAMBOLL

ENVIRONMENT
& HEALTH

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 1	DATE: 06/11/2024	 	
DESCRIPTION: Concrete well pad and four bollards installed at MW-1.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 2	DATE: 06/11/2024	 	
DESCRIPTION: Concrete well pad and four bollards installed at MW-2.			

ENVIRONMENT
& HEALTH

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 3	DATE: 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-3.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 4	DATE: 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-4.			

CLIENT NAME:		**SITE LOCATION:**	**PROJECT NO.**
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 5	**DATE:** 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-5.			

CLIENT NAME:		**SITE LOCATION:**	**PROJECT NO.**
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 6	**DATE:** 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-6.			

CLIENT NAME: Kincaid Generation, LLC		**SITE LOCATION:** Kincaid Power Plant	**PROJECT NO.** 1940108210
PHOTO NO. 7	**DATE:** 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-7.			

CLIENT NAME: Kincaid Generation, LLC		**SITE LOCATION:** Kincaid Power Plant	**PROJECT NO.** 1940108210
PHOTO NO. 8	**DATE:** 06/11/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-8.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 9	DATE: 06/03/2024		
DESCRIPTION: Photo of MW-9 taken prior to installation of concrete well pad and four bollards.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 10	DATE: 06/12/2024		
DESCRIPTION: Concrete well pad and four bollards installed at MW-10.			

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 11	**DATE:** 06/12/2024		
DESCRIPTION: Four bollards replaced and two additional bollards installed at PZ-4A/B/C.			

CLIENT NAME:		SITE LOCATION:	PROJECT NO.
Kincaid Generation, LLC		Kincaid Power Plant	1940108210
PHOTO NO. 12	**DATE:** 06/12/2024		
DESCRIPTION: Four existing bollards set in concrete at MW-28. Also completed at MW-7S, MW-8S, MW-12S/D, MW-25, MW-26, MW-27, and MW-29.			

<table>
<tr><td colspan="2">CLIENT NAME:
Kincaid Generation, LLC</td><td>SITE LOCATION:
Kincaid Power Plant</td><td>PROJECT NO.
1940108210</td></tr>
<tr><td>PHOTO NO.
13</td><td>DATE:
06/12/2024</td><td colspan="2" rowspan="2"></td></tr>
<tr><td colspan="2">DESCRIPTION:
One bollard installed at MW-12.</td></tr>
</table>

<table>
<tr><td colspan="2">CLIENT NAME:
Kincaid Generation, LLC</td><td>SITE LOCATION:
Kincaid Power Plant</td><td>PROJECT NO.
1940108210</td></tr>
<tr><td>PHOTO NO.
13</td><td>DATE:
06/11/2024</td><td colspan="2" rowspan="2"></td></tr>
<tr><td colspan="2">DESCRIPTION:
Three bollards installed at MW-20 and MW-20S.</td></tr>
</table>

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 14	**DATE:** 06/11/2024		
DESCRIPTION: Bollards not installed at MW-22 due to proximity of buried electrical utility line within the Critical Zone.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 15	**DATE:** 06/11/2024		
DESCRIPTION: Two bollards installed at MW-30.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 16	**DATE:** 06/11/2024		
DESCRIPTION: Three bollards installed at MW-31 and MW-31S.			

CLIENT NAME: Kincaid Generation, LLC		SITE LOCATION: Kincaid Power Plant	PROJECT NO. 1940108210
PHOTO NO. 17	**DATE:** 06/11/2024		
DESCRIPTION: Two bollards installed at MW-32.			

APPENDIX B
FIELD SAMPLING FORMS AND
GROUNDWATER LABORATORY ANALYTICAL REPORTS

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 4Q 2023

			Weather				Well Condition				
WO Sample	**Well ID**	**Program/ Sample Type**	**Temp (°F)**	**Precipitation**	**Wind Direction**	**Sky**	**Well Pad**	**Casing**	**Protective Cover**	**Reference Mark/ ID**	**Well Locked**
001	MW-1	Groundwater Sample	30.0	None	W	Clear	Good	Good	Good	Yes	Yes
002	MW-11	Groundwater Sample	23.0	None	SE	Clear	Good	Good	Good	Yes	Yes
003	MW-12	Groundwater Sample	21.0	None	SE	Clear	Good	Good	Good	Yes	Yes
004	MW-12S	DTW Only	35.0	None	E	Clear	Good	Good	Good	Yes	Yes
005	MW-12D	DTW Only	35.0	None	E	Clear	Good	Good	Good	Yes	Yes
006	MW-2	Groundwater Sample	30.0	None	W	Clear	Good	Good	Good	Yes	Yes
007	MW-20	Groundwater Sample	29.0	None	E	Clear	Good	Good	Good	Yes	Yes
008	MW-20S	Groundwater Sample	28.0	None	E	Clear	Good	Good	Good	Yes	Yes
009	MW-23	Groundwater Sample	24.0	None	E	Clear	Good	Good	Good	Yes	Yes
010	MW-27	Groundwater Sample	20.0	None	W	Clear	Good	Good	Good	Yes	Yes
011	MW-28	Groundwater Sample	20.0	None	W	Clear	Good	Good	Good	Yes	Yes
012	MW-3	Groundwater Sample	27.0	None	E	Clear	Good	Good	Good	Yes	Yes
013	MW-30	Groundwater Sample	20.0	None	W	Clear	Good	Good	Good	Yes	Yes
014	MW-31	Groundwater Sample	35.0	None	E	Clear	Good	Good	Good	Yes	Yes
015	MW-31S	Groundwater Sample	34.0	None	E	Clear	Good	Good	Good	Yes	Yes
016	MW-32	Groundwater Sample	32.0	None	E	Clear	Good	Good	Good	Yes	Yes
017	MW-5	Groundwater Sample	33.0	None	E	Clear	Good	Good	Good	Yes	Yes
018	MW-6	Groundwater Sample	20.0	None	W	Clear	Good	Good	Good	Yes	Yes
019	MW-7	Groundwater Sample	30.0	None	W	Clear	Good	Good	Good	Yes	Yes
020	MW-7S	Groundwater Sample	30.0	None	W	Clear	Good	Good	Good	Yes	Yes
021	MW-8	Groundwater Sample	18.0	None	W	Clear	Good	Good	Good	Yes	Yes
022	MW-8S	Groundwater Sample	33.0	None	W	Clear	Good	Good	Good	Yes	Yes
023	PZ-4A	Groundwater Sample	40.0	None	E	Clear	Good	Good	Good	Yes	Yes
024	PZ-4C	Groundwater Sample	30.0	None	E	Clear	Good	Good	Good	Yes	Yes
025	SG-02	DTW Only	30.0	None	W	Clear	Good	Good	Good	Yes	Yes
026	XSG-01	DTW Only	28.0	None	W	Clear	Good	Good	Good	Yes	Yes
027	Field Blank	QA/QC Sample	41.0	None	E	Clear					
028	MW-8 Duplicate	QA/QC Sample	18.0	None	W	Clear	Good	Good	Good	Yes	Yes

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 4Q 2023

		GW Level Measurement				Purge Activities							
WO Sample	Well ID	Sampler Initials	Date/Time	DTW (ft)	DTB (ft)	Sampler Initials	Purge Date	Purge Start Time	Purge End Time	Purging Device	Well Diameter (in)	Actual Volume Purged (L)	Purge Rate (mL/min)
001	MW-1	DC	11/27/23 11:41	17.05		DC	11/27/2023	11:42	12:05	Bladder Pump	2"	5.0	217.4
002	MW-11	JC	11/28/23 10:28	11.74		JC	11/28/2023	10:30	10:44	Bladder Pump	2"	2.0	142.9
003	MW-12	JC	11/28/23 9:29	7.22		JC	11/28/2023	09:30	10:03	Bladder Pump	2"	5.0	151.5
004	MW-12S	JC	11/27/23 10:53	7.89									
005	MW-12D	JC	11/27/23 10:52	4.56									
006	MW-2	TAC	11/27/23 10:07	8.11		DC	11/27/2023	10:37	11:11	Bladder Pump	2"	7.5	220.6
007	MW-20	JC	11/28/23 12:44	8.20		JC	11/28/2023	12:57	13:20	Bladder Pump	2"	3.0	130.4
008	MW-20S	JC	11/28/23 12:31	7.92		JC	11/28/2023	12:31	12:41	Bladder Pump	2"	2.0	200.0
009	MW-23	JC	11/28/23 11:23	16.61		JC	11/28/2023	11:05	11:21	Bladder Pump	2"	2.0	125.0
010	MW-27	DC	11/28/23 11:01	T.O.P.		DC	11/28/2023	11:03	11:13	Bladder Pump	2"		
011	MW-28	DC	11/28/23 13:58	8.11		DC	11/28/2023	13:58	14:23	Bladder Pump	2"	5.5	220.0
012	MW-3	JC	11/28/23 11:54	8.62		JC	11/28/2023	11:55	12:08	Bladder Pump	2"	3.0	230.8
013	MW-30	TAC	11/28/23 11:48	25.56		DC	11/28/2023	12:06	12:24	Bladder Pump	2"	3.5	194.4
014	MW-31	JC	11/27/23 13:13	33.20		JC	11/27/2023	13:36	13:47	Bladder Pump	2"	2.0	181.8
015	MW-31S	JC	11/27/23 12:35	20.31		JC	11/27/2023	12:51	13:09	Bladder Pump	2"	2.5	138.9
016	MW-32	JC	11/27/23 11:36	25.50		JC	11/27/2023	11:22	11:32	Bladder Pump	2"	1.0	100.0
017	MW-5	JC	11/27/23 11:39	28.57		JC	11/27/2023	11:58	12:31	Bladder Pump	2"	3.0	90.9
018	MW-6	DC	11/28/23 13:15	12.05		DC	11/28/2023	13:15	13:36	Bladder Pump	2"	6.5	309.5
019	MW-7	DC	11/27/23 12:58	9.44		DC	11/27/2023	13:15	13:35	Bladder Pump	2"	3.0	150.0
020	MW-7S	DC	11/27/23 12:34	T.O.P.		DC	11/27/2023	12:36	12:54	Bladder Pump	2"	2.5	138.9
021	MW-8	DC	11/28/23 10:06	9.52		DC	11/28/2023	10:07	10:35	Bladder Pump	2"	7.0	250.0
022	MW-8S	DC	11/27/23 14:17	T.O.P.		DC	11/27/2023	14:18	14:28	Bladder Pump	2"	0.0	0.0
023	PZ-4A	JC	11/29/23 10:02	7.97		JC	11/29/2023	10:07	10:30	Submersible Pump	2"	3.0	130.4
024	PZ-4C	JC	11/28/23 13:40	7.56		JC	11/28/2023	13:45	14:01	Submersible Pump	2"	4.0	250.0
025	SG-02	JC	11/27/23 10:30	14.73									
026	XSG-01	JC	11/27/23 9:49	5.52									
027	Field Blank												
028	MW-8 Duplicate	DC	11/28/23 10:06	9.52			11/28/2023	10:07	10:35	Bladder Pump	2"	7.0	250.0

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 4Q 2023

		Sampling Activities and Observations									
WO Sample	**Well ID**	**Sampler Initials**	**Date**	**Time**	**Sampling Method**	**Field Filtered**	**Appearance**	**Odor**	**Color**	**Post-Sample DTW (ft)**	**Drawdown (ft)**
001	MW-1	TAC	11/27/23	12:05	Low Flow	No	Clear	None	None	17.50	0.45
002	MW-11	JC	11/28/23	10:44	Low Flow	No	Clear	None	none	12.70	**0.96**
003	MW-12	JC	11/28/23	10:03	Low Flow	No	Clear	Slight	none	8.28	**1.06**
004	MW-12S										
005	MW-12D										
006	MW-2	TAC	11/27/23	11:11	Low Flow	No	Slightly cloudy	Slight	None	10.08	**1.97**
007	MW-20	JC	11/28/23	13:20	Low Flow	No	Cloudy	None	none	11.70	**3.50**
008	MW-20S	JC	11/28/23	12:41	Low Flow	No	Clear	None	none	8.92	**1.00**
009	MW-23	JC	11/28/23	11:21	Low Flow	No	Slightly cloudy	None	none	18.45	**1.84**
010	MW-27										
011	MW-28	TAC	11/28/23	14:23	Low Flow	No	Clear	None	None	8.65	**0.54**
012	MW-3	JC	11/28/23	12:08	Low Flow	No	Clear	None	none	9.29	**0.67**
013	MW-30	TAC	11/28/23	12:24	Low Flow	No	Clear	None	None	30.76	**5.20**
014	MW-31	JC	11/27/23	13:47	Low Flow	No	Clear	Slight	none	34.18	**0.98**
015	MW-31S	JC	11/27/23	13:09	Low Flow	No	Slightly cloudy	Moderate	none	23.56	**3.25**
016	MW-32	JC	11/27/23	11:32	Low Flow	No	Clear	None	none	25.51	0.01
017	MW-5	JC	11/27/23	12:31	Low Flow	No	Clear	None	none	29.81	**1.24**
018	MW-6	TAC	11/28/23	13:36	Low Flow	No	Clear	None	None	13.45	**1.40**
019	MW-7	TAC	11/27/23	13:35	Low Flow	No	Clear	None	None	11.06	**1.62**
020	MW-7S	TAC	11/27/23	12:54	Low Flow	No	Clear	None	None		
021	MW-8	TAC	11/28/23	10:35	Low Flow	No	Clear	None	None	10.01	0.49
022	MW-8S										
023	PZ-4A	JC	11/29/23	10:30	Low Flow	No	Slightly cloudy	None	none	8.18	0.21
024	PZ-4C	JC	11/28/23	14:01	Low Flow	No	Slightly cloudy	Strong	none	8.20	**0.64**
025	SG-02										
026	XSG-01										
027	Field Blank	JC	11/29/23	10:35							
028	MW-8 Duplicate	TAC	11/28/23	10:35	Low Flow	No	Clear	None	None	10.01	0.49

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 4Q 2023

WO Sample	Well ID	COMMENTS
001	MW-1	
002	MW-11	
003	MW-12	
004	MW-12S	DTW Only
005	MW-12D	DTW Only
006	MW-2	
007	MW-20	
008	MW-20S	
009	MW-23	
010	MW-27	15.33 Top of pump/ Dry- No sample
011	MW-28	
012	MW-3	
013	MW-30	
014	MW-31	
015	MW-31S	
016	MW-32	
017	MW-5	
018	MW-6	
019	MW-7	
020	MW-7S	Top of pump 10.24
021	MW-8	
022	MW-8S	Top of Pump 7.50/ Dry- No sample
023	PZ-4A	
024	PZ-4C	
025	SG-02	DTW Only
026	XSG-01	DTW Only
027	Field Blank	
028	MW-8 Duplicate	

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Stabilized Field Parameters Summary
Kincaid- 4Q 2023

Well ID	Date	Time	Temp (deg C)	Temp (deg F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	LIMS ID
MW-1	11/27/2023	12:05	15.6	60.1	6.36	532.1	1.01	2.23	84.6	17.05	23110440-001A
MW-11	11/28/2023	10:44	13.2	55.8	6.88	962.8	1.17	8.12	16.8	11.74	23110440-002A
MW-12	11/28/2023	10:03	10.6	51.1	6.75	1,412.9	0.87	9.27	-37.7	7.22	23110440-003A
MW-12S	11/27/2023	10:53	DTW Only							7.89	23110440-004A
MW-12D	11/27/2023	10:52	DTW Only							4.56	23110440-005A
MW-2	11/27/2023	11:11	13.3	55.9	6.95	779.0	1.82	54.42	7.8	8.11	23110440-006A
MW-20	11/28/2023	13:20	13.8	56.8	7.09	993.1	1.35	65.30	17.8	8.20	23110440-007A
MW-20S	11/28/2023	12:41	13.8	56.8	7.01	1,349.3	3.17	5.30	101.5	7.92	23110440-008A
MW-23	11/28/2023	11:21	13.0	55.4	6.96	947.1	1.52	9.38	42.7	16.61	23110440-009A
MW-27			*Dry- No Sample*							T.O.P.	23110440-010A
MW-28	11/28/2023	14:23	14.5	58.1	6.58	1,893.2	1.04	2.78	77.2	8.11	23110440-011A
MW-3	11/28/2023	12:08	12.8	55.0	6.97	882.0	1.59	6.22	65.9	8.62	23110440-012A
MW-30	11/28/2023	12:24	13.5	56.3	6.57	1,041.8	1.38	34.93	-66.1	25.56	23110440-013A
MW-31	11/27/2023	13:47	13.1	55.6	6.65	980.9	2.30	5.90	-51.6	33.20	23110440-014A
MW-31S	11/27/2023	13:09	14.0	57.2	6.54	1,232.9	1.34	9.47	-85.6	20.31	23110440-015A
MW-32	11/27/2023	11:32	14.1	57.4	6.38	1,386.0	1.38	4.33	142.5	25.50	23110440-016A
MW-5	11/27/2023	12:31	10.9	51.6	6.62	1,225.0	0.95	10.28	20.8	28.57	23110440-017A
MW-6	11/28/2023	13:36	14.6	58.3	6.40	922.6	3.19	14.52	74.5	12.05	23110440-018A
MW-7	11/27/2023	13:35	13.7	56.7	6.75	1,292.9	1.32	11.19	26.8	9.44	23110440-019A
MW-7S	11/27/2023	12:54	14.8	58.6	6.68	1,605.3	0.86	4.52	-56.0	T.O.P.	23110440-020A
MW-8	11/28/2023	10:35	14.1	57.4	6.41	1,168.6	0.94	1.60	110.2	9.52	23110440-021A
MW-8S			*Dry- No Sample*							T.O.P.	23110440-022A
PZ-4A	11/29/2023	10:30	14.8	58.6	6.78	1,384.5	4.62	16.80	120.4	7.97	23110440-023A
PZ-4C	11/28/2023	14:01	13.6	56.5	7.36	876.9	1.00	12.62	-294.6	7.56	23110440-024A
SG-02	11/27/2023	10:30	DTW Only							14.73	23110440-025A
XSG-01	11/27/2023	9:49	DTW Only							5.52	23110440-026A
Field Blank	11/29/2023	10:35									23110440-027A
MW-8 Duplicate	11/28/2023	10:35	14.1	57.4	6.41	1,168.6	0.94	1.60	110.2	9.52	23110440-028A

Notes:
T.O.P.= top of pump measurment, no measurable water

Site Samping Event: Kincaid 4Q 2023
LIMS Workorder: 23110440
Technician(s): DC, JC, TC, BG

Groundwater Sampling Field Form- Groundwater Quality Parameters
Kincaid- 4Q 2023

Well ID	Date	Time	DTW	Temp (deg C)	Temp (deg F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
PZ-4A	11/29/2023	10:15	7.97	13.8	56.8	6.72	1,383.7	5.01	51.83	124.5
PZ-4A	11/29/2023	10:18	7.97	14.1	57.4	6.73	1,385.2	4.68	35.49	121.2
PZ-4A	11/29/2023	10:21	7.97	14.1	57.4	6.75	1,385.7	4.56	26.81	120.6
PZ-4A	11/29/2023	10:24	7.97	14.0	57.2	6.77	1,384.7	4.56	21.52	120.0
PZ-4A	11/29/2023	10:27	7.97	14.1	57.4	6.78	1,383.0	4.63	19.60	120.0
PZ-4A	11/29/2023	10:30	7.97	14.8	58.6	6.78	1,384.5	4.62	16.80	120.4

Site Samping Event: Kincaid 4Q 2023

LIMS Workorder: 23110440

Technician(s): DC, JC, TC, BG

Groundwater Sampling Field Form- Groundwater Quality Parameters

Kincaid- 4Q 2023

Well ID	Date	Time	DTW	Temp (deg C)	Temp (deg F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
Field Blank	11/29/2023	10:35	No water quality data							

Field Calibration Log(s)
Kincaid- 4Q 2023

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: 29218
Technician: Justin Colp

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230720g	4.02	11/27/23 11:02
7.0 Buffer	wc230616f	7.00	11/27/23 11:07
10.0 Buffer	wc231027d	9.99	11/27/23 11:12
LCS (7.0 Buffer)			

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.	87241	1413	11/27/23 11:17

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS	11/27/23 11:21	18.7	7.01	1417	
CCV	11/27/23 14:20	17.8	7.02	1426	

Field Meter ID: 29218
Technician: Justin Colp

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230720g	4.00	11/28/23 9:05
7.0 Buffer	wc230616f	7.01	11/28/23 9:10
10.0 Buffer	wc231027d	10.00	11/28/23 9:15
LCS (7.0 Buffer)			

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.	87241	1421	11/28/23 9:21

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS	11/28/23 9:26	15.8	7.01	1434	
CCV	11/28/23 14:15	17.2	7.04	1471	

Field Meter ID: 29218
Technician: Justin Colp

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230720g	4.03	11/29/23 9:50
7.0 Buffer	wc230616f	7.02	11/29/23 9:55
10.0 Buffer	wc231027d	10.03	11/29/23 10:00
LCS (7.0 Buffer)			

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.	87241	1439	11/29/23 10:06

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS	11/29/23 10:09	16.7	7.04	1441	
CCV	11/29/23 10:38	17.2	7.04	1482	

Field Calibration Log(s)
Kincaid- 4Q 2023

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: 51290
Technician: Tracy Carroll

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC230720G	4.00	11/27/23 10:14
7.0 Buffer	WC230616F	7.04	11/27/23 10:18
10.0 Buffer	WC231027D	10.00	11/27/23 10:26
LCS (7.0 Buffer)	WC230504B		

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.	87241	1412	11/27/23 10:31

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS	11/27/23 10:34	13.5	7.10	1415	
CCV	11/27/23 16:00	18.5	7.05	1428	

Field Meter ID: 51290
Technician: Tracy Carroll

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC230720G	4.00	11/28/23 9:48
7.0 Buffer	WC230616F	7.05	11/28/23 9:56
10.0 Buffer	WC231027D	10.00	11/28/23 10:02
LCS (7.0 Buffer)	WC230504B		

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.	87241	1412	11/28/23 10:03

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS	11/28/23 10:04	5.5	7.05	1415	
CCV	11/28/23 16:34	14.7	7.08	1455	

Field Meter ID:
Technician:

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer			
7.0 Buffer			
10.0 Buffer			
LCS (7.0 Buffer)			

Conductivity Standard	LIMS ID/Lot#	Reading	Date/Time
1412 µS Std.			

Sample ID	Date/Time	Temp. °C	pH	Conductivity µS	Comments
LCS					
CCV					

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 1Q 2024

			Weather				Well Condition				
WO Sample	**Well ID**	**Program/ Sample Type**	**Temp (°F)**	**Precipitation**	**Wind Direction**	**Sky**	**Well Pad**	**Casing**	**Protective Cover**	**Reference Mark/ ID**	**Well Locked**
001	MW-01	Groundwater Sample	68.0	None	N	Clear	Good	Good	Good	Yes	Yes
002	MW-02	Groundwater Sample	69.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
003	MW-03	Groundwater Sample	73.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
004	MW-04	Groundwater Sample	75.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
005	MW-05	Groundwater Sample	75.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
006	MW-06	Groundwater Sample	55.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
007	MW-07	Groundwater Sample	56.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
008	MW-07S	Groundwater Sample	67.0	None	N	Clear	Good	Good	Good	Yes	Yes
009	MW-08	Groundwater Sample	56.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
010	MW-08S	Groundwater Sample	68.0	None	N	Clear	Good	Good	Good	Yes	Yes
011	MW-09	Groundwater Sample	53.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
012	MW-10	Groundwater Sample	53.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
013	MW-11	Groundwater Sample	51.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
014	MW-12	Groundwater Sample	55.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
015	MW-20	Groundwater Sample	53.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
016	MW-20S	Groundwater Sample	66.0	None	N	Clear	Good	Good	Good	Yes	Yes
017	MW-23	Groundwater Sample	52.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
018	MW-27	Groundwater Sample	68.0	None	N	Clear	Good	Good	Good	Yes	Yes
019	MW-28	Groundwater Sample	52.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
020	MW-30	Groundwater Sample	50.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
021	MW-31	Groundwater Sample	52.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
022	MW-31S	Groundwater Sample	66.0	None	N	Clear	Good	Good	Good	Yes	Yes
023	MW-32	Groundwater Sample	53.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
024	PZ4!A	Groundwater Sample	45.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
025	PZ4!C	Groundwater Sample	46.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
026	XPW01_pore	Groundwater Sample	53.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
027	XPW02_pore	Groundwater Sample	53.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
028	XPW03_pore	Groundwater Sample	47.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
029	XPW04_pore	Groundwater Sample	51.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
030	XSG-01	DTW Only	64.0	None	N	Clear					
031	YSG-02	DTW Only	64.0	None	N	Clear					
032	Field Blank	QA/QC Sample	66.0	None	N	Clear					
033	MW-08 Duplicate	QA/QC Sample	56.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
034	Equipment Blank 1	QA/QC Sample	66.0	None	N	Clear					

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 1Q 2024

		GW Level Measurement				Purge Activities							
WO Sample	Well ID	Sampler Initials	Date/Time	DTW (ft)	DTB (ft)	Sampler Initials	Purge Date	Purge Start Time	Purge End Time	Purging Device	Well Diameter (in)	Actual Volume Purged (L)	Purge Rate (mL/min)
001	MW-01	DC	3/4/24 14:05	17.00	27.10	DC	3/4/2024	14:06	14:26	Peristaltic Pump	2"	4.0	200.0
002	MW-02	JC	3/4/24 11:20	7.34	22.20	JC	3/4/2024	11:20	12:30	Bladder Pump	2"	8.5	121.4
003	MW-03	JC	3/4/24 12:45	8.63	26.20	JC	3/4/2024	12:45	13:00	Bladder Pump	2"	3.0	200.0
004	MW-04	JC	3/4/24 13:09	7.59	24.40	JC	3/4/2024	13:09	13:23	Bladder Pump	2"	3.0	214.3
005	MW-05	JC	3/4/24 13:34	25.93	41.70	JC	3/4/2024	13:34	14:46	Bladder Pump	2"	8.0	111.1
006	MW-06	JC	3/5/24 11:06	9.52	22.00	JC	3/5/2024	11:06	11:24	Bladder Pump	2"	3.5	194.4
007	MW-07	JC	3/5/24 13:07	4.80	21.80	JC	3/5/2024	13:07	13:26	Bladder Pump	2"	3.0	157.9
008	MW-07S	DC	3/4/24 12:21	10.53	17.05	DC	3/4/2024	12:22	12:48	Peristaltic Pump	2"	5.0	192.3
009	MW-08	JC	3/5/24 13:36	8.07	24.00	JC	3/5/2024	13:37	13:48	Bladder Pump	2"	2.0	181.8
010	MW-08S	DC	3/4/24 13:48	9.60	10.02	DC	3/4/2024	13:50	14:11	Peristaltic Pump	2"	3.0	142.9
011	MW-09	DC	3/5/24 9:49	12.90	21.80	DC	3/5/2024	09:52	10:23	Peristaltic Pump	2"	4.0	129.0
012	MW-10	DC	3/5/24 10:41	11.95	21.90	DC	3/5/2024	10:44	11:06	Peristaltic Pump	2"	4.0	181.8
013	MW-11	JC	3/5/24 9:20	11.46	23.50	JC	3/5/2024	09:20	09:32	Bladder Pump	2"	2.0	166.7
014	MW-12	JC	3/5/24 11:34	6.46	27.60	JC	3/5/2024	11:35	12:57	Bladder Pump	2"	9.5	115.9
015	MW-20	JC	3/5/24 10:25	5.81	26.25	JC	3/5/2024	10:25	10:48	Bladder Pump	2"	4.0	173.9
016	MW-20S	DC	3/4/24 10:26	7.13	12.21	DC	3/4/2024	10:30	11:09	Peristaltic Pump	2"	6.0	153.8
017	MW-23	JC	3/5/24 9:50	16.20	30.27	JC	3/5/2024	09:50	10:08	Bladder Pump	2"	3.0	166.7
018	MW-27	DC	3/4/24 13:01	15.17	17.70	DC	3/4/2024	13:04	13:27	Peristaltic Pump	2"	4.0	173.9
019	MW-28	BG	3/6/24 11:02	6.04	25.07	BG	3/6/2024	11:05	11:23	Bladder Pump	2"	3.5	194.4
020	MW-30	JC	3/6/24 10:37	24.26	42.47	JC	3/5/2024	10:40	10:53	Bladder Pump	2"	2.5	192.3
021	MW-31	JC	3/6/24 11:12	29.65	42.32	JC	3/6/2024	11:13	11:25	Bladder Pump	2"	2.0	166.7
022	MW-31S	DC	3/4/24 11:31	22.21	32.41	DC	3/4/2024	11:32	11:55	Peristaltic Pump	2"	3.0	130.4
023	MW-32	JC	3/6/24 11:41	22.66	39.29	JC	3/6/2024	11:41	11:53	Bladder Pump	2"	1.5	125.0
024	PZ4!A	JC	3/6/24 9:16	7.70	12.94	JC	3/6/2024	09:25	09:43	Submersible Pump	2"	2.0	111.1
025	PZ4!C	JC	3/6/24 9:48	7.12	23.18	JC	3/6/2024	09:52	10:04	Submersible Pump	2"	1.5	125.0
026	XPW01_pore	DC	3/5/24 11:55	24.34	34.36	DC	3/5/2024	11:56	12:17	Bladder Pump	2"	5.0	238.1
027	XPW02_pore	DC	3/5/24 12:31	16.40	25.28	DC	3/5/2024	12:32	12:58	Bladder Pump	2"	8.0	307.7
028	XPW03_pore	BG	3/6/24 9:30	15.01	22.78	BG	3/6/2024	09:30	10:19	Bladder Pump	2"	7.0	142.9
029	XPW04_pore	BG	3/6/24 10:38	2.99	24.96	BG	3/6/2024	10:39	10:48	Bladder Pump	2"	2.5	277.8
030	XSG-01	BG	3/4/24 9:37	4.79	-								
031	YSG-02	BG	3/4/24 10:43	13.03	-								
032	Field Blank				-								
033	MW-08 Duplicate	JC	3/5/24 13:36	8.07	24.00	JC	3/5/2024	13:37	13:48	Bladder Pump	2"	2.0	181.8
034	Equipment Blank 1				-								

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 1Q 2024

WO Sample	Well ID	Sampling Activities and Observations										
		Sampler Initials	Date	Time	Sampling Method	Instrument ID	Field Filtered	Appearance	Odor	Color	Post-Sample DTW (ft)	Drawdown (ft)
001	MW-01	TAC	03/04/24	14:26	Low Flow	218079	No	Clear	None	None	17.43	0.43
002	MW-02	JC	03/04/24	12:30	Low Flow	211367	No	Slightly cloudy	None	none	7.34	0
003	MW-03	JC	03/04/24	13:00	Low Flow	211367	No	Clear	None	none	8.63	0
004	MW-04	JC	03/04/24	13:23	Low Flow	211367	No	Clear	None	none	7.59	0
005	MW-05	JC	03/04/24	14:46	Low Flow	211367	No	Slightly cloudy	None	none	25.93	0
006	MW-06	JC	03/05/24	11:24	Low Flow	211367	No	Clear	None	none	9.52	0
007	MW-07	JC	03/05/24	13:26	Low Flow	211367	No	Clear	None	none	4.80	0
008	MW-07S	TAC	03/04/24	12:48	Low Flow	218079	No	Clear	None	None	10.61	0.08
009	MW-08	JC	03/05/24	13:48	Low Flow	211367	No	Clear	None	none	8.07	0
010	MW-08S	TAC	03/04/24	N/A	Low Flow	218079	No	Clear	None	None	-	**N/A**
011	MW-09	TAC	03/05/24	10:23	Low Flow	218079	No	Clear	None	None	13.16	0.26
012	MW-10	TAC	03/05/24	11:06	Low Flow	218079	No	Clear	None	None	12.30	0.35
013	MW-11	JC	03/05/24	09:32	Low Flow	211367	No	Clear	None	none	11.46	0
014	MW-12	JC	03/05/24	12:57	Low Flow	211367	No	Cloudy	Slight	rust	6.46	0
015	MW-20	JC	03/05/24	10:48	Low Flow	211367	No	Slightly cloudy	None	none	8.80	**2.99**
016	MW-20S	TAC	03/04/24	11:09	Low Flow	218079	No	Clear	None	None	7.29	0.16
017	MW-23	JC	03/05/24	10:08	Low Flow	211367	No	Clear	None	none	16.20	0
018	MW-27	TAC	03/05/24	11:35	Low Flow	218079	No	Clear	None	None	Below T.O.P.	**N/A**
019	MW-28	BG	03/06/24	11:23	Low Flow	218079	No	Clear	None	Clear	6.62	**0.58**
020	MW-30	JC	03/06/24	10:53	Low Flow	211367	No	Clear	None	none	27.21	**2.95**
021	MW-31	JC	03/06/24	11:25	Low Flow	211367	No	Clear	None	none	29.65	0
022	MW-31S	TAC	03/04/24	11:55	Low Flow	218079	No	Clear	None	None	26.07	**3.86**
023	MW-32	JC	03/06/24	11:53	Low Flow	211367	No	Clear	None	none	22.66	0
024	PZ4!A	JC	03/06/24	09:43	Low Flow	211367	No	Cloudy	None	lt. brown	10.05	**2.35**
025	PZ4!C	JC	03/06/24	10:04	Low Flow	211367	No	Slightly cloudy	Strong	none	13.15	**6.03**
026	XPW01_pore	TAC	03/05/24	12:17	Low Flow	218079	No	Clear	None	None	24.40	0.06
027	XPW02_pore	TAC	03/05/24	12:58	Low Flow	218079	No	Clear	None	Orange tint	16.53	0.13
028	XPW03_pore	BG	03/05/24	10:19	Low Flow	218079	No	Cloudy	Slight	Orange tint	15.08	0.07
029	XPW04_pore	BG	03/05/24	10:48	Low Flow	218079	No	Clear	None	Clear	3.04	0.05
030	XSG-01											
031	YSG-02											
032	Field Blank	JC	03/06/24	12:11								
033	MW-08 Duplicate	JC	03/05/24	13:48	Low Flow	211367	No	Clear	None	none	8.07	0
034	Equipment Blank 1	JC	03/06/24	12:14								

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Groundwater Sampling Summary
Kincaid- 1Q 2024

WO Sample	Well ID	COMMENTS
001	MW-01	
002	MW-02	
003	MW-03	
004	MW-04	
005	MW-05	
006	MW-06	
007	MW-07	
008	MW-07S	
009	MW-08	
010	MW-08S	Dry- no sample
011	MW-09	
012	MW-10	
013	MW-11	
014	MW-12	
015	MW-20	
016	MW-20S	
017	MW-23	
018	MW-27	Purged dry on 3/4, sampled on 3/5.
019	MW-28	
020	MW-30	
021	MW-31	
022	MW-31S	
023	MW-32	
024	PZ4!A	
025	PZ4!C	
026	XPW01_pore	
027	XPW02_pore	
028	XPW03_pore	
029	XPW04_pore	
030	XSG-01	DTW only
031	YSG-02	DTW only
032	Field Blank	
033	MW-08 Duplicate	
034	Equipment Blank 1	

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Stabilized Field Parameters Summary
Kincaid- 1Q 2024

Well ID	Date	Time	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	LIMS ID
MW-01	3/4/2024	14:26	17.3	63.1	6.59	511.8	1.13	17.85	41.9	17.00	24021452-001A
MW-02	3/4/2024	12:30	17.3	63.1	7.18	664.2	1.59	83.62	42.0	7.34	24021452-002A
MW-03	3/4/2024	13:00	15.8	60.4	6.79	821.1	1.50	12.43	67.9	8.63	24021452-003A
MW-04	3/4/2024	13:23	15.2	59.4	6.90	732.1	0.94	4.46	-14.8	7.59	24021452-004A
MW-05	3/4/2024	14:46	16.9	62.4	6.63	1,151.6	0.66	54.41	31.8	25.93	24021452-005A
MW-06	3/5/2024	11:24	12.1	53.8	6.36	651.7	7.09	8.90	119.3	9.52	24021452-006A
MW-07	3/5/2024	13:26	10.8	51.4	6.90	803.2	0.94	15.97	26.6	4.80	24021452-007A
MW-07S	3/4/2024	12:48	17.9	64.2	6.77	1,495.7	0.90	1.04	0.4	10.53	24021452-008A
MW-08	3/5/2024	13:48	12.6	54.7	6.65	1,044.4	1.11	5.91	49.4	8.07	24021452-009A
MW-08S	3/4/2024	13:48	*Dry- no sample*							9.60	24021452-010A
MW-09	3/5/2024	10:23	12.1	53.8	6.72	670.8	5.20	15.04	101.4	12.90	24021452-011A
MW-10	3/5/2024	11:06	12.5	54.5	6.49	1,717.0	2.28	26.41	106.2	11.95	24021452-012A
MW-11	3/5/2024	9:32	13.8	56.8	6.62	887.3	1.85	9.27	117.5	11.46	24021452-013A
MW-12	3/5/2024	12:57	11.4	52.5	6.68	1,298.5	0.66	196.06	0.3	6.46	24021452-014A
MW-20	3/5/2024	10:48	12.1	53.8	6.87	912.8	2.36	27.01	108.0	5.81	24021452-015A
MW-20S	3/4/2024	11:09	20.4	68.7	6.74	1,338.8	3.29	4.79	117.6	7.13	24021452-016A
MW-23	3/5/2024	10:08	13.6	56.5	6.68	875.0	2.44	6.13	114.9	16.20	24021452-017A
MW-27	3/5/2024	11:35	13.1	55.6	6.82	1,454.0	6.27	45.07	59.8	15.17	24021452-018A
MW-28	3/6/2024	11:23	12.4	54.3	6.74	1,750.7	0.45	7.41	-8.4	6.04	24021452-019A
MW-30	3/6/2024	10:53	13.2	55.8	6.66	950.8	1.65	9.26	1.5	24.26	24021452-020A
MW-31	3/6/2024	11:25	13.1	55.6	6.76	956.7	1.63	7.26	-6.9	29.65	24021452-021A
MW-31S	3/4/2024	11:55	20.6	69.1	6.74	1,260.6	2.23	17.02	-27.0	22.21	24021452-022A
MW-32	3/6/2024	11:53	13.1	55.6	6.59	1,266.5	1.96	8.91	36.5	22.66	24021452-023A
PZ4!A	3/6/2024	9:43	10.2	50.4	6.97	981.4	6.24	153.88	63.1	7.70	24021452-024A
PZ4!C	3/6/2024	10:04	11.4	52.5	6.90	828.8	1.48	6.83	-12.4	7.12	24021452-025A
XPW01_pore	3/5/2024	12:17	18.4	65.1	7.54	615.7	0.51	74.77	37.0	24.34	24021452-026A
XPW02_pore	3/5/2024	12:58	15.6	60.1	6.73	1,011.9	0.26	24.95	-61.2	16.40	24021452-027A
XPW03_pore	3/6/2024	10:19	15.3	59.5	7.07	2,106.8	0.27	339.97	22.2	15.01	24021452-028A
XPW04_pore	3/6/2024	10:48	11.8	53.2	6.88	565.7	0.47	9.08	-94.6	2.99	24021452-029A
XSG-01	3/4/2024	9:37	*DTW only*							4.79	24021452-030A
YSG-02	3/4/2024	10:43	*DTW only*							13.03	24021452-031A
Field Blank	3/6/2024	12:11	*QA/QC Sample*								24021452-032A
MW-08 Duplicate	3/5/2024	13:48	12.6	54.7	6.65	1,044.4	1.11	5.91	49.4	8.07	24021452-033A
Equipment Blank 1	3/6/2024	12:14	*QA/QC Sample*								24021452-034A

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Groundwater Sampling Form- Groundwater Quality Parameters
Kincaid- 1Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
PZ4!A	3/6/2024	9:28	7.70	9.9	49.8	6.96	982.9	7.65	541.59	65.4
PZ4!A	3/6/2024	9:31	7.70	9.9	49.8	6.98	982.6	6.46	266.32	56.5
PZ4!A	3/6/2024	9:34	7.70	10.0	50.0	6.99	980.3	6.27	199.51	56.4
PZ4!A	3/6/2024	9:37	7.70	10.0	50.0	6.98	981.8	6.23	187.17	58.4
PZ4!A	3/6/2024	9:40	7.70	10.2	50.4	6.98	979.9	6.23	146.94	60.7
PZ4!A	3/6/2024	9:43	7.70	10.2	50.4	6.97	981.4	6.24	153.88	63.1

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Field Calibration Log(s)
Kincaid- 1Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 218079 Technician(s): Tracy Carroll/Danny Crump Date: 3/4/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC230820B	4.00	3/4/24 9:54
7.0 Buffer	WC230616F	7.00	3/4/24 9:55
10.0 Buffer	WC231027D	10.00	3/4/24 9:56
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1412	3/4/24 9:58

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1		
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/4/24 10:13	21.5	7.05	1,411	1.61			
CCV	3/4/24 15:25	31.1	7.06	1,333	0.95			

Field Meter ID: Pine 218079 Technician(s): Tracy Carroll/Danny Crump Date: 3/5/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC230820B	4.00	3/5/24 9:39
7.0 Buffer	WC230616F	7.00	3/5/24 9:40
10.0 Buffer	WC231027D	10.00	3/5/24 9:42
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1412	3/5/24 9:44

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.12	3/5/24 9:45
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/5/24 9:48	19.3	7.09	1,413	1.12			
CCV	3/5/24 13:35	18.8	7.08	1,349	0.43			

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Field Calibration Log(s)
Kincaid- 1Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 218079 Technician(s): Daniel Crump Date: 3/6/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230820B	4.00	3/6/24 9:21
7.0 Buffer	WC230616F	7.00	3/6/24 9:22
10.0 Buffer	WC231027D	10.00	3/6/24 9:22
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1412	3/6/24 9:23

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.66	3/6/24 9:25
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/6/24 9:25	19.4	7.07	1,413	0.66			
CCV	3/6/24 12:24	14.7	7.05	1,413	0.44			

Field Meter ID: Pine Technician(s): Date:

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer			
7.0 Buffer			
10.0 Buffer			
LCS/CCV (7.0 Buffer)			

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.			

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1		
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS								
CCV (Midday)								
CCV								

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Field Calibration Log(s)
Kincaid- 1Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 211367 Technician(s): justin colp Date: 3/4/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.00	3/4/24 11:04
7.0 Buffer	wc230616f	7.01	3/4/24 10:56
10.0 Buffer	wc231027d	10.00	3/4/24 11:09
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1414	3/4/24 11:12

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.15	3/4/24 11:12
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/4/24 11:15	21.2	7.01	1,418	0.16			
CCV	3/4/24 14:52	23.6	7.03	1,426	0.19			

Field Meter ID: Pine 211367 Technician(s): justin colp Date: 3/5/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	3.99	3/5/24 9:06
7.0 Buffer	wc230616f	7.02	3/5/24 9:03
10.0 Buffer	wc231027d	10.00	3/5/24 9:09
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1415	3/5/24 9:14

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.19	3/5/24 9:14
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/5/24 9:16	19.1	7.02	1,415	0.19			
CCV (Midday)	3/5/24 12:08	19.6	7.01	1,418	0.16			
CCV	3/5/24 14:00	19.9	7.02	1,423	0.2			

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 211367
Description YSI Pro DSS Display
Calibrated 3/1/2024 10:04:30AM

Manufacturer	YSI	**State Certified**	
Model Number	YSI Pro Dss	**Status**	Pass
Serial Number/ Lot Number	22C102235	**Temp °C**	22.2
Location	St. Louis	**Humidity %**	43
Department			

Calibration Specifications

Group # 1
Group Name Instrument Test
Test Performed: Yes **As Found Result:** Pass **As Left Result:** Pass

Test Instruments Used During the Calibration (As Of Cal Entry Date)

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

Site Samping Event: Kincaid 1Q24
LIMS Workorder: 24021452
Technician(s): DC, JC, TC, BG

Field Calibration Log(s)
Kincaid- 1Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 211367 Technician(s): justin colp Date: 3/6/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.00	3/6/24 8:59
7.0 Buffer	wc230616f	7.00	3/6/24 8:55
10.0 Buffer	wc231027d	9.98	3/6/24 9:02
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1415	3/6/24 9:07

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.16	3/6/24 9:07
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS	3/6/24 9:10	14.6	7.01	1,417	0.16			
CCV	3/6/24 12:00	16.8	7.01	1,423	0.19			

Field Meter ID: Pine Technician(s): Date:

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer			
7.0 Buffer			
10.0 Buffer			
LCS/CCV (7.0 Buffer)			

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.			

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1		
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %	Comments
LCS								
CCV (Midday)								
CCV								

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218079
Description YSI Pro DSS Sonde
Calibrated 3/1/2024 10:09:04AM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 23F102670
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.37	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.41	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.13	10.05	0.50%	Pass

Group # 2
Group Name Turbidity (NTU)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	0.44	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	119.15	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.552	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	226.60	240.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218079
Description YSI Pro DSS Sonde
Calibrated 3/1/2024 10:09:04AM

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	92.40	100.00	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
STL 126 NTU L#23E24002133	STL 126 NTU L#23E24002133	YSI	126 NTU	23E24002133		5/20/2024
STL 1413 COND L#4GB0749	STL 1413 COND L#4GB0749	AquaPhoenix Scientific	31986	4GB0749		2/25/2025
STL AUTOCAL L#24002361	Auto Cal Solution 0 NTU/PH 4	GFS	8483	24002361		6/28/2024
STL ORP SOLUTION 240MV L#3GJ0994	STL ORP SOLUTION 240MV L#3GJ0994	AquaPhoenix Scientific	ORP Solution	3GJ0994		7/25/2024
STL PH10 #3GK0004	STL PH10 #3GK0004	AquaPhoenix Scientific	PH 10	3GK0004		11/25/2025
STL PH4 L#3GH0675	STL pH4 L#3GH0675	AquaPhoenix Scientific	pH 4	3GH0675		8/25/2025
STL PH7 L#3GK1332	STL PH7 L#3GK1332	AquaPhoenix Scientific	PH7	3GK1332		11/25/2025

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 2Q 2024

			Weather				Well Condition				
WO Sample	Well ID	Program/ Sample Type	Temp (°F)	Precipitation	Wind Direction	Sky	Well Pad	Casing	Protective Cover	Reference Mark/ ID	Well Locked
001	MW-01	Groundwater Sample	84.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
002	MW-02	Groundwater Sample	78.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
003	MW-03	Groundwater Sample	82.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
004	MW-05	Groundwater Sample	85.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
005	MW-06	Groundwater Sample	80.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
006	MW-07	Groundwater Sample	80.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
007	MW-07S	Groundwater Sample	80.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
008	MW-08	Groundwater Sample	85.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
009	MW-08S	Groundwater Sample	80.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
010	MW-11	Groundwater Sample	81.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
011	MW-12	Groundwater Sample	82.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
012	MW-20	Groundwater Sample	84.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
013	MW-20S	Groundwater Sample	78.0	None	S	Clear	Good	Good	Good	Yes	Yes
014	MW-23	Groundwater Sample	80.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
015	MW-27	Groundwater Sample	78.0	None	NE	Clear	Good	Good	Good	Yes	Yes
016	MW-28	Groundwater Sample	82.0	None	N	Partly cloudy	Good	Good	Good	Yes	Yes
017	MW-30	Groundwater Sample	85.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
018	MW-31	Groundwater Sample	80.0	None	NE	Clear	Good	Good	Good	Yes	Yes
019	MW-31S	Groundwater Sample	82.0	None	NE	Clear	Good	Good	Good	Yes	Yes
020	MW-32	Groundwater Sample	85.0	None	S	Cloudy	Good	Good	Good	Yes	Yes
021	PZ4!A	Groundwater Sample	81.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
022	PZ4!C	Groundwater Sample	82.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
023	XSG-01	DTW Only	78.0	None	S	Partly cloudy					
024	YSG-02	DTW Only	80.0	None	S	Partly cloudy					
025	YSG-03	DTW Only	78.0	None	S	Partly cloudy					
026	Field Blank	QA/QC Sample	82.0	None	NE	Clear					
027	MW-08 Duplicate	QA/QC Sample	85.0	None	N	Cloudy	Good	Good	Good	Yes	Yes
028	Equipment Blank 1	QA/QC Sample	82.0	None	NE	Clear					

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 2Q 2024

		GW Level Measurement				Purge Activities							
WO Sample	**Well ID**	**Sampler Initials**	**Date/Time**	**DTW (ft)**	**DTB (ft)**	**Sampler Initials**	**Purge Date**	**Purge Start Time**	**Purge End Time**	**Purging/Sampling Device**	**Well Diameter (in)**	**Actual Volume Purged (L)**	**Purge Rate (mL/min)**
001	MW-01	BG	5/20/24 12:18	15.48	27.10	BG	5/20/2024	12:18	13:12	Peristaltic Pump	2"	5.0	92.6
002	MW-02	JC	5/20/24 9:38	7.31	22.20	JC	5/20/2024	09:40	10:02	Bladder Pump	2"	5.0	227.3
003	MW-03	JC	5/20/24 11:53	8.76	26.20	JC	5/20/2024	11:54	12:15	Bladder Pump	2"	4.5	214.3
004	MW-05	JC	5/20/24 13:55	26.45	41.70	JC	5/20/2024	13:57	14:16	Bladder Pump	2"	4.0	210.5
005	MW-06	TAC	5/20/24 12:21	9.06	22.00	TAC	5/20/2024	12:21	12:48	Bladder Pump	2"	11.0	**407.4**
006	MW-07	TAC	5/20/24 13:23	9.65	21.80	TAC	5/20/2024	13:23	13:40	Bladder Pump	2"	6.0	352.9
007	MW-07S	TAC	5/20/24 14:04	10.49	13.49	TAC	5/20/2024	14:08	14:31	Peristaltic Pump	2"	6.0	260.9
008	MW-08	BG	5/20/24 13:29	8.44	24.00	BG	5/20/2024	13:29	13:42	Bladder Pump	2"	1.5	115.4
009	MW-08S	BG	5/20/24 10:35	9.76	10.02	JC	5/20/2024	11:00	11:02	Peristaltic Pump	2"	0.1	50.0
010	MW-11	JC	5/20/24 11:06	11.89	23.50	JC	5/20/2024	11:07	11:24	Bladder Pump	2"	4.0	235.3
011	MW-12	TAC	5/20/24 10:33	6.57	27.60	TAC	5/20/2024	10:34	11:06	Bladder Pump	2"	12.0	375.0
012	MW-20	JC	5/20/24 12:32	6.24	26.25	JC	5/20/2024	12:34	12:51	Bladder Pump	2"	4.0	235.3
013	MW-20S	JC	5/21/24 9:50	6.25	12.21	JC	5/21/2024	09:52	10:09	Submersible Pump	2"	3.0	176.5
014	MW-23	JC	5/20/24 10:34	16.58	30.27	JC	5/20/2024	10:36	10:50	Bladder Pump	2"	4.0	285.7
015	MW-27	BG	5/21/24 12:02	13.40	17.70	BG	5/21/2024	12:05	12:11	Peristaltic Pump	2"	0.5	83.3
016	MW-28	TAC	5/20/24 11:30	6.74	25.07	TAC	5/20/2024	11:32	11:56	Bladder Pump	2"	6.0	250.0
017	MW-30	BG	5/20/24 14:43	24.52	42.47	BG	5/20/2024	14:43	15:03	Bladder Pump	2"	3.0	150.0
018	MW-31	bg	5/21/24 10:34	30.44	42.32	bg	5/21/2024	10:34	10:53	Bladder Pump	2"	2.5	131.6
019	MW-31S	BG	5/21/24 10:58	23.16	32.41	BG	5/21/2024	10:58	11:36	Bladder Pump	2"	4.0	105.3
020	MW-32	JC	5/20/24 13:15	23.18	39.29	JC	5/20/2024	13:17	13:40	Bladder Pump	2"	5.0	217.4
021	PZ4!A	JC	5/21/24 10:35	7.85	12.94	JC	5/21/2024	10:37	11:04	Submersible Pump	2"	3.0	111.1
022	PZ4!C	JC	5/21/24 11:10	7.24	23.18	JC	5/21/2024	11:11	11:23	Submersible Pump	2"	3.0	250.0
023	XSG-01	BG	5/20/24 9:48	5.21	-								
024	YSG-02	BG	5/20/24 12:18	20.37	-								
025	YSG-03	BG	5/20/24 10:54	13.08	-								
026	Field Blank												
027	MW-08 Duplicate	BG	5/20/24 13:29	8.44	24.00	BG	5/20/2024	13:29	13:42	Bladder Pump	2"	1.5	115.4
028	Equipment Blank 1												

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 2Q 2024

WO Sample	Well ID	Sampling Activities and Observations										
		Sampler Initials	Date	Time	Sampling Method	Instrument ID	Field Filtered	Appearance	Odor	Color	Post-Sample DTW (ft)	Drawdown (ft)
001	MW-01	BG	05/20/24	13:12	Low Flow	26559	No	Clear	None	CLEAR	15.78	0.3
002	MW-02	JC	05/20/24	10:02	Low Flow	218083	No	Clear	Slight	none	8.78	1.47
003	MW-03	JC	05/20/24	12:15	Low Flow	218083	No	Clear	None	none	9.38	0.62
004	MW-05	JC	05/20/24	14:16	Low Flow	218083	No	Slightly cloudy	Slight	none	28.26	1.81
005	MW-06	TAC	05/20/24	12:48	Low Flow	45986	No	Clear	None	None	10.88	1.82
006	MW-07	TAC	05/20/24	13:40	Low Flow	45986	No	Clear	None	None	12.22	2.57
007	MW-07S	TAC	05/20/24	14:31	Low Flow	45986	No	Clear	None	None	10.53	0.04
008	MW-08	BG	05/20/24	13:42	Low Flow	26559	No	Clear	None	CLEAR	8.59	0.15
009	MW-08S											
010	MW-11	JC	05/20/24	11:24	Low Flow	218083	No	Clear	None	none	13.17	1.28
011	MW-12	TAC	05/20/24	11:06	Low Flow	45986	No	Clear	None	None	6.80	0.23
012	MW-20	JC	05/20/24	12:51	Low Flow	218083	No	Clear	None	none	8.98	2.74
013	MW-20S	JC	05/21/24	10:09	Low Flow	218083	No	Clear	None	none	8.22	1.97
014	MW-23	JC	05/20/24	10:50	Low Flow	218083	No	Clear	None	none	19.10	2.52
015	MW-27	BG	05/21/24	12:11	Low Flow	26559	No	Clear	None	none	Below T.O.P.	N/A
016	MW-28	TAC	05/20/24	11:56	Low Flow	45986	No	Clear	None	None	7.54	0.8
017	MW-30	BG	05/20/24	15:03	Low Flow	26559	No	Clear	None	CLEAR	25.04	0.52
018	MW-31	bg	05/21/24	10:53	Low Flow	26559	No	Slightly cloudy	None	clear	31.46	1.02
019	MW-31S	BG	05/21/24	11:36	Low Flow	26559	No	Cloudy	None	lt brown	29.17	6.01
020	MW-32	JC	05/20/24	13:40	Low Flow	218083	No	Clear	None	none	23.88	0.7
021	PZ4!A	JC	05/21/24	11:04	Low Flow	218083	No	Slightly cloudy	None	none	10.69	2.84
022	PZ4!C	JC	05/21/24	11:23	Low Flow	218083	No	Slightly cloudy	Slight	none	8.21	0.97
023	XSG-01											
024	YSG-02											
025	YSG-03											
026	Field Blank	JC	05/21/24	11:31	Direct Sample							
027	MW-08 Duplicate	BG	05/20/24	13:42	Low Flow	26559	No	Clear	None	CLEAR	8.59	0.15
028	Equipment Blank 1	JC	05/21/24	11:37	Direct Sample							

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 2Q 2024

WO Sample	Well ID	COMMENTS
001	MW-01	
002	MW-02	
003	MW-03	
004	MW-05	
005	MW-06	
006	MW-07	
007	MW-07S	
008	MW-08	
009	MW-08S	Dry- no sample
010	MW-11	
011	MW-12	
012	MW-20	
013	MW-20S	
014	MW-23	
015	MW-27	Dry dyring purge on 5/20, able to yield sample on 5/21
016	MW-28	
017	MW-30	
018	MW-31	
019	MW-31S	
020	MW-32	
021	PZ4!A	
022	PZ4!C	
023	XSG-01	
024	YSG-02	
025	YSG-03	
026	Field Blank	
027	MW-08 Duplicate	
028	Equipment Blank 1	

Site Samping Event: Kincaid- 2Q24

LIMS Workorder: 24050124

Technician(s): DC, JC, TC, BG, PY

Stabilized Field Parameters Summary

Kincaid- 2Q 2024

Well ID	Date	Time	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	LIMS ID
MW-01	5/20/2024	13:12	16.4	61.5	6.48	543.8	1.10	5.06	132.2	15.48	24050124-001A
MW-02	5/20/2024	10:02	15.7	60.2	7.21	485.1	0.28	48.83	35.2	7.31	24050124-002A
MW-03	5/20/2024	12:15	15.7	60.2	6.73	595.4	0.35	5.84	247.0	8.76	24050124-003A
MW-05	5/20/2024	14:16	17.2	63.0	6.51	841.9	0.46	27.25	39.9	26.45	24050124-004A
MW-06	5/20/2024	12:48	13.4	56.1	6.44	609.5	6.07	4.66	69.3	9.06	24050124-005A
MW-07	5/20/2024	13:40	13.4	56.2	6.97	759.5	1.00	4.53	-61.9	9.65	24050124-006A
MW-07S	5/20/2024	14:31	16.9	62.4	6.71	1,337.4	1.55	2.82	-57.0	10.49	24050124-007A
MW-08	5/20/2024	13:42	17.2	62.9	6.60	1,189.6	0.95	3.62	92.2	8.44	24050124-008A
MW-08S	5/20/2024	10:35	Dry- No Sample							9.76	24050124-009A
MW-11	5/20/2024	11:24	15.9	60.6	6.77	640.9	0.83	2.68	172.5	11.89	24050124-010A
MW-12	5/20/2024	11:06	14.4	57.9	6.50	1,366.4	0.76	9.28	-35.7	6.57	24050124-011A
MW-20	5/20/2024	12:51	15.3	59.5	6.89	677.5	0.28	9.17	264.3	6.24	24050124-012A
MW-20S	5/21/2024	10:09	17.0	62.6	6.62	1,568.4	0.66	31.25	249.5	6.25	24050124-013A
MW-23	5/20/2024	10:50	15.7	60.3	6.79	651.4	0.28	5.14	133.0	16.58	24050124-014A
MW-27	5/21/2024	12:11	17.9	64.3	6.97	1,756.4	3.14	280.04	-14.4	13.40	24050124-015A
MW-28	5/20/2024	11:56	14.8	58.7	6.64	2,098.9	0.94	5.22	36.7	6.74	24050124-016A
MW-30	5/20/2024	15:03	18.2	64.8	6.73	1,101.6	1.36	8.06	-77.5	24.52	24050124-017A
MW-31	5/21/2024	10:53	19.9	67.8	6.72	1,139.8	1.63	4.58	-61.4	30.44	24050124-018A
MW-31S	5/21/2024	11:36	20.9	69.6	6.77	1,308.9	3.57	35.54	-42.7	23.16	24050124-019A
MW-32	5/20/2024	13:40	16.4	61.5	6.40	922.6	0.48	2.91	193.1	23.18	24050124-020A
PZ4!A	5/21/2024	11:04	20.7	69.3	6.79	1,206.5	4.22	33.47	272.1	7.85	24050124-021A
PZ4!C	5/21/2024	11:23	20.4	68.7	6.82	998.9	0.59	21.58	-112.7	7.24	24050124-022A
XSG-01	5/20/2024	9:48	DTW Only							5.21	24050124-023A
YSG-02	5/20/2024	12:18	DTW Only							20.37	24050124-024A
YSG-03	5/20/2024	10:54	DTW Only							13.08	24050124-025A
Field Blank	5/21/2024	11:31	QA/QC Sample							-	24050124-026A
MW-08 Duplicate	5/20/2024	13:42	17.2	62.9	6.60	1,189.6	0.95	3.62	92.2	8.44	24050124-027A
Equipment Blank 1	5/21/2024	11:37	QA/QC Sample							-	24050124-028A

Groundwater Sampling Field Forms- Groundwater Quality Parameters

Kincaid- 2Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
PZ4!A	5/21/2024	10:43	7.85	19.3	66.8	6.65	1,219.8	2.08	200.84	266.8
PZ4!A	5/21/2024	10:46	7.85	19.3	66.7	6.66	1,221.8	2.35	128.09	268.8
PZ4!A	5/21/2024	10:49	7.85	19.5	67.1	6.68	1,220.4	2.74	88.95	268.2
PZ4!A	5/21/2024	10:52	7.85	18.0	64.4	6.72	1,221.5	3.28	60.94	270.4
PZ4!A	5/21/2024	10:55	7.85	17.8	64.0	6.75	1,208.6	3.82	40.06	273.3
PZ4!A	5/21/2024	10:58	7.85	18.8	65.9	6.78	1,207.4	4.12	35.26	273.2
PZ4!A	5/21/2024	11:01	7.85	19.7	67.5	6.79	1,203.8	4.13	34.26	270.6
PZ4!A	5/21/2024	11:04	7.85	20.7	69.3	6.79	1,206.5	4.22	33.47	272.1

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 2Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 45986 Technician(s): Tracy Carroll Date: 5/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC230830B	3.99	5/20/24 10:13
7.0 Buffer	WC240307F	7.02	5/20/24 10:06
10.0 Buffer	WC230619B	10.04	5/20/24 10:24
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1412	5/20/24 10:33

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	2	5/20/24 10:33
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1	**LCS**	5/20/24 10:33	23.8	7.03	1,413	2		
CCV-1	**CCV**	5/20/24 15:21	26.5	6.99	1,440	1.99		

Comments:

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 2Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 218083 Technician(s): justin colp Date: 5/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.00	5/20/24 9:08
7.0 Buffer	wc240307f	6.98	5/20/24 9:04
10.0 Buffer	wc230619b	9.98	5/20/24 9:11
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1408	5/20/24 9:15

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.83	5/20/24 9:19
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1	LCS	5/20/24 9:21	20.2	6.98	1,408	0.83		
CCV-1	CCV	5/20/24 14:39	21.6	7.02	1,415	0.91		

Comments:

Field Meter ID: Pine 218083 Technician(s): justin colp Date: 5/21/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.00	5/21/24 9:13
7.0 Buffer	wc240307f	6.99	5/21/24 9:08
10.0 Buffer	wc230619b	10.00	5/21/24 9:17
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1413	5/21/24 9:21

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.88	5/21/24 9:23
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2	LCS	5/21/24 9:28	21.3	6.99	1,413	0.88		
CCV-2	CCV	5/21/24 12:15	22.1	7.01	1,420	0.92		

Comments:

Site Samping Event: Kincaid- 2Q24
LIMS Workorder: 24050124
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 2Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 26559 Technician(s): B. Gillihan Date: 5/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.00	5/20/24 11:56
7.0 Buffer	wc240307f	7.01	5/20/24 11:57
10.0 Buffer	wc231027d	10.04	5/20/24 12:05
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1414	5/20/24 12:09

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.4	5/20/24 12:14
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1	LCS	5/20/24 12:17	23.01	7.02	1,414	1.4		
CCV-1	CCV	5/20/24 15:22	24.09	7.03	1,414	1.5		

Comments:

Field Meter ID: Pine 26559 Technician(s): B. Gillihan Date: 5/21/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc230830b	4.01	5/21/24 8:57
7.0 Buffer	wc240307f	7.00	5/21/24 9:05
10.0 Buffer	wc231027d	10.00	5/21/24 9:11
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	95009	1418	5/21/24 9:15

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.5	5/21/24 9:19
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2	LCS	5/21/24 14:02	18.4	7.01	1,418	1.5		
CCV-2	CCV	5/21/24 14:00	22	7.02	1,418	1.5		

Comments:

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 43197
Description YSI ProDSS Display
Calibrated 4/26/2024 6:27:15PM

Manufacturer YSI
Model Number ProDSS
Serial Number/ Lot Number 18E105408
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name Functional / Datalogging Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 26599
Description YSI ProDSS
Calibrated 4/26/2024 6:29:23PM

Manufacturer YSI
Model Number ProDSS
Serial Number/ Lot Number 15H101893
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.37	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.41	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.22	10.05	0.50%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	0.31	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	119.85	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.494	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.0 / 240.0	mv	240.0	mv	225.8	240.0	0.00%	Pass

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 43907
Description YSI ProDSS
Calibrated 4/25/2024 3:34:30PM

Manufacturer	YSI	**State Certified**	
Model Number	PRO DSS	**Status**	Pass
Serial Number/ Lot Number	18J103033	**Temp °C**	22.2
Location	St. Louis	**Humidity %**	43
Department			

Calibration Specifications

Group # 1
Group Name Function Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 45986
Description YSI Pro DSS
Calibrated 4/25/2024 3:36:31PM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 19E101800
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.71	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.83	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.49	10.05	0.50%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	2.33	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	98.92	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.550	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	200.30	240.00	0.00%	Pass

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218050
Description YSI Pro DSS Display
Calibrated 4/26/2024 6:24:40PM

Manufacturer YSI
Model Number YSI Pro Dss
Serial Number/ Lot Number 23E101406
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name Instrument Test
Test Performed: **Yes** **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218083
Description YSI Pro DSS Sonde
Calibrated 4/26/2024 6:26:38PM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 23F102674
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.34	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.36	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.27	10.05	0.50%	Pass

Group # 2
Group Name Turbidity (NTU)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	FNU	0.00	FNU	0.44	0.00	0.00%	Pass
124.00 / 124.00	FNU	124.00	FNU	115.85	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.510	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	223.10	240.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 3Q 2024

			Weather				Well Condition				
WO Sample	**Well ID**	**Program/ Sample Type**	**Temp (°F)**	**Precipitation**	**Wind Direction**	**Sky**	**Well Pad**	**Casing**	**Protective Cover**	**Reference Mark/ ID**	**Well Locked**
001	MW-01	Groundwater Sample	73.0	None	S	Clear	Good	Good	Good	Yes	Yes
002	MW-02	Groundwater Sample	72.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
003	MW-03	Groundwater Sample	75.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
004	MW-04	Groundwater Sample	77.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
005	MW-05	Groundwater Sample	78.0	None	S	Partly cloudy	Good	Good	Good	Yes	Yes
006	MW-06	Groundwater Sample	70.0	None	S	Clear	Good	Good	Good	Yes	Yes
007	MW-07	Groundwater Sample	68.0	None	SW	Clear	Good	Good	Good	Yes	Yes
008	MW-07S	Groundwater Sample	69.0	None	SW	Clear	Good	Good	Good	Yes	Yes
009	MW-08	Groundwater Sample	70.0	None	W	Clear	Good	Good	Good	Yes	Yes
010	MW-08S	Groundwater Sample	72.0	None	W	Clear	Good	Good	Good	Yes	Yes
011	MW-09	Groundwater Sample	78.0	None	S	Clear	Good	Good	Good	Yes	Yes
012	MW-10	Groundwater Sample	75.0	None	S	Clear	Good	Good	Good	Yes	Yes
013	MW-11	Groundwater Sample	70.0	None	SW	Clear	Good	Good	Good	Yes	Yes
014	MW-12	Groundwater Sample	74.0	None	S	Clear	Good	Good	Good	Yes	Yes
015	MW-20	Groundwater Sample	67.0	None	W	Cloudy	Good	Good	Good	Yes	Yes
016	MW-20S	Groundwater Sample	73.0	None	SW	Clear	Good	Good	Good	Yes	Yes
017	MW-23	Groundwater Sample	62.0	None	W	Cloudy	Good	Good	Good	Yes	Yes
018	MW-27	Groundwater Sample	73.0	None	W	Clear	Good	Good	Good	Yes	Yes
019	MW-28	Groundwater Sample	73.0	None	S	Clear	Good	Good	Good	Yes	Yes
020	MW-30	Groundwater Sample	67.0	None	S	Clear	Good	Good	Good	Yes	Yes
021	MW-31	Groundwater Sample	70.0	None	W	Cloudy	Good	Good	Good	Yes	Yes
022	MW-31S	Groundwater Sample	63.0	None	W	Partly cloudy	Good	Good	Good	Yes	Yes
023	MW-32	Groundwater Sample	74.0	None	SW	Clear	Good	Good	Good	Yes	Yes
024	MW-33S	Groundwater Sample	65.0	None	W	Partly cloudy	Good	Good	Good	Yes	Yes
025	MW-34S	Groundwater Sample	74.0	None	W	Clear	Good	Good	Good	Yes	Yes
026	MW-35S	Groundwater Sample	70.0	None	W	Partly cloudy	Good	Good	Good	Yes	Yes
027	PZ-4A	Groundwater Sample	69.0	None	W	Partly cloudy	Good	Good	Good	Yes	Yes
028	PZ-4C	Groundwater Sample	67.0	None	W	Partly cloudy	Good	Good	Good	Yes	Yes
029	SG-02	DTW Only	72.0	None	S	Partly cloudy					
030	XSG-01	DTW Only	72.0	None	S	Partly cloudy					
031	Field Blank	QA/QC Sample	70.0	None	W	Cloudy					
032	MW-08 Duplicate	QA/QC Sample	70.0	None	W	Clear	Good	Good	Good	Yes	Yes
033	Equipment Blank	QA/QC Sample	70.0	None	W	Cloudy					

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 3Q 2024

		GW Level Measurement				Purge Activities						
WO Sample	**Well ID**	**Sampler Initials**	**Date/Time**	**DTW (ft)**	**DTB (ft)**	**Sampler Initials**	**Purge Date**	**Purge Start Time**	**Purge End Time**	**Purging/Sampling Device**	**Well Diameter (in)**	**Purge Rate (mL/min)**
001	MW-01	BG	8/19/24 9:59	16.24	27.10	BG	8/19/2024	09:59	10:26	Peristaltic Pump	2"	166.7
002	MW-02	JC	8/19/24 9:51	17.49	22.20	JC	8/19/2024	09:55	10:29	Bladder Pump	2"	117.6
003	MW-03	JC	8/19/24 10:52	8.70	26.20	JC	8/19/2024	10:53	11:32	Bladder Pump	2"	141.0
004	MW-04	JC	8/19/24 11:47	9.97	24.40	JC	8/19/2024	11:48	12:21	Bladder Pump	2"	181.8
005	MW-05	JC	8/19/24 12:46	28.00	41.70	JC	8/19/2024	12:47	13:26	Bladder Pump	2"	153.8
006	MW-06	JC	8/20/24 10:38	11.57	22.00	JC	8/20/2024	10:39	11:14	Bladder Pump	2"	185.7
007	MW-07	BG	8/20/24 9:31	10.24	21.80	BG	8/20/2024	09:30	09:48	Bladder Pump	2"	250.0
008	MW-07S	BG	8/20/24 9:53	10.64	13.49	BG	8/20/2024	09:53	10:11	Peristaltic Pump	2"	138.9
009	MW-08	TAC	8/20/24 9:52	9.33	24.00	PY	8/20/2024	09:55	10:19	Bladder Pump	2"	375.0
010	MW-08S	TAC	8/20/24 10:29	9.53	10.02	PY	8/20/2024	10:42	10:44	Peristaltic Pump	2"	
011	MW-09	BG	8/19/24 11:58	14.91	21.80	BG	8/19/2024	11:58	12:37	Peristaltic Pump	2"	243.6
012	MW-10	BG	8/19/24 10:46	12.77	21.90	BG	8/19/2024	10:46	11:43	Peristaltic Pump	2"	157.9
013	MW-11	BG	8/20/24 10:41	11.97	23.50	BG	8/20/2024	10:41	10:57	Bladder Pump	2"	156.3
014	MW-12	JC	8/20/24 12:22	7.21	27.60	JC	8/20/2024	12:24	12:56	Bladder Pump	2"	187.5
015	MW-20	JC	8/21/24 10:42	9.80	26.25	JC	8/21/2024	10:42	11:18	Bladder Pump	2"	166.7
016	MW-20S	BG	8/20/24 11:25	9.76	12.21	BG	8/20/2024	11:25	11:47	Peristaltic Pump	2"	136.4
017	MW-23	JC	8/21/24 9:35	16.59	30.27	JC	8/21/2024	09:37	10:19	Bladder Pump	2"	142.9
018	MW-27	TAC	8/20/24 10:53	16.34	17.70	PY	8/20/2024	10:57	11:07	Peristaltic Pump	2"	75.0
019	MW-28	JC	8/20/24 11:28	7.93	25.07	JC	8/20/2024	11:28	12:02	Bladder Pump	2"	147.1
020	MW-30	JC	8/20/24 9:30	25.29	42.47	JC	8/20/2024	09:31	10:09	Bladder Pump	2"	144.7
021	MW-31	JC	8/21/24 11:38	32.18	42.32	JC	8/21/2024	11:38	12:17	Bladder Pump	2"	128.2
022	MW-31S	BG	8/21/24 9:30	21.90	32.41	BG	8/21/2024	09:30	10:01	Peristaltic Pump	2"	112.9
023	MW-32	BG	8/20/24 12:21	25.16	39.29	BG	8/20/2024	12:21	12:48	Bladder Pump	2"	92.6
024	MW-33S	TAC	8/21/24 10:59	10.99	17.84	TAC	8/21/2024	11:00	11:26	Peristaltic Pump	2"	192.3
025	MW-34S	TAC	8/20/24 11:30	10.54	18.76	PY	8/20/2024	11:32	11:56	Peristaltic Pump	2"	187.5
026	MW-35S	TAC	8/21/24 11:59	9.77	18.44	TAC	8/21/2024	12:00	12:30	Peristaltic Pump	2"	200.0
027	PZ-4A	BG	8/21/24 11:00	9.03	12.94	BG	8/21/2024	11:00	11:23	Peristaltic Pump	2"	87.0
028	PZ-4C	BG	8/21/24 10:23	9.09	23.18	BG	8/21/2024	10:23	10:54	Peristaltic Pump	2"	129.0
029	SG-02	PY	8/19/24 12:17	19.73	-							
030	XSG-01	PY	8/19/24 10:10	5.12	-							
031	Field Blank				-					Direct Grab		
032	MW-08 Duplicate	TAC	8/20/24 9:52	9.33	24.00	PY	8/20/2024	09:55	10:19	Bladder Pump	2"	375.0
033	Equipment Blank				-					Direct Grab		

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 3Q 2024

WO Sample	Well ID	Sampling Activities and Observations										
		Sampler Initials	**Date**	**Time**	**Sampling Method**	**Instrument ID**	**Field Filtered**	**Appearance**	**Odor**	**Color**	**Post-Sample DTW (ft)**	**Drawdown (ft)**
001	MW-01	BG	08/19/24	10:26	Low Flow	45985	Yes	Clear	None	Clear	16.97	**0.73**
002	MW-02	JC	08/19/24	10:29	Low Flow	218074	Yes	Cloudy	None	none	17.67	0.18
003	MW-03	JC	08/19/24	11:32	Low Flow	218074	Yes	Clear	None	none	8.95	0.25
004	MW-04	JC	08/19/24	12:21	Low Flow	218074	No	Clear	None	none	10.32	0.35
005	MW-05	JC	08/19/24	13:26	Low Flow	218074	Yes	Clear	None	none	30.28	**2.28**
006	MW-06	JC	08/20/24	11:14	Low Flow	218074	Yes	Clear	None	none	13.09	**1.52**
007	MW-07	BG	08/20/24	09:48	Low Flow	45985	Yes	Clear	Moderate	Clear	10.76	**0.52**
008	MW-07S	BG	08/20/24	10:11	Low Flow	45985	Yes	Clear	None	Clear	10.74	0.10
009	MW-08	PY	08/20/24	10:19	Low Flow	223344	Yes	Clear	None	None	9.93	**0.60**
010	MW-08S											
011	MW-09	BG	08/19/24	12:37	Low Flow	45985	No	Clear	None	Clear	15.84	**0.93**
012	MW-10	BG	08/19/24	11:43	Low Flow	45985	No	Clear	None	Clear	13.15	0.38
013	MW-11	BG	08/20/24	10:57	Low Flow	45985	Yes	Clear	None	Clear	13.06	**1.09**
014	MW-12	JC	08/20/24	12:56	Low Flow	218074	Yes	Clear	None	none	7.29	0.08
015	MW-20	JC	08/21/24	11:18	Low Flow	218074	Yes	Clear	None	none	15.58	**5.78**
016	MW-20S	BG	08/20/24	11:47	Low Flow	45985	Yes	Clear	None	Clear	9.98	0.22
017	MW-23	JC	08/21/24	10:19	Low Flow	218074	Yes	Clear	None	none	18.79	**2.20**
018	MW-27	TAC	08/21/24	10:25	Low Flow	223344	Yes	Clear	None	None	17.43	**1.09**
019	MW-28	JC	08/20/24	12:02	Low Flow	218074	Yes	Clear	None	none	8.39	0.46
020	MW-30	JC	08/20/24	10:09	Low Flow	218074	Yes	Clear	None	none	31.10	**5.81**
021	MW-31	JC	08/21/24	12:17	Low Flow	218074	Yes	Clear	None	none	33.41	**1.23**
022	MW-31S	BG	08/21/24	10:01	Low Flow	45985	Yes	Slightly cloudy	None	Clear	22.75	**0.85**
023	MW-32	BG	08/20/24	12:48	Low Flow	45985	Yes	Clear	None	Clear	25.62	0.46
024	MW-33S	TAC	08/21/24	11:26	Low Flow	223344	Yes	Clear	None	None	12.71	**1.72**
025	MW-34S	PY	08/20/24	11:56	Low Flow	223344	Yes	Clear	None	None	12.48	**1.94**
026	MW-35S	TAC	08/20/24	12:30	Low Flow	223344	Yes	Clear	None	None	12.35	**2.58**
027	PZ-4A	BG	08/21/24	11:23	Low Flow	45985	Yes	Clear	None	Clear	9.78	**0.75**
028	PZ-4C	BG	08/21/24	10:54	Low Flow	45985	Yes	Clear	Slight	Clear	9.63	**0.54**
029	SG-02											
030	XSG-01											
031	Field Blank	JC	08/21/24	12:40	Direct Sample		No	Clear	None	None	-	**-**
032	MW-08 Duplicate	PY	08/20/24	10:19	Low Flow	223344	Yes	Clear	None	None	9.93	**0.60**
033	Equipment Blank	JC	08/21/24	12:45	Direct Sample		No	Clear	None	None	-	**-**

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Summary
Kincaid- 3Q 2024

WO Sample	Well ID	COMMENTS
001	MW-01	
002	MW-02	
003	MW-03	
004	MW-04	
005	MW-05	
006	MW-06	
007	MW-07	
008	MW-07S	
009	MW-08	
010	MW-08S	Well Went dry during pumping. No recharge, no sample.
011	MW-09	
012	MW-10	
013	MW-11	
014	MW-12	
015	MW-20	
016	MW-20S	
017	MW-23	
018	MW-27	Well went dry during purge (8/20), sample collected 8/21.
019	MW-28	
020	MW-30	
021	MW-31	
022	MW-31S	
023	MW-32	
024	MW-33S	
025	MW-34S	
026	MW-35S	
027	PZ-4A	
028	PZ-4C	
029	SG-02	
030	XSG-01	
031	Field Blank	
032	MW-08 Duplicate	
033	Equipment Blank	Equipment blank collected from water meter (measurement tape).

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Stabilized Field Parameters Summary
Kincaid- 3Q 2024

Well ID	Date	Time	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	LIMS ID
MW-01	8/19/2024	10:26	18.8	65.9	6.13	558.2	2.60	8.07	143.7	16.24	24080169-001A
MW-02	8/19/2024	10:29	21.1	70.0	7.06	750.4	4.10	196.64	84.4	17.49	24080169-002A
MW-03	8/19/2024	11:32	18.2	64.7	6.69	892.0	3.57	1.44	88.7	8.70	24080169-003A
MW-04	8/19/2024	12:21	17.6	63.7	6.71	789.7	3.41	15.82	-115.0	9.97	24080169-004A
MW-05	8/19/2024	13:26	17.5	63.6	6.55	1,234.9	3.36	17.82	1.7	28.00	24080169-005A
MW-06	8/20/2024	11:14	16.9	62.3	6.45	745.5	4.96	3.69	87.9	11.57	24080169-006A
MW-07	8/20/2024	9:48	17.4	63.4	6.83	1,230.3	0.72	6.96	-139.6	10.24	24080169-007A
MW-07S	8/20/2024	10:11	19.3	66.8	6.66	1,604.5	3.00	10.15	-65.8	10.64	24080169-008A
MW-08	8/20/2024	10:19	15.7	60.2	6.41	763.4	0.51	1.22	118.7	9.33	24080169-009A
MW-8S	8/20/2024	Well went dry during purge (8/20), no recharge (8/21), no sample								9.53	24080169-010A
MW-09	8/19/2024	12:37	17.5	63.5	6.55	689.4	3.96	41.43	115.2	14.91	24080169-011A
MW-10	8/19/2024	11:43	19.5	67.0	6.39	1,788.9	2.91	6.33	88.1	12.77	24080169-012A
MW-11	8/20/2024	10:57	17.9	64.2	6.67	1,033.6	0.77	2.38	35.7	11.97	24080169-013A
MW-12	8/20/2024	12:56	18.4	65.2	6.74	1,422.6	3.52	16.21	-67.1	7.21	24080169-014A
MW-20	8/21/2024	11:18	16.9	62.4	6.90	979.5	4.03	14.99	-40.9	9.80	24080169-015A
MW-20S	8/20/2024	11:47	19.0	66.2	6.60	1,425.4	1.60	8.78	30.5	9.76	24080169-016A
MW-23	8/21/2024	10:19	16.1	61.1	6.80	954.2	4.31	0.40	-149.8	16.59	24080169-017A
MW-27	8/21/2024	10:25	18.4	65.0	6.54	993.1	4.69	42.95	-6.1	16.34	24080169-018A
MW-28	8/20/2024	12:02	17.5	63.5	6.73	2,294.1	3.84	0.95	76.6	7.93	24080169-019A
MW-30	8/20/2024	10:09	16.3	61.4	6.61	1,032.0	4.30	0.86	-100.6	25.29	24080169-020A
MW-31	8/21/2024	12:17	16.7	62.1	6.69	1,041.6	3.56	0.29	-89.9	32.18	24080169-021A
MW-31S	8/21/2024	10:01	21.2	70.2	6.71	1,310.9	5.58	19.35	-67.8	21.90	24080169-022A
MW-32	8/20/2024	12:48	16.2	61.2	6.41	1,405.2	1.10	2.31	16.2	25.16	24080169-023A
MW-33S	8/21/2024	11:26	18.5	65.3	6.60	765.1	2.81	4.04	134.0	10.99	24080169-024A
MW-34S	8/20/2024	11:56	18.7	65.6	6.60	826.8	4.00	6.57	78.8	10.54	24080169-025A
MW-35S	8/21/2024	12:30	18.6	65.5	6.67	775.3	4.39	31.39	129.9	9.77	24080169-026A
PZ-4A	8/21/2024	11:23	20.3	68.6	6.57	1,133.7	4.32	4.13	26.7	9.03	24080169-027A
PZ-4C	8/21/2024	10:54	17.6	63.7	6.83	950.2	1.94	96.37	-68.0	9.09	24080169-028A
SG-02	8/19/2024	12:17	DTW Only							19.73	24080169-029A
XSG-01	8/19/2024	10:10	DTW Only							5.12	24080169-030A
Field Blank	8/21/2024	12:40	QA/QC Sample							-	24080169-031A
MW-08 Duplicate	8/20/2024	10:19	15.7	60.2	6.41	763.4	0.51	1.22	118.7	9.33	24080169-032A
Equipment Blank	8/21/2024	12:45	QA/QC Sample							-	24080169-033A

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Field Form- Quality Parameters
Kincaid- 3Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
MW-33S	8/21/2024	11:14	10.99	17.8	64.0	6.60	765.3	2.96	13.80	137.6
MW-33S	8/21/2024	11:17	10.99	17.8	64.1	6.60	764.3	2.90	9.25	136.7
MW-33S	8/21/2024	11:20	10.99	18.2	64.7	6.60	763.8	2.85	8.51	135.9
MW-33S	8/21/2024	11:23	10.99	18.3	65.0	6.60	764.4	2.90	7.91	135.0
MW-33S	8/21/2024	11:26	10.99	18.5	65.3	6.60	765.1	2.81	4.04	134.0

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Field Form- Quality Parameters
Kincaid- 3Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
MW-34S	8/20/2024	11:41	10.54	18.2	64.7	6.54	823.1	2.85	14.62	46.5
MW-34S	8/20/2024	11:44	10.54	18.4	65.0	6.52	823.9	2.71	15.51	56.5
MW-34S	8/20/2024	11:47	10.54	18.4	65.2	6.53	821.4	2.89	15.99	64.1
MW-34S	8/20/2024	11:50	10.54	18.7	65.6	6.55	819.7	3.27	16.77	69.7
MW-34S	8/20/2024	11:53	10.54	18.8	65.9	6.58	821.3	3.62	16.55	74.1
MW-34S	8/20/2024	11:56	10.54	18.7	65.6	6.60	826.8	4.00	6.57	78.8

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Groundwater Sampling Field Form- Quality Parameters
Kincaid- 3Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
MW-35S	8/21/2024	12:18	9.77	18.8	65.8	6.63	783.7	3.05	30.73	143.1
MW-35S	8/21/2024	12:21	9.77	19.0	66.2	6.64	781.1	3.21	34.74	140.6
MW-35S	8/21/2024	12:24	9.77	19.0	66.1	6.65	780.0	3.62	39.87	136.9
MW-35S	8/21/2024	12:27	9.77	18.8	65.8	6.66	777.9	4.03	38.95	133.6
MW-35S	8/21/2024	12:30	9.77	18.6	65.5	6.67	775.3	4.39	31.39	129.9

Groundwater Sampling Field Form- Quality Parameters
Kincaid- 3Q 2024

Well ID	Date	Time	DTW	Temp (°C)	Temp (°F)	pH (SU)	Sp Cond (µS/cm)	ODO (mg/L)	Turbidity (NTU)	ORP (mV)
PZ-4A	8/21/2024	11:05	9.03	20.0	67.9	6.87	1,031.4	4.90	53.39	-74.1
PZ-4A	8/21/2024	11:08	9.03	19.6	67.2	6.71	1,136.6	5.23	11.87	-54.7
PZ-4A	8/21/2024	11:11	9.03	20.4	68.8	6.61	1,131.8	5.33	8.14	-19.0
PZ-4A	8/21/2024	11:14	9.03	20.7	69.3	6.62	1,125.2	5.26	7.32	8.0
PZ-4A	8/21/2024	11:17	9.03	20.7	69.2	6.63	1,123.0	4.96	4.06	15.6
PZ-4A	8/21/2024	11:20	9.03	20.7	69.3	6.60	1,132.3	4.60	3.79	23.2
PZ-4A	8/21/2024	11:23	9.03	20.3	68.6	6.57	1,133.7	4.32	4.13	26.7

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 3Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 223344 Technician(s): Payton Yoch/Tracy Carroll Date: 8/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	4.00	8/20/24 9:22
7.0 Buffer	WC240307F	7.00	8/20/24 9:18
10.0 Buffer	WC240625B	10.00	8/20/24 9:24
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1412	8/20/24 9:27

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1		
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1-TC	LCS	8/20/24 9:32	20.7	7.06	1,424	1.97		
CCV-1-TC	CCV	8/20/24 13:26	21.8	7.08	1,439	0.73		

Comments:

Field Meter ID: Pine 223344 Technician(s): Tracy Carroll Date: 8/21/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	4.00	8/21/24 10:12
7.0 Buffer	WC240307F	7.00	8/21/24 10:11
10.0 Buffer	WC240625B	10.00	8/21/24 10:13
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1412	8/21/24 10:15

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1		
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2-TC	LCS	8/21/24 10:16	20.3	7.03	1,413	1.46		
CCV-2-TC	CCV	8/21/24 13:08	22.8	7.05	1,490	1.42		

Comments:

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 3Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 45985 Technician(s): Brett Gillihan Date: 8/19/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	3.99	8/19/24 9:32
7.0 Buffer	WC240307F	7.02	8/19/24 9:29
10.0 Buffer	WC240625B	10.01	8/19/24 9:40
LCS/CCV (7.0 Buffer)	WC231207A		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1420	8/19/24 9:43

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.8	8/19/24 9:49
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1-BG	**LCS**	8/19/24 9:50	22.6	7.01	1,413	1.8		
CCV-1-BG	**CCV**	8/19/24 14:57	24.1	7.01	1,420	1.6		

Comments:

Field Meter ID: Pine 45985 Technician(s): Brett Gillihan Date: 8/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	4.00	8/20/24 8:55
7.0 Buffer	WC240307F	7.00	8/20/24 8:51
10.0 Buffer	WC240625A	9.98	8/20/24 8:59
LCS/CCV (7.0 Buffer)	WC240625B		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1418	8/20/24 9:03

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.5	8/20/24 9:05
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2-BG	**LCS**	8/20/24 9:07	20.6	7.01	1,414	1.5		
CCV-2-BG	**CCV**	8/20/24 13:25	23.5	7.00	1,418	1.6		

Comments:

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 3Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 45985 Technician(s): Brett Gillihan Date: 8/21/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	3.99	8/21/24 9:09
7.0 Buffer	WC240307F	7.01	8/21/24 9:04
10.0 Buffer	WC240625A	10.00	8/21/24 9:16
LCS/CCV (7.0 Buffer)	WC240625B		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1412	8/21/24 9:17

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.3	8/21/24 9:18
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-3-BG	LCS	8/21/24 9:20	22.4	7.00	1,410	1.3		
CCV-3-BG	CCV	8/21/24 12:53	24.1	7.00	1,416	1.3		

Comments:

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 3Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 218074 Technician(s): justin colp Date: 8/19/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	4.02	8/19/24 9:34
7.0 Buffer	wc240307f	6.99	8/19/24 9:30
10.0 Buffer	wc240625b	9.98	8/19/24 9:39
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1406	8/19/24 9:44

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.44	8/19/24 9:44
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1-JC	LCS	8/19/24 9:46	23.6	7.00	1,406	0.44		
CCV-1-JC	CCV	8/19/24 13:48	25.2	7.02	1,419	0.49		

Comments:

Field Meter ID: Pine 218074 Technician(s): justin colp Date: 8/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	3.99	8/20/24 9:15
7.0 Buffer	wc240307f	7.00	8/20/24 9:08
10.0 Buffer	wc240625b	10.00	8/20/24 9:19
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1410	8/20/24 9:24

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.53	8/20/24 9:24
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2-JC	LCS	8/20/24 9:39	20.7	7.01	1,410	0.53		
CCV-2-JC	CCV	8/20/24 13:23	24.5	7.04	1,427	0.6		

Comments:

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 45985
Description YSI Pro DSS
Calibrated 7/25/2024 3:07:11PM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 19E101797
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.06	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.04	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.03	10.04	0.40%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	0.24	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	125.76	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.459	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.0 / 240.0	mv	240.0	mv	243.2	240.0	0.00%	Pass

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 45985
Description YSI Pro DSS
Calibrated 7/25/2024 3:07:11PM

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.0 / 100.0	%	100.0	%	99.8	100.3	0.30%	Pass

Test Instruments Used During the Calibration (As Of Cal Entry Date)

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
STL 126NTU L#24E24011653	STL 126 NTU L#24E24011653	YSI	126 NTU	24E24011653		5/25/2025
STL 1413 COND L#4GB0749	STL 1413 COND L#4GB0749	AquaPhoenix Scientific	31986	4GB0749		2/25/2025
STL AUTOCAL L#24009059	Auto Cal Solution 0 NTU/PH 4	GFS	8483	24009059		3/20/2025
STL ORP SOLUTION 240MV L#4GA1475	STL ORP SOLUTION 240MV L#4GA1475	AquaPhoenix Scientific	ORP Solution	4GA1475		10/25/2024
STL PH10 #4GB0253	STL PH10 #4GB0253	Absolute Accuracy	PH 10	4GB0253		2/25/2026
STL PH4 L#4GB0637	STL pH4 L#4GB0637	AquaPhoenix Scientific	pH 4	4GB0637		2/25/2026
STL PH7 L#4GB0027	STL PH7 L#4GB0027	AquaPhoenix Scientific	PH7	4GB0027		2/25/2026

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218074
Description YSI Pro DSS Sonde
Calibrated 7/25/2024 6:32:30PM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 23F102664
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.30	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	4.36	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.20	10.04	0.40%	Pass

Group # 2
Group Name Turbidity (NTU)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	0.06	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	105.31	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.435	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	216.10	240.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

Site Samping Event: KIN-24Q3
LIMS Workorder: 24080169
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 3Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 218074 Technician(s): justin colp Date: 8/21/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	4.00	8/21/24 9:19
7.0 Buffer	wc240307f	7.00	8/21/24 9:16
10.0 Buffer	wc240625b	9.98	8/21/24 9:23
LCS/CCV (7.0 Buffer)	wc231207a		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	98627	1407	8/21/24 9:27

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.37	8/21/24 9:27
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-3-JC	LCS	8/21/24 9:30	20.2	7.01	1,407	0.37		
CCV-3-JC	CCV	8/21/24 12:45	23.4	7.03	1,417	0.29		

Comments:

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 218074
Description YSI Pro DSS Sonde
Calibrated 7/25/2024 6:32:30PM

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	98.90	100.00	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
STL 126NTU L#24E24011653	STL 126 NTU L#24E24011653	YSI	126 NTU	24E24011653		5/25/2025
STL 1413 COND L#4GB0749	STL 1413 COND L#4GB0749	AquaPhoenix Scientific	31986	4GB0749		2/25/2025
STL AUTOCAL L#24009059	Auto Cal Solution 0 NTU/PH 4	GFS	8483	24009059		3/20/2025
STL ORP SOLUTION 240MV L#4GA1475	STL ORP SOLUTION 240MV L#4GA1475	AquaPhoenix Scientific	ORP Solution	4GA1475		10/25/2024
STL PH10 #4GB0253	STL PH10 #4GB0253	Absolute Accuracy	PH 10	4GB0253		2/25/2026
STL PH4 L#4GB0637	STL pH4 L#4GB0637	AquaPhoenix Scientific	pH 4	4GB0637		2/25/2026
STL PH7 L#4GB0027	STL PH7 L#4GB0027	AquaPhoenix Scientific	PH7	4GB0027		2/25/2026

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 223344
Description YSI Pro DSS Sonde
Calibrated 7/25/2024 3:04:32PM

Manufacturer	YSI	**State Certified**	
Model Number	Pro DSS	**Status**	Pass
Serial Number/ Lot Number	24B105081	**Temp °C**	22.2
Location	St. Louis	**Humidity %**	43
Department			

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.05	7.02	0.29%	Pass
4.00 / 4.00	PH	4.00	PH	3.96	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.11	10.05	0.50%	Pass

Group # 2
Group Name Turbidity (NTU)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	-4.44	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	114.08	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.465	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	227.30	240.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 223344
Description YSI Pro DSS Sonde
Calibrated 7/25/2024 3:04:32PM

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	95.30	100.30	0.30%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
STL 126NTU L#24E24011653	STL 126 NTU L#24E24011653	YSI	126 NTU	24E24011653		5/25/2025
STL 1413 COND L#4GB0749	STL 1413 COND L#4GB0749	AquaPhoenix Scientific	31986	4GB0749		2/25/2025
STL 800 NTU L#24010026	STL 800 NTU L#24010026	GFS	8523	24010026		3/20/2025
STL AUTOCAL L#24009059	Auto Cal Solution 0 NTU/PH 4	GFS	8483	24009059		3/20/2025
STL ORP SOLUTION 240MV L#4GA1475	STL ORP SOLUTION 240MV L#4GA1475	AquaPhoenix Scientific	ORP Solution	4GA1475		10/25/2024
STL PH10 #4GB0253	STL PH10 #4GB0253	Absolute Accuracy	PH 10	4GB0253		2/25/2026
STL PH4 L#4GB0637	STL pH4 L#4GB0637	AquaPhoenix Scientific	pH 4	4GB0637		2/25/2026
STL PH7 L#4GB0027	STL PH7 L#4GB0027	AquaPhoenix Scientific	PH7	4GB0027		2/25/2026

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Chris Harkins

Field Data Sheet

Project Name:	KIN-24Q4	**Monitoring Point:**	MW-33S
Project Location:	Kincaid, IL	**Sample ID:**	021
W.O. Number (s):	24110014	**Date (s):**	11/20/2024

Field Team Members

Name: Justin Colp — Affiliation: TekLab, Inc.

Name: Danny Crump — Affiliation: TekLab, Inc.

Weather Conditions

Temp: 45 °F

Wind Direction: ☐ N ☐ S ☐ W ☑ E ☐ SE ☐ SW ☐ NE ☐ NW

Precipitation: ☑ None ☐ Light ☐ Heavy

Sky: ☑ Clear ☐ Partly Cloudy ☐ Cloudy

Well Observations

Well Pad: Good

Casing: Good

Protective Casing: Good

Reference Mark/Identification: Yes

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements

Date/Time Measured: 11/20/2024 9:06

Static Water Level: 6.35 feet below TOC

Total Depth: 17.84 feet below TOC

Water Column: 11.49 feet

Purging Activities

Purged By: JC

Purge Date: 11/20/2024

Purge Method: Peristaltic Pump

Well Diameter: 2"

Purge Volume Calculation (L): 11.49 ft. x 0.022 = 0.25 L x 3 Vol. = 0.75 L **Based on Low-Flow (3/8" discharge)*

Actual Purge Volume (L): 4.00 L

Physical appearance of purge water: Clear

Odor: None

Color: none

Purge Time	Cumulative Purge Vol.(L)	Purge Rate (mL/m)	pH (S.U.)	Specific Conductivity (µS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Other
9:07	0.0	167	purge start time						
9:14	1.2	↓	6.69	970.80	15.18	6.15	-33.40	19.19	
9:22	2.6		6.74	975.80	15.26	5.35	5.70	102.53	
9:25	3.1		6.74	975.40	15.29	5.19	12.60	77.55	
9:28	3.6		6.74	976.80	15.29	5.05	16.60	15.55	
9:31	4.1		6.74	977.30	15.34	4.92	17.70	65.73	

Sampling Activities

Sampled By: JC

Sample Date/Time: 11/20/2024 9:31

Sample Method: Low Flow

Sample Equipment: Peristaltic Pump

Sample Parameters: 6.74 pH 977.30 Spec. Cond. 15.34 Temp

Field Filtered: No

Filter Type:

Water Level: 7.98 feet below TOC

Drawdown: 1.63 feet

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

- Field Meter: 210771

Form Completed By: Justin Colp

Date: 11/20/2024

Field Data Sheet

Project Name: KIN-24Q4
Project Location: Kincaid, IL
W.O. Number (s): 24110014
Monitoring Point: MW-34S
Sample ID: 022
Date (s): 11/20/2024

Field Team Members

Name: Justin Colp — Affiliation: TekLab, Inc.
Name: Danny Crump — Affiliation: TekLab, Inc.

Weather Conditions

Temp: 48 °F

Wind Direction: ☐ N ☐ S ☐ W ☑ E ☐ SE ☐ SW ☐ NE ☐ NW

Precipitation: ☑ None ☐ Light ☐ Heavy

Sky: ☑ Clear ☐ Partly Cloudy ☐ Cloudy

Well Observations

Well Pad: Good
Casing: Good
Protective Casing: Good
Reference Mark/Identification: Yes

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements

Date/Time Measured: 11/20/2024 9:58
Static Water Level: 6.38 feet below TOC
Total Depth: 18.76 feet below TOC
Water Column: 12.38 feet

Purging Activities

Purged By: JC
Purge Date: 11/20/2024
Purge Method: Peristaltic Pump
Well Diameter: 2"
Purge Volume Calculation (L): 12.38 ft. x 0.022 = 0.27 L x 3 Vol. = 0.81 L **Based on Low-Flow (3/8" discharge)*
Actual Purge Volume (L): 6.50 L
Physical appearance of purge water: Clear
Odor: None
Color: none

Purge Time	Cumulative Purge Vol.(L)	Purge Rate (mL/m)	pH (S.U.)	Specific Conductivity (µS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Other
9:58	0.0	260	purge start time						
10:03	1.3	↓	6.82	1,087.20	15.82	5.63	67.50	37.18	
10:06	2.1		6.84	1,092.50	15.81	5.49	68.70	56.81	
10:09	2.9		6.88	1,102.40	15.88	5.61	70.00	80.96	
10:14	4.2		6.91	1,111.00	15.86	6.07	74.60	124.50	
10:17	4.9		6.92	1,112.60	15.60	6.31	76.60	121.28	
10:20	5.7		6.92	1,110.50	15.54	6.45	77.80	119.07	
10:23	6.5		6.90	1,108.80	15.53	6.48	78.20	122.24	

Sampling Activities

Sampled By: JC
Sample Date/Time: 11/20/2024 10:23
Sample Method: Low Flow
Sample Equipment: Peristaltic Pump
Sample Parameters: 6.90 pH 1,108.80 Spec. Cond. 15.53 Temp
Field Filtered: No Filter Type:
Water Level: 8.30 feet below TOC
Drawdown: 1.92 feet

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

- Field Meter: 210771

Form Completed By: Justin Colp
Date: 11/20/2024

Field Data Sheet

Project Name:	KIN-24Q4	**Monitoring Point:**	MW-35S
Project Location:	Kincaid, IL	**Sample ID:**	023
W.O. Number (s):	24110014	**Date (s):**	11/20/2024

Field Team Members

Name: Justin Colp — Affiliation: TekLab, Inc.

Name: Danny Crump — Affiliation: TekLab, Inc.

Weather Conditions

Temp: 47 °F

Wind Direction: ☐ N ☐ S ☐ W ☑ E ☐ SE ☐ SW ☐ NE ☐ NW

Precipitation: ☑ None ☐ Light ☐ Heavy

Sky: ☑ Clear ☐ Partly Cloudy ☐ Cloudy

Well Observations

Well Pad: Good

Casing: Good

Protective Casing: Good

Reference Mark/Identification: Yes

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements

Date/Time Measured: 11/20/2024 9:41

Static Water Level: 6.76 feet below TOC

Total Depth: 18.44 feet below TOC

Water Column: 11.68 feet

Purging Activities

Purged By: JC

Purge Date: 11/20/2024

Purge Method: Peristaltic Pump

Well Diameter: 2"

Purge Volume Calculation (L): 11.68 ft. x 0.022 = 0.26 L x 3 Vol. = 0.78 L **Based on Low-Flow (3/8" discharge)*

Actual Purge Volume (L): 4.00 L

Physical appearance of purge water: Clear

Odor: None

Color: none

Purge Time	Cumulative Purge Vol.(L)	Purge Rate (mL/m)	pH (S.U.)	Specific Conductivity (µS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Other
9:41	0.0	333	purge start time						
9:44	1.0	↓	6.67	1,004.40	15.54	5.46	51.40	14.84	
9:47	2.0		6.77	1,002.50	15.65	4.85	54.90	17.95	
9:50	3.0		6.79	1,003.00	15.73	4.70	59.10	18.95	
9:53	4.0		6.80	1,002.60	15.78	4.64	62.30	18.80	

Sampling Activities

Sampled By: JC

Sample Date/Time: 11/20/2024 9:53

Sample Method: Low Flow

Sample Equipment: Peristaltic Pump

Sample Parameters: 6.80 pH 1,002.60 Spec. Cond. 15.78 Temp

Field Filtered: No Filter Type:

Water Level: 8.32 feet below TOC

Drawdown: 1.56 feet

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

- Field Meter: 210771

Form Completed By: Justin Colp

Date: 11/20/2024

Field Data Sheet

Project Name: KIN-24Q4
Project Location: Kincaid, IL
W.O. Number (s): 24110014

Monitoring Point: Field Blank
Sample ID: 028
Date (s): -

Field Team Members

Name: Justin Colp — Affiliation: TekLab, Inc.
Name: Danny Crump — Affiliation: TekLab, Inc.

Weather Conditions

Temp: 47 °F

Wind Direction: ☐ N ☐ S ☐ W ☑ E ☐ SE ☐ SW ☐ NE ☐ NW

Precipitation: ☑ None ☐ Light ☐ Heavy

Sky: ☑ Clear ☐ Partly Cloudy ☐ Cloudy

Well Observations

Well Pad:
Casing:
Protective Casing:
Reference Mark/Identification:

Locks	Yes	No
Protective Casing		X
Well		X

Groundwater Level Measurements

Date/Time Measured: 12/2/2024 7:49

Static Water Level: - feet below TOC
Total Depth: - feet below TOC
Water Column: - feet

Purging Activities

Purged By: JC
Purge Date: -
Purge Method: Direct Grab
Well Diameter:
Purge Volume Calculation (L): #VALUE!
Actual Purge Volume (L): -
Physical appearance of purge water:
Odor:
Color:

Purge Time	Cumulative Purge Vol.(L)	Purge Rate (mL/m)	pH (S.U.)	Specific Conductivity (µS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Other

Sampling Activities

Sampled By: JC
Sample Date/Time: 11/20/2024 10:31
Sample Method: Direct Sample
Sample Equipment: Direct Grab
Sample Parameters: pH Spec. Cond. Temp
Field Filtered:
Filter Type:
Water Level: feet below TOC
Drawdown: feet

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

- Field Meter: 210771
- QA/QC sample

Form Completed By: [signature]

Date: 11/20/2024

Field Data Sheet

Project Name: KIN-24Q4
Project Location: Kincaid, IL
W.O. Number (s): 24110014

Monitoring Point: MW-35S Duplicate
Sample ID: 031
Date (s): 11/20/2024

Field Team Members

Name: Justin Colp — Affiliation: TekLab, Inc.
Name: Danny Crump — Affiliation: TekLab, Inc.

Weather Conditions

Temp: 47 °F

Wind Direction: ☐ N ☐ S ☐ W ☑ E ☐ SE ☐ SW ☐ NE ☐ NW

Precipitation: ☑ None ☐ Light ☐ Heavy

Sky: ☑ Clear ☐ Partly Cloudy ☐ Cloudy

Well Observations

Well Pad: Good
Casing: Good
Protective Casing: Good
Reference Mark/Identification: Yes

Locks	Yes	No
Protective Casing	X	
Well		X

Groundwater Level Measurements

Date/Time Measured: 11/20/2024 9:41

Static Water Level: 6.76 feet below TOC
Total Depth: 18.44 feet below TOC
Water Column: 11.68 feet

Purging Activities

Purged By: JC
Purge Date: 11/20/2024
Purge Method: Peristaltic Pump
Well Diameter: 2"
Purge Volume Calculation (L): 11.68 ft. x 0.022 = 0.26 L x 3 Vol. = 0.78 L **Based on Low-Flow (3/8" discharge)*
Actual Purge Volume (L): 4.00 L
Physical appearance of purge water: Clear
Odor: None
Color: none

Purge Time	Cumulative Purge Vol.(L)	Purge Rate (mL/m)	pH (S.U.)	Specific Conductivity (µS/cm)	Temp (°C)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Other
9:41	0.0	333	purge start time						
9:44	1.0	↓	6.67	1,004.40	15.54	5.46	51.40	14.84	
9:47	2.0		6.77	1,002.50	15.65	4.85	54.90	17.95	
9:50	3.0		6.79	1,003.00	15.73	4.70	59.10	18.95	
9:53	4.0		6.80	1,002.60	15.78	4.64	62.30	18.80	

Sampling Activities

Sampled By: JC
Sample Date/Time: 11/20/2024 9:53
Sample Method: Low Flow
Sample Equipment: Peristaltic Pump
Sample Parameters: 6.80 pH 1,002.60 Spec. Cond. 15.78 Temp
Field Filtered: No
Filter Type:
Water Level: 8.32 feet below TOC
Drawdown: 1.56 feet

Observations/Comments: (i.e., equipment malfunctions, contamination sources, sampling difficulties; duplicate sample)

- Field Meter: 210771

Form Completed By: [signature]
Date: 11/20/2024

Site Samping Event: KIN- 24Q4
LIMS Workorder: 24110014
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 4Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 210771 Technician(s): justin colp Date: 11/18/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	4.00	11/18/24 9:34
7.0 Buffer	wc240913b	7.00	11/18/24 9:30
10.0 Buffer	wc240625b	10.00	11/18/24 9:38
LCS/CCV (7.0 Buffer)	wc240913c		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	100029	1412	11/18/24 9:45

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.52	11/18/24 9:45
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1-JC	LCS	11/18/24 9:51	21.2	6.98	1,407	0.55		
CCV-1-JC	CCV	11/18/24 14:20	22.2	7.01	1,420	0.62		

Comments:

Field Meter ID: Pine 210771 Technician(s): justin colp Date: 11/19/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	4.00	11/19/24 8:53
7.0 Buffer	wc240913b	7.00	11/19/24 8:49
10.0 Buffer	wc240625b	10.00	11/19/24 8:58
LCS/CCV (7.0 Buffer)	wc240913c		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	100029	1412	11/19/24 9:03

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.65	11/19/24 9:03
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-2-JC	LCS	11/19/24 9:08	20.9	7.00	1,410	0.62		
CCV-2-JC	CCV	11/19/24 13:46	21.5	7.03	1,425	0.61		

Comments:

Site Samping Event: KIN- 24Q4
LIMS Workorder: 24110014
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 4Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 210771 Technician(s): justin colp Date: 11/20/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	wc240612a	4.00	11/20/24 8:42
7.0 Buffer	wc240913b	7.00	11/20/24 8:38
10.0 Buffer	wc240625b	10.00	11/20/24 8:46
LCS/CCV (7.0 Buffer)	wc240913c		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	100029	1412	11/20/24 8:52

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	0.58	11/20/24 8:52
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-3-JC	**LCS**	11/20/24 8:55	16.1	7.01	1,411	0.55		
CCV-3-JC	**CCV**	11/20/24 10:32	16.4	7.01	1,417	0.59		

Comments:

Site Samping Event: KIN- 24Q4
LIMS Workorder: 24110014
Technician(s): DC, JC, TC, BG, PY

Field Calibration Log(s)
Kincaid- 4Q 2024

Field Temp SOP 1156 - SM 2550 B
Field pH SOP 1152 - SW-846 9040B - SM 4500-H B
Field Cond. SOP 1155 - SW-846 9050A - SM 2510 B

Field Meter ID: Pine 210760 Technician(s): Brett Gillihan Date: 11/18/2024

pH Standards	LIMS ID	Calibration reading	Date/Time
4.0 Buffer	WC240612A	4.98	11/18/24 9:30
7.0 Buffer	WC240913B	6.99	11/18/24 9:26
10.0 Buffer	WC240625B	9.99	11/18/24 9:42
LCS/CCV (7.0 Buffer)	WC240913C		

Conductivity Standard	LIMS ID	Reading	Date/Time
1,412 µS Std.	100029	1418	11/18/24 9:44

Turbidity Standard	LIMS ID	Reading	Date/Time
0 NTU (DI Water)	1	1.6	11/18/24 9:48
124 NTU	95834		

ORP Standard	LIMS ID/Lot#	Reading	Date/Time

D.O. Saturation	LIMS ID/Lot#	Reading	Date/Time
100%	N/A		

Sample ID	Sample Type	Date/Time	Temp. °C	pH S.U.	Conductivity µS	Turbidity NTU	ORP mV	D.O. %
LCS-1-BG	LCS	11/18/24 9:49	15.4	7.00	1,412	1.6		
CCV-1-BG	CCV	11/18/24 15:47	17.5	6.99	1,412	1.6		

Comments:

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 210771
Description YSI Pro DSS
Calibrated 10/22/2024 4:43:35PM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 22C103115
Location St. Louis
Department

State Certified
Status Pass
Temp °C 22.2
Humidity % 43

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.00	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	3.90	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.03	10.00	0.00%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	-0.68	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	119.12	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.500	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	230.90	240.00	0.00%	Pass

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

11669 Lilburn Park Rd.
St. Louis, MO 63146
Office: 314.344.1079

Pine Environmental Services, Inc.

Instrument ID 210771
Description YSI Pro DSS
Calibrated 10/22/2024 4:43:35PM

Group # 5
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	96.50	100.00	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
STL 126NTU L#24E24011653	STL 126 NTU L#24E24011653	YSI	126 NTU	24E24011653		5/25/2025
STL 1413 COND L#4GB0749	STL 1413 COND L#4GB0749	AquaPhoenix Scientific	31986	4GB0749		2/25/2025
STL AUTOCAL LOT#24014218	Auto Cal Solution 0 NTU/PH 4	GFS	8483	24014218		9/25/2025
STL ORP SOLUTION 240MV L#4GG0438	STL ORP SOLUTION 240MV L#4GG0438	AquaPhoenix Scientific	ORP Solution	4GG0438		4/25/2025
STL PH10 #4GB0253	STL PH10 #4GB0253	Absolute Accuracy	PH 10	4GB0253		2/25/2026
STL PH4 L#4GB0637	STL pH4 L#4GB0637	AquaPhoenix Scientific	pH 4	4GB0637		2/25/2026
STL PH7 L#4GG1129	STL PH7 L#4GG1129	AquaPhoenix Scientific	PH7	4GG1129		7/25/2026

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Austin Carter

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

10521 Research Drive
Suite 102
Knoxville, TN 37932
Toll-free: (865) 777-1418

Pine Environmental Services, Inc.

Instrument ID 223357
Description YSI Pro DSS Sonde
Calibrated 9/26/2024 10:44:47AM

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	99.10	100.00	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
TN 1.413 3GL1056	TN 1.413 3GL1056	AquaPhoenix Scientific	31986	3GL1056		12/21/2024
TN 126 TURB NTU	TN TURB 126 NTU	YSI	607300	24G24012705		7/30/2025
TN AUTOCAL 24010121	TN AUTOCAL 24010121	GFS	8483	24010121		4/29/2025
TN ORP 4GD1716	TN ORP 4GD1716	AquaPhoenix Scientific	32001	4GD1716		1/1/2025
TN PH10 2GJ290	TN PH10 2GJ290	AquaPhoenix Scientific	32034	2GJ290		10/21/2024
TN PH4 3GL0108	TN PH4 3GL0108	AquaPhoenix Scientific	32017	3GL0108		12/21/2024
TN PH7 4GA0071	TN PH7 4GA0071	AquaPhoenix Scientific	32025	4GA0071		1/25/2025

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Justin C. Moore

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
10521 Research Drive
Suite 102
Knoxville, TN 37932
Toll-free: (865) 777-1418

Pine Environmental Services, Inc.

Instrument ID 223357
Description YSI Pro DSS Sonde
Calibrated 9/26/2024 10:44:47AM

Manufacturer YSI
Model Number Pro DSS
Serial Number/ Lot Number 24b105093
Location Tennessee
Department

State Certified
Status Pass
Temp °C 73
Humidity % 64

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	6.99	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	4.12	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	9.97	10.00	0.00%	Pass

Group # 2
Group Name Turbidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	NTU	0.00	NTU	0.81	0.00	0.00%	Pass
124.00 / 124.00	NTU	124.00	NTU	119.56	124.00	0.00%	Pass

Group # 3
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.421	1.413	0.00%	Pass

Group # 4
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	217.50	240.00	0.00%	Pass

Group # 5
Group Name Dissolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

December 13, 2023

Eric Bauer
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
TEL: (414) 837-3607
FAX: (414) 837-3608

Illinois	100226
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: KIN-23Q4 **WorkOrder:** 23110440

Dear Eric Bauer:

TEKLAB, INC received 28 samples on 11/29/2023 12:21:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley

Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

This reporting package includes the following:

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- C - RL shown is a Client Requested Quantitation Limit
- E - Value above quantitation range
- H - Holding times exceeded
- I - Associated internal standard was outside method criteria
- J - Analyte detected below quantitation limits
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- T - TIC(Tentatively identified compound)
- X - Value exceeds Maximum Contaminant Level

Case Narrative

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 23110440

Client Project: KIN-23Q4 | **Report Date:** 13-Dec-23

Cooler Receipt Temp: 9.0 °C

An employee of Teklab, Inc. collected the sample(s).

MW-12S, MW-12D, SG-02, and XSG-01 date/times of collection per SAR3. MW-27 and MW-8S could not be collected; the wells were dry. EAH 11/29/23

Per Eric Bauer's request, only KIN_SUP_000 data is included in this report. EAH 12/13/23

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	arenner@teklabinc.com

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2024	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2024	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2024	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2024	Collinsville
Missouri	MDNR	00930		5/31/2023	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll
Work Order: 23110440
Client Project: KIN-23Q4
Report Date: 13-Dec-23
Lab ID: 23110440-023
Client Sample ID: PZ-4A
Matrix: GROUNDWATER
Collection Date: 11/29/2023 10:30

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**7.97**	ft	1	11/29/2023 10:30	R339877
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**17**	NTU	1	11/29/2023 10:30	R339877
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**120**	mV	1	11/29/2023 10:30	R339877
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1380**	µS/cm	1	11/29/2023 10:30	R339877
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**14.8**	°C	1	11/29/2023 10:30	R339877
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.62**	mg/L	1	11/29/2023 10:30	R339877
SW-846 9040B FIELD									
pH	*	0	1.00		**6.78**		1	11/29/2023 10:30	R339877
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**492**	mg/L	1	11/30/2023 9:01	R339918
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/30/2023 9:01	R339918
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	40	50		**655**	mg/L	2.5	11/29/2023 13:47	R339908
SW-846 9036 (TOTAL)									
Sulfate	NELAP	61	100		**102**	mg/L	10	12/01/2023 19:48	R340009
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**0.39**	mg/L	1	11/30/2023 10:06	R339841
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**23**	mg/L	1	12/01/2023 19:42	R340022
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**127**	mg/L	1	12/05/2023 18:08	215420
Magnesium	NELAP	0.0055	0.0500		**78.1**	mg/L	1	12/05/2023 18:08	215420
Potassium	NELAP	0.0400	0.100		**0.660**	mg/L	1	12/05/2023 18:08	215420
Sodium	NELAP	0.0180	0.0500		**21.9**	mg/L	1	12/05/2023 18:08	215420
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**0.0019**	mg/L	5	12/06/2023 15:26	215420
Arsenic	NELAP	0.0004	0.0010		**0.0022**	mg/L	5	12/05/2023 1:39	215420
Barium	NELAP	0.0007	0.0010		**0.111**	mg/L	5	12/05/2023 1:39	215420
Beryllium	NELAP	0.0002	0.0010	J	**0.0003**	mg/L	5	12/05/2023 1:39	215420
Boron	NELAP	0.0092	0.0250		**0.963**	mg/L	5	12/05/2023 1:39	215420
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:39	215420
Chromium	NELAP	0.0007	0.0015		**0.0129**	mg/L	5	12/05/2023 1:39	215420
Cobalt	NELAP	0.0001	0.0010		**0.0023**	mg/L	5	12/05/2023 1:39	215420
Lead	NELAP	0.0006	0.0010		**0.0036**	mg/L	5	12/05/2023 1:39	215420
Lithium	*	0.0015	0.0030		**0.0048**	mg/L	5	12/05/2023 1:39	215420
Molybdenum	NELAP	0.0006	0.0015	J	**0.0007**	mg/L	5	12/06/2023 15:26	215420
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:39	215420
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	12/05/2023 17:39	215420

Client: Ramboll | **Work Order:** 23110440

Client Project: KIN-23Q4 | **Report Date:** 13-Dec-23

Lab ID: 23110440-023 | **Client Sample ID:** PZ-4A

Matrix: GROUNDWATER | **Collection Date:** 11/29/2023 10:30

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	12/06/2023 13:21	215504

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

Lab ID: 23110440-027 **Client Sample ID:** Field Blank

Matrix: AQUEOUS **Collection Date:** 11/29/2023 10:35

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	11/30/2023 9:03	R339918
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/30/2023 9:03	R339918
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**< 20**	mg/L	1	11/29/2023 13:47	R339908
SW-846 9036 (TOTAL)									
Sulfate	NELAP	6	10		**< 10**	mg/L	1	12/01/2023 19:58	R340009
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**< 0.10**	mg/L	1	11/30/2023 10:09	R339841
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**< 4**	mg/L	1	12/01/2023 19:58	R340022
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	12/05/2023 18:10	215420
Magnesium	NELAP	0.0055	0.0500		**< 0.0500**	mg/L	1	12/05/2023 18:10	215420
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	12/05/2023 18:10	215420
Sodium	NELAP	0.0180	0.0500		**< 0.0500**	mg/L	1	12/05/2023 18:10	215420
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	J	**0.0006**	mg/L	5	12/06/2023 15:36	215420
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Boron	NELAP	0.0092	0.025	J	**0.0094**	mg/L	5	12/05/2023 1:51	215420
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	12/05/2023 1:51	215420
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	12/05/2023 1:51	215420
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	12/06/2023 15:36	215420
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	12/05/2023 1:51	215420
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	12/05/2023 17:51	215420
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	12/06/2023 13:26	215504

Sample Summary

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-23Q4
Work Order: 23110440
Report Date: 13-Dec-23

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
23110440-023	PZ-4A	Groundwater	2	11/29/2023 10:30
23110440-027	Field Blank	Aqueous	2	11/29/2023 10:35

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

STANDARD METHODS 2540 C (LE) D

Batch RUUPg/ / S19 7T, 7am) pS Units ySe 9

SampID: LCS-R339877-1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4320**	1412	0	100.2	90	110	11/27/2023

Batch RUUPg/ / S19 7T, 7am) pS Units ySe 9

SampID: LCS-R339877-2

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4320**	1412	0	100.4	90	110	11/27/2023

Batch RUUPg/ / S19 7T, 7am) pS Units ySe 9

SampID: LCS-R339877-3

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**43U0**	1412	0	101.6	90	110	11/28/2023

Batch RUUPg/ / S19 7T, 7am) pS Units ySe 9

SampID: LCS-R339877-4

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4320**	1412	0	100.2	90	110	11/28/2023

Batch RUUPg/ / S19 7T, 7am) pS Units ySe 9

SampID: LCS-R339877-5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4330**	1412	0	102.1	90	110	11/29/2023

SB Kg3< P030C (LE) D

Batch RUUPg/ / S19 7T, 7am) pS Units

SampID: LCS-R339877-1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**/ 640**	7.000	0	101.4	98.57	101.4	11/27/2023

Batch RUUPg/ / S19 7T, 7am) pS Units

SampID: LCS-R339877-2

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**/ 604**	7.000	0	100.1	98.57	101.4	11/27/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEDEH O2540

Batch a mmMNpp SC(L) 1L97 4, S Units

SampID: LCS-R339877-3

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyEe	7.000	0	100.1	98.57	101.4	11/28/2023

Batch a mmMNpp SC(L) 1L97 4, S Units

SampID: LCS-R339877-4

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyE:	7.000	0	100.7	98.57	101.4	11/28/2023

Batch a mmMNpp SC(L) 1L97 4, S Units

SampID: LCS-R339877-5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyED	7.000	0	100.6	98.57	101.4	11/29/2023

S) UP0 Ua 0 g 5) / 3 0 S B: DE , K(3) U4<eMMp6BEee

Batch a mmMNmp SC(L) 1L97 g H48 Units (- .4

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		F BE	16.00	0	0	-100	100	11/28/2023

Batch a mmMNmp SC(L) 1L97 4, S Units (- .4

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		MMD	1000	0	99.4	90	110	11/28/2023

Batch a mmMNmp SC(L) 1L97 0 Units (- .4 RPD Limit eE

SampID: 23110440-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		mmN				324.0	4.23	11/28/2023

Batch a mmMMEN SC(L) 1L97 g H48 Units (- .4

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		F BE	16.00	0	0	-100	100	11/29/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch Rgg990/ **SampType:** LCS Units **mUR**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**970**	1000	0	97.0	90	110	11/29/2023

Batch Rgg990/ **SampType:** D3B Units **mUR** RPD Limit **10**
SampID: 23111973-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**49/**				508.0	1.99	11/29/2023

Batch Rgg9971 **SampType:** MKL< Units **mUR**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**6 20**	16.00	0	0	-100	100	11/30/2023

Batch Rgg9971 **SampType:** LCS Units **mUR**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**990**	1000	0	99.0	90	110	11/30/2023

Batch Rgg9971 **SampType:** D3B Units **mUR** RPD Limit **10**
SampID: 23112078-012ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**g50**				380.0	8.22	12/01/2023

S8 -/ 4. 90g. (TOTAL)

Batch Rg40009 **SampType:** MKL< Units **mUR**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**6 10**	6.140	0	0	-100	100	12/01/2023

Batch Rg40009 **SampType:** LCS Units **mUR**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	95.5	90	110	12/01/2023

Client: Ramboll
Client Project: KIN-23Q4

Work Order: 23110440
Report Date: 13-Dec-23

S8 -/ 4. 90g. (TOTAL)

Batch Rg40009 **SampType:** MS Units **mUR**
SampID: 23110440-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50		**192**	100.0	91.92	100.2	85	115	12/01/2023

Batch Rg40009 **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23110440-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50		**1/ /**	100.0	91.92	95.7	192.1	2.34	12/01/2023

Batch Rg40009 **SampType:** MS Units **mUR**
SampID: 23111685-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		**g70**	200.0	176.4	96.8	90	110	12/01/2023

Batch Rg40009 **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23111685-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**g. 9**	200.0	176.4	96.3	370.1	0.26	12/01/2023

Batch Rg40009 **SampType:** MS Units **mUR**
SampID: 23111785-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10	S	**42**	20.00	35.33	35.0	90	110	12/01/2023

Batch Rg40009 **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23111785-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	S	**42**	20.00	35.33	33.1	42.32	0.88	12/01/2023

Batch Rg40009 **SampType:** MS Units **mUR**
SampID: 23112066-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20	S	**59**	40.00	23.04	88.7	90	110	12/01/2023

Batch Rg40009 **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23112066-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**59**	40.00	23.04	90.2	58.51	1.00	12/01/2023

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 23110440

Client Project: KIN-23Q4 | **Report Date:** 13-Dec-23

S8 -/ 4. 90g. (TOTAL)

Batch Rg40009 **SampType:** MS Units **mUR**
SampID: 23112078-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		**g1.**	200.0	133.3	91.2	85	115	12/01/2023

Batch Rg40009 **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23112078-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**g19**	200.0	133.3	92.9	315.7	1.06	12/01/2023

Batch Rg4012. **SampType:** MKL< Units **mUR**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**6 10**	6.140	0	0	-100	100	12/05/2023

Batch Rg4012. **SampType:** LCS Units **mUR**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	95.0	90	110	12/05/2023

Batch Rg4012. **SampType:** MS Units **mUR**
SampID: 23112078-010AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**92**	40.00	53.68	94.8	85	115	12/05/2023

Batch Rg4012. **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23112078-010AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**92**	40.00	53.68	96.7	91.58	0.84	12/05/2023

Batch Rg4012. **SampType:** MS Units **mUR**
SampID: 23120036-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	94.3	90	110	12/05/2023

Batch Rg4012. **SampType:** MSD Units **mUR** RPD Limit **10**
SampID: 23120036-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**19**	20.00	0	96.5	18.86	2.31	12/05/2023

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

S8 -/ 4. 90g. (TOTAL)

Batch Rg4012. **SampType:** MS Units mUR.
SampID: 23120190-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		g2	20.00	14.61	85.0	85	115	12/05/2023

Batch Rg4012. **SampType:** MSD Units mUR. RPD Limit 10
SampID: 23120190-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		g2	20.00	14.61	85.0	31.60	0.06	12/05/2023

Batch Rg401/ 5 **SampType:** MKL< Units mUR.
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		6 10	6.140	0	0	-100	100	12/06/2023

Batch Rg401/ 5 **SampType:** LCS Units mUR.
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		21	20.00	0	107.4	90	110	12/06/2023

Batch Rg401/ 5 **SampType:** MS Units mUR.
SampID: 23112017-007AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		g90	200.0	207.1	91.7	85	115	12/06/2023

Batch Rg401/ 5 **SampType:** MSD Units mUR. RPD Limit 10
SampID: 23112017-007AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		g/ 5	200.0	207.1	88.9	390.5	1.43	12/06/2023

Batch Rg401/ 5 **SampType:** MS Units mUR.
SampID: 23120088-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		200		. 25	400.0	257.5	91.8	90	110	12/06/2023

Batch Rg401/ 5 **SampType:** MSD Units mUR. RPD Limit 10
SampID: 23120088-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		200		. 29	400.0	257.5	92.8	624.8	0.61	12/06/2023

Client: Ramboll
Work Order: 23110440

Client Project: KIN-23Q4
Report Date: 13-Dec-23

S8 -/ 4. 90g. (TOTAL)

Batch Rg401/ 5 **SampType:** MS Units mUR.
SampID: 23120202-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		1000		**g9/ 0**	2000	2009	98.8	90	110	12/06/2023

Batch Rg401/ 5 **SampType:** MSD Units mUR. RPD Limit **10**
SampID: 23120202-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		1000		**g990**	2000	2009	99.2	3984	0.22	12/06/2023

Batch Rg401/ 5 **SampType:** MS Units mUR.
SampID: 23120317-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**40**	20.00	22.03	91.4	85	115	12/06/2023

Batch Rg401/ 5 **SampType:** MSD Units mUR. RPD Limit **10**
SampID: 23120317-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**41**	20.00	22.03	92.6	40.32	0.54	12/06/2023

S8 -/ 4. 9214 (TOTAL)

Batch Rgg97/ 1 **SampType:** MKL< Units mUR.
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**6 0F10**	0.0500	0	0	-100	100	11/28/2023

Batch Rgg97/ 1 **SampType:** LCS Units mUR.
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0F9/**	1.000	0	98.3	90	110	11/28/2023

Batch Rgg97/ 1 **SampType:** MS Units mUR.
SampID: 23110002-027AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2F55**	2.000	0.4220	106.5	75	125	11/28/2023

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEHD Q25 240C

Batch yeeM NH S(L)21)97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-027AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERUR	2.000	0.4220	106.7	2.552	0.16	11/28/2023

Batch yeeM NH S(L)21)97 , S Units L mp0
SampID: 23110002-035AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERDR	2.000	0.3380	106.3	75	125	11/28/2023

Batch yeeM NH S(L)21)97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-035AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERD:	2.000	0.3380	106.8	2.464	0.36	11/28/2023

Batch yeeM NH S(L)21)97 , S Units L mp0
SampID: 23110002-057AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERDU	2.000	0.3060	107.0	75	125	11/28/2023

Batch yeeM NH S(L)21)97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-057AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERDD	2.000	0.3060	106.6	2.447	0.33	11/28/2023

Batch yeeM NH S(L)21)97 , S Units L mp0
SampID: 23110002-066AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERDN	2.000	0.3340	107.4	75	125	11/28/2023

Batch yeeM NH S(L)21)97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-066AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERDU	2.000	0.3340	105.7	2.482	1.38	11/28/2023

Batch yeeM NH S(L)21)97 , S Units L mp0
SampID: 23110002-090AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERUR	2.000	0.3530	110.2	75	125	11/28/2023

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440
Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEHD Q25 240C

Batch y eeM NH S(L) 21) 97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-090AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		EPDN	2.000	0.3530	106.5	2.557	2.94	11/28/2023

Batch y eeM NH S(L) 21) 97 , S Units L mp0
SampID: 23110002-102CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERgE	2.000	0	101.0	75	125	11/28/2023

Batch y eeM NH S(L) 21) 97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-102CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERgE	2.000	0	100.8	2.019	0.20	11/28/2023

Batch y eeM NH S(L) 21) 97 , S Units L mp0
SampID: 23110002-107AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERUg	2.000	0.3860	105.8	75	125	11/28/2023

Batch y eeM NH S(L) 21) 97 , Sa Units L mp0 RPD Limit HU
SampID: 23110002-107AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		ERUD	2.000	0.3860	107.6	2.502	1.43	11/28/2023

Batch y eeM NH S(L) 21) 97 , S Units L mp0
SampID: 23110440-020AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		EPDH	2.000	0.2890	106.1	75	125	11/28/2023

Batch y eeM NH S(L) 21) 97 , Sa Units L mp0 RPD Limit HU
SampID: 23110440-020AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		EReE	2.000	0.2890	101.7	2.411	3.76	11/28/2023

Batch yeeMNDH S(L) 21) 97 , / 03 Units L mp0
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		BgPHg	0.0500	0	0	-100	100	11/29/2023

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEHD Q25 240C

Batch yeeMNDH S(L)21)97 0KS Units L mp0

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		HRgg	1.000	0	99.5	90	110	11/29/2023

Batch yeeMNDH S(L)21)97 , S Units L mp0

SampID: 23110440-013AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		EPDR	2.000	0.3480	105.8	75	125	11/29/2023

Batch yeeMNDH S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23110440-013AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		EPD:	2.000	0.3480	106.1	2.465	0.20	11/29/2023

Batch yeeMNDH S(L)21)97 , S Units L mp0

SampID: 23111951-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		eRgN	2.000	0.9510	106.4	75	125	11/29/2023

Batch yeeMNDH S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23111951-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		eRgH	2.000	0.9510	103.1	3.080	2.20	11/29/2023

Batch yeeMNDH S(L)21)97 , S Units L mp0

SampID: 23112078-005AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		EReH	2.000	0.2400	103.6	75	125	11/30/2023

Batch yeeMNDH S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23112078-005AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		EReN	2.000	0.2400	107.2	2.311	3.11	11/30/2023

Batch yeeMNDH S(L)21)97 , S Units L mp0

SampID: 23112078-013AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		ERUg	2.000	0.3540	107.4	75	125	11/30/2023

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 23110440

Client Project: KIN-23Q4 | **Report Date:** 13-Dec-23

ST ANDR MEHD Q25 240C

Batch yeeMNDH S(L)21)97 , Sa | Units L mp0 | RPD Limit HU

SampID: 23112078-013AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		EFDH	2.000	0.3540	102.7	2.501	3.79	11/30/2023

ST ANDR MEUH Q25 240(

Batch yeDggEE S(L)21)97 , / 03 | Units L mp0

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		BD	0.5000	0	0	-100	100	12/01/2023

Batch yeDggEE S(L)21)97 0KS | Units L mp0

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		Eg	20.00	0	101.0	90	110	12/01/2023

Batch yeDggEE S(L)21)97 , S | Units L mp0

SampID: 23110440-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		ee	20.00	14.00	92.6	85	115	12/01/2023

Batch yeDggEE S(L)21)97 , Sa | Units L mp0 | RPD Limit HU

SampID: 23110440-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		ee	20.00	14.00	93.1	32.52	0.31	12/01/2023

Batch yeDggEE S(L)21)97 , S | Units L mp0

SampID: 23112078-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		eg	20.00	11.15	93.3	85	115	12/01/2023

Batch yeDggEE S(L)21)97 , Sa | Units L mp0 | RPD Limit HU

SampID: 23112078-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		eg	20.00	11.15	93.4	29.80	0.07	12/01/2023

Client: Ramboll | **Work Order:** 23110440

Client Project: KIN-23Q4 | **Report Date:** 13-Dec-23

ST ANDR MEUH Q25 240C

Batch yeDggEE S(L)21)97 , S Units L mp0

SampID: 23112078-010AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		eg	20.00	10.55	95.6	85	115	12/01/2023

Batch yeDggEE S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23112078-010AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		eg	20.00	10.55	94.8	29.66	0.54	12/01/2023

Batch yeDgHeM S(L)21)97 , /03 Units L mp0

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		BD	0.5000	0	0	-100	100	12/05/2023

Batch yeDgHeM S(L)21)97 0KS Units L mp0

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		EH	20.00	0	102.9	90	110	12/05/2023

Batch yeDgHeM S(L)21)97 , S Units L mp0

SampID: 23112008-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		80		URE	400.0	201.7	90.2	85	115	12/05/2023

Batch yeDgHeM S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23112008-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		80		URN	400.0	201.7	91.6	562.3	1.05	12/05/2023

Batch yeDgHeM S(L)21)97 , S Units L mp0

SampID: 23120036-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		HM	20.00	0	97.0	85	115	12/05/2023

Batch yeDgHeM S(L)21)97 , Sa Units L mp0 RPD Limit HU

SampID: 23120036-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		HM	20.00	0	96.3	19.39	0.67	12/05/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEHO 254 50 C(

Batch y eD: OeM SL) 15917, a S Units) mpC

SampID: 23120088-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		EU	20.00	7.150	97.0	85	115	12/05/2023

Batch y eD: OeM SL) 15917, a SP Units) mpC RPD Limit OH

SampID: 23120088-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		ER	20.00	7.150	94.0	26.54	2.25	12/05/2023

Batch y eD: OeM SL) 15917, a S Units) mpC

SampID: 23120190-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		ED	20.00	5.240	95.5	85	115	12/05/2023

Batch y eD: OeM SL) 15917, a SP Units) mpC RPD Limit OH

SampID: 23120190-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		ED	20.00	5.240	96.0	24.33	0.41	12/05/2023

Batch y eD: ONN SL) 15917, a gC/ Units) mpC

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		3 D	0.5000	0	0	-100	100	12/06/2023

Batch y eD: ONN SL) 15917, CBS Units) mpC

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		EO	20.00	0	103.8	90	110	12/06/2023

Batch y eD: ONN SL) 15917, a S Units) mpC

SampID: 23112017-007AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		8		N:	40.00	45.89	85.4	85	115	12/06/2023

Batch y eD: ONN SL) 15917, a SP Units) mpC RPD Limit OH

SampID: 23112017-007AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		8		NO	40.00	45.89	88.8	80.03	1.73	12/06/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEHO 254 50 C(

Batch y eD: ONN SL) 15917, a S Units) mpC

SampID: 23120202-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		200		EDD:	1000	1521	92.3	85	115	12/06/2023

Batch y eD: ONN SL) 15917, a SP Units) mpC RPD Limit OH

SampID: 23120202-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		200		EDH:	1000	1521	93.3	2444	0.39	12/06/2023

Batch y eD: ONN SL) 15917, a S Units) mpC

SampID: 23120317-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		e:	20.00	11.76	93.4	85	115	12/06/2023

Batch y eD: ONN SL) 15917, a SP Units) mpC RPD Limit OH

SampID: 23120317-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		e:	20.00	11.76	93.2	30.43	0.10	12/06/2023

ST ANDR e: : H0 KR: Q g Ka <50 CS g6 8B- 254 50 C(

Batch EOHEHH SL) 15917, a gC/ Units) mpC

SampID: MBLK-215255

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		3 : .Q :	0.0350	0	0	-100	100	12/05/2023
Magnesium		0.0500		3 : .: H: :	0.0055	0	0	-100	100	12/05/2023
Potassium		0.100		3 : .Q :	0.0400	0	0	-100	100	12/05/2023
Sodium		0.0500		3 : .: H: :	0.0180	0	0	-100	100	12/05/2023

Batch EOHEHH SL) 15917, CBS Units) mpC

SampID: LCS-215255

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		E RD	2.500	0	105.5	85	115	12/05/2023
Magnesium		0.0500		E eN	2.500	0	95.3	85	115	12/05/2023
Potassium		0.100		E RH	2.500	0	106.0	85	115	12/05/2023
Sodium		0.0500		E HM	2.500	0	103.6	85	115	12/05/2023

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-23Q4

Work Order: 23110440
Report Date: 13-Dec-23

ST ANDR e: : H0 KR: Q g Ka <50 CS g6 8B- 254 50 C(

Batch EOHEHH SL) 15917, a S Units) mpC
SampID: 23110440-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		R .U	2.500	58.24	98.8	75	125	12/05/2023
Magnesium		0.0500		EMD	2.500	26.96	98.6	75	125	12/05/2023
Potassium		0.100		E.MU	2.500	0.2761	107.8	75	125	12/05/2023
Sodium		0.0500		ON.U	2.500	16.57	86.4	75	125	12/05/2023

Batch EOHEHH SL) 15917, a SP Units) mpC RPD Limit E:
SampID: 23110440-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		RO.E	2.500	58.24	117.6	60.71	0.77	12/05/2023
Magnesium		0.0500		EMH	2.500	26.96	103.1	29.42	0.38	12/05/2023
Potassium		0.100		E.MU	2.500	0.2761	107.6	2.972	0.22	12/05/2023
Sodium		0.0500		ON.N	2.500	16.57	89.6	18.73	0.43	12/05/2023

Batch EOHEHR SL) 15917, a gC/ Units) mpC
SampID: MBLK-215256

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		3 : .Q :	0.0350	0	0	-100	100	12/01/2023
Magnesium		0.0500		3 : .: H :	0.0055	0	0	-100	100	12/01/2023
Potassium		0.100		3 : .Q :	0.0400	0	0	-100	100	12/01/2023
Sodium		0.0500		3 : .: H :	0.0180	0	0	-100	100	12/01/2023

Batch EOHEHR SL) 15917, CBS Units) mpC
SampID: LCS-215256

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		E.DN	2.500	0	99.3	85	115	12/01/2023
Magnesium		0.0500		E.eR	2.500	0	94.3	85	115	12/01/2023
Potassium		0.100		E.DU	2.500	0	98.9	85	115	12/01/2023
Sodium		0.0500		E.De	2.500	0	97.3	85	115	12/01/2023

Batch EOHEHR SL) 15917, a S Units) mpC
SampID: 23110440-006BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		MU.D	2.500	95.00	94.0	75	125	12/01/2023
Magnesium		0.0500		eH.N	2.500	33.70	83.9	75	125	12/01/2023
Potassium		0.100		e.RD	2.500	1.340	92.1	75	125	12/01/2023
Sodium		0.0500	S	ED.R	2.500	22.79	71.2	75	125	12/01/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR e: : H0 KR: Q: g Ka <50 CS g 6 8B- 254 50 C(

Batch EOHEHR SL) 15917, a SP Units) mpC RPD Limit E:

SampID: 23110440-006BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	Q:	2.500	95.00	210.4	97.35	2.95	12/01/2023
Magnesium		0.0500	S	eU.O	2.500	33.70	135.2	35.80	3.52	12/01/2023
Potassium		0.100		e.UR	2.500	1.340	96.9	3.642	3.24	12/01/2023
Sodium		0.0500		EH.H	2.500	22.79	108.0	24.57	3.68	12/01/2023

Batch EOHDE SL) 15917, a gC/ Units) mpC

SampID: MBLK-215420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		3 : .Q :	0.0350	0	0	-100	100	12/04/2023
Magnesium		0.0500		3 : .: H: :	0.0055	0	0	-100	100	12/04/2023
Potassium		0.100		3 : .Q :	0.0400	0	0	-100	100	12/04/2023
Sodium		0.0500		3 : .: H: :	0.0180	0	0	-100	100	12/04/2023

Batch EOHDE SL) 15917, CBS Units) mpC

SampID: LCS-215420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		E.HM	2.500	0	103.6	85	115	12/04/2023
Magnesium		0.0500		E.HH	2.500	0	102.0	85	115	12/04/2023
Potassium		0.100		E.RH	2.500	0	105.9	85	115	12/04/2023
Sodium		0.0500		E.RN	2.500	0	107.2	85	115	12/04/2023

Batch EOHDE SL) 15917, a S Units) mpC

SampID: 23110440-021BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	ODU	2.500	146.8	29.2	75	125	12/05/2023
Magnesium		0.0500	S	Ue.R	2.500	72.24	56.4	75	125	12/05/2023
Potassium		0.100		e.D:	2.500	0.5819	112.6	75	125	12/05/2023
Sodium		0.0500		eE.U	2.500	30.24	96.8	75	125	12/05/2023

Batch EOHDE SL) 15917, a SP Units) mpC RPD Limit E:

SampID: 23110440-021BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	ODN	2.500	146.8	35.2	147.5	0.10	12/05/2023
Magnesium		0.0500		UD.e	2.500	72.24	83.7	73.65	0.92	12/05/2023
Potassium		0.100		e.D:	2.500	0.5819	112.9	3.398	0.20	12/05/2023
Sodium		0.0500		eE.U	2.500	30.24	99.2	32.66	0.18	12/05/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR e: : H0 KR E 0 Ka <50 CS g6 8B- a S 254 50 C(

Batch ECHEHH SL) 15917, a gC/ Units) mpC

SampID: MBLK-215255

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		3 : .: : Q	0.0004	0	0	-100	100	12/07/2023
Arsenic		0.0010		3 : .: : Q	0.0004	0	0	-100	100	12/01/2023
Barium		0.0010		3 : .: : Q	0.0007	0	0	-100	100	12/01/2023
Beryllium		0.0010		3 : .: : Q	0.0002	0	0	-100	100	12/01/2023
Boron		0.0250		3 : .: EH	0.0093	0	0	-100	100	12/01/2023
Cadmium		0.0010		3 : .: : Q	0.0001	0	0	-100	100	12/01/2023
Chromium		0.0015		3 : .: : QH	0.0007	0	0	-100	100	12/01/2023
Cobalt		0.0010		3 : .: : Q	0.0001	0	0	-100	100	12/01/2023
Lead		0.0010		3 : .: : Q	0.0006	0	0	-100	100	12/01/2023
Lithium	*	0.0030		3 : .: : e:	0.0015	0	0	-100	100	12/01/2023
Molybdenum		0.0015		3 : .: : QH	0.0006	0	0	-100	100	12/01/2023
Selenium		0.0010		3 : .: : Q	0.0006	0	0	-100	100	12/01/2023
Thallium		0.0020		3 : .: : E:	0.0010	0	0	-100	100	12/01/2023

Batch ECHEHH SL) 15917, CBS Units) mpC

SampID: LCS-215255

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		: .HMD	0.5000	0	118.9	80	120	12/06/2023
Arsenic		0.0010		: .HMO	0.5000	0	118.2	80	120	12/01/2023
Barium		0.0010		E.Oe	2.000	0	106.3	80	120	12/01/2023
Beryllium		0.0010		: .: HR	0.0500	0	112.0	80	120	12/04/2023
Boron		0.0250		: .HDR	0.5000	0	109.3	80	120	12/04/2023
Cadmium		0.0010		: .: HDN	0.0500	0	109.6	80	120	12/01/2023
Chromium		0.0015		: .EEM	0.2000	0	114.4	80	120	12/04/2023
Cobalt		0.0010		: .HUR	0.5000	0	115.3	80	120	12/04/2023
Lead		0.0010		: .HU	0.5000	0	114.1	80	120	12/04/2023
Lithium	*	0.0030		: .HR	0.5000	0	112.0	80	120	12/04/2023
Molybdenum		0.0015		: .H e	0.5000	0	100.6	80	120	12/01/2023
Selenium		0.0010		: .HND	0.5000	0	116.8	80	120	12/04/2023
Thallium		0.0020		: .ENH	0.2500	0	113.8	80	120	12/04/2023

ST ANDR MEEHO2RE5EO24 0CO(S L) 19 7 4 S ,Ca CO(m

Batch 53H5HH **Spy eC: eUP 4 S** Units **y g/(**

SampID: 23110440-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		EBHHE	0.5000	0	110.0	75	125	12/04/2023
Barium		0.0010		5B5E	2.000	0.04534	107.9	75	125	12/04/2023
Beryllium		0.0010		EBBEHDK	0.0500	0	109.7	75	125	12/04/2023
Boron		0.0250		EBN5H	0.5000	0.2928	106.4	75	125	12/04/2023
Cadmium		0.0010		EBBEHDE	0.0500	0	108.0	75	125	12/04/2023
Chromium		0.0015		EB535	0.2000	0	106.0	75	125	12/04/2023
Cobalt		0.0010		EBHM3	0.5000	0	106.2	75	125	12/04/2023
Lead		0.0010		EBHD3	0.5000	0	108.2	75	125	12/04/2023
Lithium	*	0.0030		EBHDD	0.5000	0.001563	108.6	75	125	12/04/2023
Molybdenum		0.0015		EBH5N	0.5000	0	105.6	75	125	12/04/2023
Selenium		0.0010		EBHMM	0.5000	0	106.7	75	125	12/04/2023
Thallium		0.0020		EB5RM	0.2500	0	105.1	75	125	12/04/2023

Batch 53H5HH **Spy eC: eUP 4 S<** Units **y g/(** RPD Limit **5E**

SampID: 23110440-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic		0.0010		EBHRN	0.5000	0	113.5	0.5499	3.19	12/04/2023
Barium		0.0010		5BME	2.000	0.04534	112.5	2.204	4.08	12/04/2023
Beryllium		0.0010		EBBEHHE	0.0500	0	110.0	0.05485	0.24	12/04/2023
Boron		0.0250		EBN55	0.5000	0.2928	105.9	0.8250	0.35	12/04/2023
Cadmium		0.0010		EBBEHHM	0.0500	0	110.6	0.05398	2.39	12/04/2023
Chromium		0.0015		EB53K	0.2000	0	109.5	0.2119	3.29	12/04/2023
Cobalt		0.0010		EBHMD	0.5000	0	106.9	0.5309	0.65	12/04/2023
Lead		0.0010		EBHD6	0.5000	0	109.4	0.5408	1.10	12/04/2023
Lithium	*	0.0030		EBHHE	0.5000	0.001563	109.6	0.5444	0.98	12/04/2023
Molybdenum		0.0015		EBHDM	0.5000	0	108.5	0.5279	2.74	12/04/2023
Selenium		0.0010		EBHD6	0.5000	0	109.3	0.5335	2.44	12/04/2023
Thallium		0.0020		EB5NR	0.2500	0	114.5	0.2627	8.58	12/04/2023

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEEHO2RE5EO24 0CO(S L) 1974 S ,Ca CO(m

Batch 53H5HR Spy eC: eUP 4 L(8 Units y g/(

SampID: MBLK-215256

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		- EBEE3E	0.0004	0	0	-100	100	12/06/2023
Arsenic		0.0010		- EBEE3E	0.0004	0	0	-100	100	12/05/2023
Barium		0.0010		- EBEE3E	0.0007	0	0	-100	100	12/05/2023
Beryllium		0.0010		- EBEE3E	0.0002	0	0	-100	100	12/04/2023
Boron		0.0250		- EBE5HE	0.0093	0	0	-100	100	12/04/2023
Cadmium		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/04/2023
Chromium		0.0015		- EBEE3H	0.0007	0	0	-100	100	12/05/2023
Cobalt		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/05/2023
Lead		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/05/2023
Lithium	*	0.0030		- EBEEME	0.0015	0	0	-100	100	12/04/2023
Molybdenum		0.0015		- EBEE3H	0.0006	0	0	-100	100	12/04/2023
Selenium		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/05/2023
Thallium		0.0020		- EBEE5E	0.0010	0	0	-100	100	12/04/2023

Batch 53H5HR Spy eC: eUP (9 S Units y g/(

SampID: LCS-215256

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		EBH65	0.5000	0	114.3	80	120	12/06/2023
Arsenic		0.0010		EBHMR	0.5000	0	107.2	80	120	12/05/2023
Barium		0.0010		5B3D	2.000	0	106.8	80	120	12/05/2023
Beryllium		0.0010		EBEDK6	0.0500	0	99.5	80	120	12/04/2023
Boron		0.0250		EBDNR	0.5000	0	97.2	80	120	12/04/2023
Cadmium		0.0010		EBEHEN	0.0500	0	101.6	80	120	12/04/2023
Chromium		0.0015		EB3NH	0.2000	0	92.6	80	120	12/05/2023
Cobalt		0.0010		EBDK5	0.5000	0	98.4	80	120	12/05/2023
Lead		0.0010		EBH36	0.5000	0	103.5	80	120	12/05/2023
Lithium	*	0.0030		EBDKR	0.5000	0	99.2	80	120	12/04/2023
Molybdenum		0.0015		EBDNR	0.5000	0	97.1	80	120	12/04/2023
Selenium		0.0010		EBHEH	0.5000	0	101.0	80	120	12/05/2023
Thallium		0.0020		EB5DH	0.2500	0	98.0	80	120	12/04/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEEHO2RE5EO24 0CO(S L) 19 7 4 S ,Ca CO(m

Batch 53H5HR Spy eC: eUP 4 S Units y g/(

SampID: 23110440-006BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		EBHD5	0.5000	0	108.5	75	125	12/06/2023
Arsenic		0.0010		EBHRR	0.5000	0.002346	112.8	75	125	12/05/2023
Barium		0.0010		5B5M	2.000	0.1232	105.4	75	125	12/05/2023
Beryllium		0.0010		EBEHDD	0.0500	0	108.7	75	125	12/04/2023
Boron		0.0250		EBH66	0.5000	0.07452	100.5	75	125	12/04/2023
Cadmium		0.0010		EBEH55	0.0500	0	104.4	75	125	12/04/2023
Chromium		0.0015		EB3K3	0.2000	0.002024	94.5	75	125	12/05/2023
Cobalt		0.0010		EBHED	0.5000	0.0006138	100.7	75	125	12/04/2023
Lead		0.0010		EBH56	0.5000	0.0006831	105.3	75	125	12/05/2023
Lithium	*	0.0030		EBHM8	0.5000	0.005587	105.1	75	125	12/04/2023
Molybdenum		0.0015		EBH3M	0.5000	0.007534	101.2	75	125	12/04/2023
Selenium		0.0010		EBH3N	0.5000	0	103.5	75	125	12/06/2023
Thallium		0.0020		EB5HN	0.2500	0	103.2	75	125	12/04/2023

Batch 53H5HR Spy eC: eUP 4 S< Units y g/(RPD Limit 5E

SampID: 23110440-006BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		EBHMR	0.5000	0	107.2	0.5424	1.22	12/06/2023
Arsenic		0.0010		EBHRD	0.5000	0.002346	112.3	0.5664	0.43	12/05/2023
Barium		0.0010		5B5M	2.000	0.1232	105.3	2.230	0.04	12/05/2023
Beryllium		0.0010		EBEH56	0.0500	0	105.4	0.05436	3.14	12/04/2023
Boron		0.0250		EBH6M	0.5000	0.07452	99.6	0.5771	0.78	12/04/2023
Cadmium		0.0010		EBEHMM	0.0500	0	106.5	0.05220	2.00	12/04/2023
Chromium		0.0015		EB3KE	0.2000	0.002024	93.8	0.1910	0.74	12/05/2023
Cobalt		0.0010		EBH3D	0.5000	0.0006138	102.7	0.5039	2.06	12/04/2023
Lead		0.0010		EBHM8	0.5000	0.0006831	106.1	0.5272	0.74	12/05/2023
Lithium	*	0.0030		EBHME	0.5000	0.005587	104.9	0.5311	0.18	12/04/2023
Molybdenum		0.0015		EBH5D	0.5000	0.007534	103.3	0.5135	2.07	12/04/2023
Selenium		0.0010		EBH5M	0.5000	0	104.6	0.5175	1.08	12/06/2023
Thallium		0.0020		EB56E	0.2500	0	108.0	0.2580	4.51	12/04/2023

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-23Q4

Work Order: 23110440

Report Date: 13-Dec-23

ST ANDR MEEHO2RE5EO24 0CO(S L) 19 7 4 S ,Ca CO(m

Batch **53HD5E** **Spy eC: eUP 4 L(8** Units **y g/(**

SampID: MBLK-215420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		- EBEE3E	0.0004	0	0	-100	100	12/07/2023
Arsenic		0.0010		- EBEE3E	0.0004	0	0	-100	100	12/04/2023
Arsenic		0.0010		- EBEE3E	0.0004	0	0	-100	100	12/05/2023
Barium		0.0010		- EBEE3E	0.0007	0	0	-100	100	12/05/2023
Barium		0.0010		- EBEE3E	0.0007	0	0	-100	100	12/04/2023
Beryllium		0.0010		- EBEE3E	0.0002	0	0	-100	100	12/04/2023
Beryllium		0.0010		- EBEE3E	0.0002	0	0	-100	100	12/05/2023
Boron		0.0250		- EBE5HE	0.0093	0	0	-100	100	12/05/2023
Boron		0.0250		- EBE5HE	0.0093	0	0	-100	100	12/04/2023
Cadmium		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/05/2023
Cadmium		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/04/2023
Chromium		0.0015		- EBEE3H	0.0007	0	0	-100	100	12/05/2023
Chromium		0.0015		- EBEE3H	0.0007	0	0	-100	100	12/04/2023
Cobalt		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/04/2023
Cobalt		0.0010		- EBEE3E	0.0001	0	0	-100	100	12/05/2023
Lead		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/04/2023
Lead		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/05/2023
Lithium	*	0.0030		- EBEEME	0.0015	0	0	-100	100	12/04/2023
Lithium	*	0.0030		- EBEEME	0.0015	0	0	-100	100	12/05/2023
Molybdenum		0.0015		- EBEE3H	0.0006	0	0	-100	100	12/07/2023
Selenium		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/04/2023
Selenium		0.0010		- EBEE3E	0.0006	0	0	-100	100	12/05/2023
Thallium		0.0020		- EBEE5E	0.0010	0	0	-100	100	12/05/2023

ST ANDR MEEHO2RE5EO24 0CO(S L) 19 7 4 S ,Ca CO(m

Batch 53HD5E Spy eC: eUP (9 S Units y g/(

SampID: LCS-215420

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		EBDRM	0.5000	0	92.6	80	120	12/07/2023
Arsenic		0.0010		EBHE	0.5000	0	110.1	80	120	12/05/2023
Barium		0.0010		5BER	2.000	0	103.2	80	120	12/05/2023
Beryllium		0.0010		EBEH53	0.0500	0	104.3	80	120	12/05/2023
Boron		0.0250		EBHE3	0.5000	0	100.1	80	120	12/05/2023
Cadmium		0.0010		EBEHE3	0.0500	0	100.3	80	120	12/05/2023
Chromium		0.0015		EB3NN	0.2000	0	93.8	80	120	12/05/2023
Cobalt		0.0010		EBDKN	0.5000	0	99.7	80	120	12/05/2023
Lead		0.0010		EBH5N	0.5000	0	105.5	80	120	12/05/2023
Lithium	*	0.0030		EBH5D	0.5000	0	104.8	80	120	12/05/2023
Molybdenum		0.0015		EBDEN	0.5000	0	81.6	80	120	12/07/2023
Selenium		0.0010		EBDKN	0.5000	0	99.7	80	120	12/05/2023
Thallium		0.0020		EB5DK	0.2500	0	99.4	80	120	12/05/2023

Batch 53HD5E Spy eC: eUP 4 S Units y g/(

SampID: 23110440-021BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		EBH66	0.5000	0	115.3	75	125	12/06/2023
Arsenic		0.0010		EBHDE	0.5000	0	108.0	75	125	12/05/2023
Barium		0.0010		5BER	2.000	0.03106	101.3	75	125	12/05/2023
Beryllium		0.0010		EBEHE6	0.0500	0	101.4	75	125	12/05/2023
Boron		0.0250		3BDN	0.5000	1.026	90.4	75	125	12/05/2023
Cadmium		0.0010		EBEDK6	0.0500	0	99.4	75	125	12/05/2023
Chromium		0.0015		EB3KR	0.2000	0	98.2	75	125	12/05/2023
Cobalt		0.0010		EBD66	0.5000	0.001272	95.1	75	125	12/05/2023
Lead		0.0010		EBHEN	0.5000	0	101.7	75	125	12/05/2023
Lithium	*	0.0030		EBHEH	0.5000	0.001933	100.6	75	125	12/05/2023
Molybdenum		0.0015		EBH3M	0.5000	0	102.5	75	125	12/06/2023
Selenium		0.0010		EBH3M	0.5000	0	102.6	75	125	12/05/2023
Thallium		0.0020		EB5DN	0.2500	0	99.1	75	125	12/05/2023

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR MEEHO2RE5EO24 0CO(S L) 1974 S ,Ca CO(m

Batch 5BHD5E Spy eC: eUP 4 Sg Units y / 3(RPD Limit 5E

SampID: 23110440-021BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		EKHDM	0.5000	0	108.6	0.5766	5.99	12/06/2023
Arsenic		0.0010		EKHR5	0.5000	0	112.3	0.5398	3.98	12/05/2023
Barium		0.0010		5KBR	2.000	0.03106	106.4	2.056	4.90	12/05/2023
Beryllium		0.0010		EKEHM5	0.0500	0	106.4	0.05072	4.82	12/05/2023
Boron		0.0250		BKHH	0.5000	1.026	103.8	1.478	4.46	12/05/2023
Cadmium		0.0010		EKEH5D	0.0500	0	104.9	0.04970	5.37	12/05/2023
Chromium		0.0015		EK6EH	0.2000	0	102.4	0.1964	4.20	12/05/2023
Cobalt		0.0010		EKHER	0.5000	0.001272	101.0	0.4767	6.03	12/05/2023
Lead		0.0010		EKHEN	0.5000	0	101.7	0.5084	0.03	12/05/2023
Lithium	*	0.0030		EKHME	0.5000	0.001933	105.6	0.5047	4.83	12/05/2023
Molybdenum		0.0015		EKON<	0.5000	0	97.7	0.5127	4.82	12/06/2023
Selenium		0.0010		EKHM6	0.5000	0	107.5	0.5132	4.59	12/05/2023
Thallium		0.0020		EK6RR	0.2500	0	106.2	0.2477	6.96	12/05/2023

ST ANDR 6D6EO ,Ca CO(r

Batch 5BHDHH Spy eC: eUP 4 L(8 Units y / 3(

SampID: MBLK-215455

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		- EKEEE5E	0.0001	0	0	-100	100	12/05/2023

Batch 5BHDHH Spy eC: eUP (9 S Units y / 3(

SampID: LCS-215455

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEED6H	0.0050	0	95.0	85	115	12/05/2023

Batch 5BHDHH Spy eC: eUP 4 S Units y / 3(

SampID: 23110440-014BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020	S	EKEE5R6	0.0050	0	53.4	75	125	12/05/2023

Batch 5BHDHH Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23110440-014BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020	S	EKEE5RM	0.0050	0	52.6	0.002672	1.53	12/05/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR 6D6EO ,Ca CO(m

Batch 5BHDHH Spy eC: eUP 4 S Units y / 3(

SampID: 23111803-004CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEE<DM	0.0100	0.0001007	93.3	75	125	12/05/2023

Batch 5BHDHH Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23111803-004CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEEN<B	0.0100	0.0001007	88.1	0.009431	5.69	12/05/2023

Batch 5BHDRB Spy eC: eUP 4 L(8 Units y / 3(

SampID: MBLK-215461

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		- EKEEE5E	0.0001	0	0	-100	100	12/05/2023

Batch 5BHDRB Spy eC: eUP (9 S Units y / 3(

SampID: LCS-215461

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDMR	0.0050	0	87.2	85	115	12/05/2023

Batch 5BHDRB Spy eC: eUP 4 S Units y / 3(

SampID: 23112036-004BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEED6M	0.0050	0	94.5	75	125	12/05/2023

Batch 5BHDRB Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23112036-004BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEED6D	0.0050	0	94.8	0.004726	0.29	12/05/2023

Batch 5BHDRB Spy eC: eUP 4 S Units y / 3(

SampID: 23112144-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDHB	0.0050	0	90.2	75	125	12/06/2023

Batch 5BHDRB Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23112144-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEEDHH	0.0050	0	91.0	0.004512	0.89	12/06/2023

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR 6D6EO ,Ca CO(m

Batch 5BHHEM Spy eC: eUP 4 L(8 Units y / 3(

SampID: MBLK-215503

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		- EKEEE5E	0.0001	0	0	-100	100	12/06/2023

Batch 5BHHEM Spy eC: eUP (9 S Units y / 3(

SampID: LCS-215503

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDN<	0.0050	0	97.7	85	115	12/07/2023

Batch 5BHHEM Spy eC: eUP 4 S Units y / 3(

SampID: 23110440-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDDN	0.0050	0	89.6	75	125	12/06/2023

Batch 5BHHEM Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23110440-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEEDDH	0.0050	0	89.1	0.004479	0.56	12/06/2023

Batch 5BHHEM Spy eC: eUP 4 S Units y / 3(

SampID: 23112078-007CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDNH	0.0050	0	97.0	75	125	12/06/2023

Batch 5BHHEM Spy eC: eUP 4 Sg Units y / 3(RPD Limit BH

SampID: 23112078-007CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEED6R	0.0050	0	95.2	0.004851	1.90	12/06/2023

Batch 5BHHED Spy eC: eUP 4 L(8 Units y / 3(

SampID: MBLK-215504

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		- EKEEE5E	0.0001	0	0	-100	100	12/06/2023

Batch 5BHHED Spy eC: eUP (9 S Units y / 3(

SampID: LCS-215504

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDHR	0.0050	0	91.2	85	115	12/06/2023

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 23110440

Client Project: KIN-23Q4 **Report Date:** 13-Dec-23

ST ANDR 6D6EO ,Ca CO(m

Batch 5BHHED **Spy eC: eUP 4 S** Units **y / 3(**

SampID: 23110440-021BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDMN	0.0050	0	87.5	75	125	12/06/2023

Batch 5BHHED **Spy eC: eUP 4 Sg** Units **y / 3(** RPD Limit **BH**

SampID: 23110440-021BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEEDDB	0.0050	0	88.2	0.004377	0.73	12/06/2023

Batch 5BHHED **Spy eC: eUP 4 S** Units **y / 3(**

SampID: 23120012-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		EKEEDH5	0.0050	0	90.4	75	125	12/07/2023

Batch 5BHHED **Spy eC: eUP 4 Sg** Units **y / 3(** RPD Limit **BH**

SampID: 23120012-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		EKEEDDN	0.0050	0	89.7	0.004522	0.85	12/07/2023

Teklab Inc. Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-23Q4

Work Order: 23110440

Report Date: 13-Dec-23

Carrier: Justin Colp

Received By: AMD

Completed by: **On:** 27-Nov-23 Amber Dilallo

Reviewed by: **On:** 29-Nov-23 Ellie Hopkins

Pages to follow: Chain of custody 5 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 9.0
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑

Any No responses must be detailed below or on the COC.

pH strip #90719. - amberdilallo - 11/27/2023 4:41:52 PM

Additional Nitric Acid (93773) was needed upon arrival at the laboratory for MW-5 and MW-31S. - amberdilallo - 11/27/2023 4:41:53 PM

Samples collected on 11/28/23 were delivered to the laboratory on 11/28/23 at 1600 (on ice - 5.4C - LTG5). pH strip #90719. Additional nitric (93773) was needed in MW20 - HW/MEK/ERH 11/29/23

Samples collected on 11/29/23 were delivered to the laboratory on 11/29/23 at 1221 (on ice - 6.8C - LTG1). pH strip #90719. AMD 11/29/23

CHAIN-OF-CUSTODY / Analytical Request Document

23110440

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104 Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes — MATRIX: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-1	WT	G	11/27/23	1205		2	1		1							X	X			23110440-001
2	MW-11	WT	G				2	1		1							X	X			23110440-002
3	MW-12	WT	G				2	1		1							X	X			23110440-003
4	MW-12S	WT	G				0										X	X			23110440-004
5	MW-12D	WT	G				0										X	X			23110440-005
6	MW-2	WT	G	11/27/23	1111		2	1		1							X	X			23110440-006
7	MW-20	WT	G				2	1		1							X	X			23110440-007
8	MW-20S	WT	G				2	1		1							X	X			23110440-008
9	MW-23	WT	G				2	1		1							X	X			23110440-009
10	MW-27	WT	G				2	1		1							X	X			23110440-010
11	MW-28	WT	G				2	1		1							X	X			23110440-011
12	MW-3	WT	G				2	1		1							X	X			23110440-012
13	MW-30	WT	G				2	1		1							X	X			23110440-013
14	MW-31	WT	G	11-27-23	1347		2	1		1							X	X			23110440-014
15	MW-31S	WT	G	11-27-23	1309		2	1		1							X	X			23110440-015
16	MW-32	WT	G	11-27-23	1132		2	1		1							X	X			23110440-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-23Q4 Rev 2	J. Colp	11-27	1615	[signature]	11/27/23	1615	9.0	Y	N	Y
							TCU			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-27-23

Added HNO3 (93773) to MW-5 & MW-31S. pH ✓ 90719. [initials] 11/27/23

Confidential

23110440

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 2

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104 Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
UST RCRA OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: MATRIX — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-5	WT	G	11-27-23	1231		2	1		1							X	X			23110440-017
2	MW-6	WT	G				2	1		1							X	X			23110440-018
3	MW-7	WT	G	11/27/23	1335		2	1		1							X	X			23110440-019
4	MW-7S	WT	G	11/27/23	1254		2	1		1							X	X			23110440-020
5	MW-8	WT	G				2	1		1							X	X			23110440-021
6	MW-8S	WT	G				2	1		1							X	X			23110440-022
7	PZ-4A	WT	G				2	1		1									X		23110440-023
8	PZ-4C	WT	G				2	1		1							X	X			23110440-024
9	SG-02	WT	G				0										X	X			23110440-025
10	XSG-01	WT	G				0										X	X			23110440-026
11	Field Blank	WT	G				2	1		1							X	X	X		23110440-027
12	MW-8 Duplicate	WT	G				2	1		1							X	X			23110440-028
13																					
14																					
15																					
16																					

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-23Q4 Rev 2	J. Colp	11-27	1615	[signature]	11/27/23	1615		Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-27-23

Confidential

CHAIN-OF-CUSTODY / Analytical Request Document

23110440

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:	Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To: Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To: Tim Arnold	Company Name:	Vistra Corp
	Kincaid, IL 62540		Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com	Purchase Order No.:	Quote Reference:	
Phone: (217) 753-8911	Fax:	Project Name:	Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:	Profile #:	

REGULATORY AGENCY		
NPDES	**GROUND WATER**	DRINKING WATER
UST	RCRA	OTHER
Site Location STATE:	IL	

Section D Required Client Information

Valid Matrix Codes: MATRIX — DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-1	WT	G				2	1		1							X	X			23110440-001
2	MW-11	WT	G	11-28-23	1044		2	1		1							X	X			23110440-002
3	MW-12	WT	G	11-28-23	1003		2	1		1							X	X			23110440-003
4	MW-12S	WT	G				0										X	X			23110440-004
5	MW-12D	WT	G				0										X	X			23110440-005
6	MW-2	WT	G				2	1		1							X	X			23110440-006
7	MW-20	WT	G	11-28-23	1320		2	1		1							X	X			23110440-007
8	MW-20S	WT	G	11-28-23	1241		2	1		1							X	X			23110440-008
9	MW-23	WT	G	11-28-23	1121		2	1		1							X	X			23110440-009
10	MW-27	WT	G	11-28-23	0124		2	1		1							X	X			23110440-010
11	MW-28	WT	G	11-28-23	1423		2	1		1							X	X			23110440-011
12	MW-3	WT	G	11-28-23	1208		2	1		1							X	X			23110440-012
13	MW-30	WT	G	11-28-23	1224		2	1		1							X	X			23110440-013
14	MW-31	WT	G				2	1		1							X	X			23110440-014
15	MW-31S	WT	G				2	1		1							X	X			23110440-015
16	MW-32	WT	G				2	1		1							X	X			23110440-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-23Q4 Rev 2	J. Colp	11-28	1600	[illegible]	11/28	1600		Y	N	

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Justin Colp		
SIGNATURE of SAMPLER:	[illegible]	DATE Signed (MM/DD/YY):	11-28-23

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

5.4 ice LTG5

pHV 90719, additional HNO3 [illegible] MEK [illegible]

23110440

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Vistra Corp-Kincaid	Report To: Brian Voelker, Sam Davies	Attention: Brian Voelker, Tim Arnold
Address: 199 IL 104	Copy To: Tim Arnold	Company Name: Vistra Corp
Kincaid, IL 62540		Address: see Section A
Email To: Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com	Purchase Order No.:	Quote Reference:
Phone: (217) 753-8911 Fax:	Project Name:	Project Manager: Liz Hurley
Requested Due Date/TAT: 10 day	Project Number:	Profile #:

REGULATORY AGENCY: NPDES | GROUND WATER | DRINKING WATER | UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information — Valid Matrix Codes: DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-5	WT	G				2	1		1							X	X			23110440-017
2	MW-6	WT	G	11-28-23	1336		2	1		1							X	X			23110440-018
3	MW-7	WT	G				2	1		1							X	X			23110440-019
4	MW-7S	WT	G				2	1		1							X	X			23110440-020
5	MW-8	WT	G	11-28-23	1035		2	1		1							X	X			23110440-021
6	MW-8S	WT	G	11-28-23	DRY		2	1		1							X	X			23110440-022
7	PZ-4A	WT	G				2	1		1									X		23110440-023
8	PZ-4C	WT	G	11-28-23	1401		2	1		1							X	X			23110440-024
9	SG-02	WT	G				0										X	X			23110440-025
10	XSG-01	WT	G				0										X	X			23110440-026
11	Field Blank	WT	G				2	1		1							X	X	X		23110440-027
12	MW-8 Duplicate	WT	G	11-28-23	1035		2	1		1							X	X			23110440-028
13																					
14																					
15																					
16																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-23Q4 Rev 2	J. Colp	11-28	1600	[signature]	11/28	1600	Y N

PHV 90719. HW 11129.
Added HNO3 (93773) to MW20.

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-28-23

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

23110440

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Vistra Corp-Kincaid	Report To: Brian Voelker, Sam Davies	Attention: Brian Voelker, Tim Arnold
Address: 199 IL 104	Copy To: Tim Arnold	Company Name: Vistra Corp
Kincaid, IL 62540		Address: see Section A
Email To: Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com	Purchase Order No.:	Quote Reference:
Phone: (217) 753-8911 Fax:	Project Name:	Project Manager: Liz Hurley
Requested Due Date/TAT: 10 day	Project Number:	Profile #:

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes — MATRIX: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-5	WT	G				2	1		1							X	X			23110440-017
2	MW-6	WT	G				2	1		1							X	X			23110440-018
3	MW-7	WT	G				2	1		1							X	X			23110440-019
4	MW-7S	WT	G				2	1		1							X	X			23110440-020
5	MW-8	WT	G				2	1		1							X	X			23110440-021
6	MW-8S	WT	G				2	1		1							X	X			23110440-022
7	PZ-4A	WT	G	11-24-23	1030		2	1		1									X		23110440-023
8	PZ-4C	WT	G				2	1		1							X	X			23110440-024
9	SG-02	WT	G				0										X	X			23110440-025
10	XSG-01	WT	G				0										X	X			23110440-026
11	Field Blank	WT	G	11-29-23	1035		2	1		1							X	X	X		23110440-027
12	MW-8 Duplicate	WT	G				2	1		1							X	X			23110440-028
13																					
14																					
15																					
16																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-23Q4 Rev 2	J. Colp	11-29	1221	[signature]	11/29/23	1221	6.8 LTCI	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-29-23

pHV90719 [illegible] 11/29/23

March 20, 2024

Eric Bauer
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
TEL: (414) 837-3607
FAX: (414) 837-3608

NELAP ACCREDITED TNI LABORATORY

Illinois	100226
Illinois	1004652024-2
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: KIN-24Q1 **WorkOrder:** 24021452

Dear Eric Bauer:

TEKLAB, INC received 4 samples for KIN-SUP-000 on 3/6/2024 3:05:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report, Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

This reporting package includes the following:

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- C - RL shown is a Client Requested Quantitation Limit
- E - Value above quantitation range
- H - Holding times exceeded
- I - Associated internal standard was outside method criteria
- J - Analyte detected below quantitation limits
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- T - TIC(Tentatively identified compound)
- X - Value exceeds Maximum Contaminant Level

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

Cooler Receipt Temp: 12.1 °C

An employee of Teklab, Inc. collected the sample(s).

Equipment Blank 2 and Equipment Blank 3 were not required.

Per Eric Bauer's request, only KIN-SUP-000 data is included in this report. EAH 3/18/24

This report was revised on March 20, 2024 per Eric Bauer's request. The reason for the revision is to omit a duplicate Barium result showing in the analytical report for Equipment Blank 1. The LCS/CCV comments were also revised to include the associated elements. Please replace report dated March 18, 2024 with this report. EAH 3/20/24

Locations

	Collinsville		Springfield		Kansas City
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	3920 Pintail Dr Springfield, IL 62711-9415	Address	8421 Nieman Road Lenexa, KS 66214
Phone	(618) 344-1004	Phone	(217) 698-1004	Phone	(913) 541-1998
Fax	(618) 344-1005	Fax	(217) 698-1005	Fax	(913) 541-1998
Email	jhriley@teklabinc.com	Email	KKlostermann@teklabinc.com	Email	jhriley@teklabinc.com

	Collinsville Air		Chicago
Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425	Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(618) 344-1004	Phone	(630) 324-6855
Fax	(618) 344-1005	Fax	
Email	EHurley@teklabinc.com	Email	arenner@teklabinc.com

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2025	Collinsville
Illinois	IEPA	1004652024-2	NELAP	4/30/2025	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2024	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2024	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2024	Collinsville
Kentucky	UST	0073		1/31/2025	Collinsville
Missouri	MDNR	00930		10/31/2026	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

Lab ID: 24021452-024 **Client Sample ID:** PZ4!A

Matrix: GROUNDWATER **Collection Date:** 03/06/2024 9:43

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**7.70**	ft	1	03/06/2024 9:43	R344088
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**150**	NTU	1	03/06/2024 9:43	R344088
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**63**	mV	1	03/06/2024 9:43	R344088
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**981**	µS/cm	1	03/06/2024 9:43	R344088
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**10.2**	°C	1	03/06/2024 9:43	R344088
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**6.24**	mg/L	1	03/06/2024 9:43	R344088
SW-846 9040B FIELD									
pH	*	0	1.00		**6.97**		1	03/06/2024 9:43	R344088
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**503**	mg/L	1	03/07/2024 12:18	R344078
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	03/07/2024 12:18	R344078
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	40	50		**750**	mg/L	2.5	03/07/2024 11:00	R344141
SW-846 9036 (TOTAL)									
Sulfate	NELAP	61	100		**144**	mg/L	10	03/07/2024 14:28	R344091
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**0.29**	mg/L	1	03/07/2024 12:59	R344072
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**15**	mg/L	1	03/07/2024 14:23	R344096
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**127**	mg/L	1	03/07/2024 10:37	219587
Magnesium	NELAP	0.0055	0.0500		**75.9**	mg/L	1	03/07/2024 10:37	219587
Potassium	NELAP	0.0400	0.100		**0.720**	mg/L	1	03/07/2024 10:37	219587
Sodium	NELAP	0.0180	0.0500		**21.0**	mg/L	1	03/07/2024 10:37	219587
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	J	**0.0005**	mg/L	5	03/11/2024 16:13	219587
Arsenic	NELAP	0.0004	0.0010		**0.0036**	mg/L	5	03/07/2024 14:01	219587
Barium	NELAP	0.0007	0.0010		**0.113**	mg/L	5	03/11/2024 16:13	219587
Beryllium	NELAP	0.0002	0.0010	J	**0.0005**	mg/L	5	03/07/2024 14:01	219587
Boron	NELAP	0.0096	0.0250		**0.824**	mg/L	5	03/07/2024 14:01	219587
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/07/2024 14:01	219587
Chromium	NELAP	0.0008	0.0015		**0.0194**	mg/L	5	03/07/2024 14:01	219587
Cobalt	NELAP	0.0001	0.0010		**0.0046**	mg/L	5	03/07/2024 14:01	219587
Lead	NELAP	0.0006	0.0010		**0.0052**	mg/L	5	03/09/2024 3:06	219587
Lithium	*	0.0015	0.0030		**0.0073**	mg/L	5	03/07/2024 14:01	219587
Molybdenum	NELAP	0.0006	0.0015	J	**0.0008**	mg/L	5	03/07/2024 14:01	219587
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/07/2024 14:01	219587
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	03/07/2024 14:01	219587

LCS recovered outside upper control limits for Cd. Sample results are below the reporting limit. Data is reportable per the TNI Standard.

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

Lab ID: 24021452-024 | **Client Sample ID:** PZ4!A

Matrix: GROUNDWATER | **Collection Date:** 03/06/2024 9:43

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	03/07/2024 13:23	219610

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24021452
Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24
Lab ID: 24021452-032 | **Client Sample ID:** Field Blank
Matrix: AQUEOUS | **Collection Date:** 03/06/2024 12:11

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	03/07/2024 12:44	R344078
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	03/07/2024 12:44	R344078
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**< 20**	mg/L	1	03/07/2024 11:10	R344141
SW-846 9036 (TOTAL)									
Sulfate	NELAP	6	10		**< 10**	mg/L	1	03/07/2024 15:10	R344091
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**< 0.10**	mg/L	1	03/07/2024 13:18	R344072
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**< 4**	mg/L	1	03/07/2024 15:11	R344096
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	03/07/2024 10:41	219587
Magnesium	NELAP	0.0055	0.0500		**< 0.0500**	mg/L	1	03/07/2024 10:41	219587
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	03/07/2024 10:41	219587
Sodium	NELAP	0.0180	0.0500		**< 0.0500**	mg/L	1	03/07/2024 10:41	219587
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	03/11/2024 17:20	219587
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	03/11/2024 17:20	219587
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Boron	NELAP	0.0096	0.025	J	**0.010**	mg/L	5	03/07/2024 15:22	219587
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Chromium	NELAP	0.0008	0.0015		**< 0.0015**	mg/L	5	03/07/2024 15:22	219587
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	03/07/2024 15:22	219587
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	03/07/2024 15:22	219587
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:22	219587
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	03/07/2024 15:22	219587
LCS recovered outside upper control limits for Cd. Sample results are below the reporting limit. Data is reportable per the TNI Standard.									
CCV recovered outside the upper control limits for Zn. Sample results are below the reporting limit. Data is reportable per the TNI standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	03/07/2024 13:38	219610

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

Lab ID: 24021452-033 **Client Sample ID:** MW-08 Duplicate

Matrix: GROUNDWATER **Collection Date:** 03/05/2024 13:48

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**8.07**	ft	1	03/05/2024 13:48	R344088
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**5.9**	NTU	1	03/05/2024 13:48	R344088
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**49**	mV	1	03/05/2024 13:48	R344088
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1040**	µS/cm	1	03/05/2024 13:48	R344088
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**12.6**	°C	1	03/05/2024 13:48	R344088
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**1.11**	mg/L	1	03/05/2024 13:48	R344088
SW-846 9040B FIELD									
pH	*	0	1.00		**6.65**		1	03/05/2024 13:48	R344088
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**454**	mg/L	1	03/06/2024 13:52	R344012
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	03/06/2024 13:52	R344012
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**766**	mg/L	1	03/06/2024 8:36	R344057
SW-846 9036 (TOTAL)									
Sulfate	NELAP	61	100		**221**	mg/L	10	03/06/2024 15:30	R344022
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**0.21**	mg/L	1	03/06/2024 15:38	R344013
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**23**	mg/L	1	03/06/2024 15:14	R344025
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100	S	**156**	mg/L	1	03/07/2024 14:44	219558
Magnesium	NELAP	0.0061	0.0500		**71.7**	mg/L	1	03/07/2024 14:44	219558
Potassium	NELAP	0.0400	0.100		**0.564**	mg/L	1	03/07/2024 14:44	219558
Sodium	NELAP	0.0180	0.0500		**27.7**	mg/L	1	03/07/2024 14:44	219558
Matrix spike control limits are not applicable due to high sample/spike ratio.									
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	03/11/2024 18:57	219558
Arsenic	NELAP	0.0004	0.0010	J	**0.0006**	mg/L	5	03/11/2024 18:57	219558
Barium	NELAP	0.0007	0.0010		**0.0208**	mg/L	5	03/11/2024 18:57	219558
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/11/2024 18:57	219558
Boron	NELAP	0.0092	0.0250		**0.958**	mg/L	5	03/11/2024 18:57	219558
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/11/2024 18:57	219558
Chromium	NELAP	0.0007	0.0015	J	**0.0010**	mg/L	5	03/11/2024 18:57	219558
Cobalt	NELAP	0.0001	0.0010		**0.0012**	mg/L	5	03/11/2024 18:57	219558
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/11/2024 18:57	219558
Lithium	*	0.0015	0.0030	J	**0.0019**	mg/L	5	03/09/2024 7:25	219558
Molybdenum	NELAP	0.0006	0.0015	J	**0.0009**	mg/L	5	03/11/2024 18:57	219558
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/09/2024 7:25	219558
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	03/09/2024 7:25	219558

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

Lab ID: 24021452-033 **Client Sample ID:** MW-08 Duplicate

Matrix: GROUNDWATER **Collection Date:** 03/05/2024 13:48

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Matrix spike recovery is outside control limits due to sample dilution.									
CCV recovered outside the upper control limits for Zn. Sample results are below the reporting limit. Data is reportable per the TNI standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00013	0.00020		**< 0.00020**	mg/L	1	03/06/2024 19:03	219560

Laboratory Results

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24021452
Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24
Lab ID: 24021452-034 | **Client Sample ID:** Equipment Blank 1
Matrix: AQUEOUS | **Collection Date:** 03/06/2024 12:14

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	03/07/2024 12:47	R344078
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	03/07/2024 12:47	R344078
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**< 20**	mg/L	1	03/07/2024 11:10	R344141
SW-846 9036 (TOTAL)									
Sulfate	NELAP	6	10		**< 10**	mg/L	1	03/07/2024 15:12	R344091
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**< 0.10**	mg/L	1	03/07/2024 13:16	R344072
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**< 4**	mg/L	1	03/07/2024 15:13	R344096
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	03/07/2024 10:42	219587
Magnesium	NELAP	0.0055	0.0500		**< 0.0500**	mg/L	1	03/07/2024 10:42	219587
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	03/07/2024 10:42	219587
Sodium	NELAP	0.018	0.050	J	**0.018**	mg/L	1	03/07/2024 10:42	219587
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	03/11/2024 17:26	219587
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	03/11/2024 17:26	219587
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Boron	NELAP	0.0096	0.0250		**< 0.0250**	mg/L	5	03/07/2024 15:28	219587
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Chromium	NELAP	0.0008	0.0015		**< 0.0015**	mg/L	5	03/07/2024 15:28	219587
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	03/07/2024 15:28	219587
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	03/07/2024 15:28	219587
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	03/07/2024 15:28	219587
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	03/07/2024 15:28	219587

LCS recovered outside upper control limits for Cd. Sample results are below the reporting limit. Data is reportable per the TNI Standard.
CCV recovered outside the upper control limits for Zn. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	03/07/2024 13:40	219610

Sample Summary

Client: Ramboll
Client Project: KIN-24Q1

Work Order: 24021452
Report Date: 20-Mar-24

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
24021452-024	PZ4!A	Groundwater	2	03/06/2024 9:43
24021452-032	Field Blank	Aqueous	3	03/06/2024 12:11
24021452-033	MW-08 Duplicate	Groundwater	3	03/05/2024 13:48
24021452-034	Equipment Blank 1	Aqueous	3	03/06/2024 12:14

Teklab, Inc.
Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

STANDARD METHODS 2540 C (lE) D

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P40**	1412	0	99.9	90	110	03/04/2024

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-2

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P40**	1412	0	100.1	90	110	03/05/2024

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-3

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P40**	1412	0	100.1	90	110	03/06/2024

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-4

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P20**	1412	0	100.4	90	110	03/04/2024

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P20**	1412	0	100.2	90	110	03/05/2024

Batch RUPP0gg S19 7T, 7am) pS Units ySe 9
SampID: LCS-R344088-6

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**4P20**	1412	0	100.4	90	110	03/06/2024

S/ 3gPB K0P0C (lE) D

Batch RUPP0gg S19 7T, 7am) pS Units
SampID: LCS-R344088-1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**<605**	7.000	0	100.7	98.57	101.4	03/04/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

ST ANDR MEDEH O2540

Batch a mDDENN SC(L) 1L97 4, S Units

SampID: LCS-R344088-2

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyEM	7.000	0	101.3	98.57	101.4	03/05/2024

Batch a mDDENN SC(L) 1L97 4, S Units

SampID: LCS-R344088-3

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyEp	7.000	0	101.0	98.57	101.4	03/06/2024

Batch a mDDENN SC(L) 1L97 4, S Units

SampID: LCS-R344088-4

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyEe	7.000	0	100.1	98.57	101.4	03/04/2024

Batch a mDDENN SC(L) 1L97 4, S Units

SampID: LCS-R344088-5

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyE:	7.000	0	100.3	98.57	101.4	03/05/2024

Batch a mDDENN SC(L) 1L97 4, S Units

SampID: LCS-R344088-6

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		pyEe	7.000	0	100.1	98.57	101.4	03/06/2024

S) UP0 Ua0 g 5) / 3 0 S : BDE , K(3) U4<eMMp6: Eee

Batch a mDmMME SC(L) 1L97 g H48 Units (- .4

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		F : E	16.00	0	0	-100	100	03/05/2024

Batch a mDmMME SC(L) 1L97 4, S Units (- .4

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		MBE	1000	0	95.0	90	110	03/05/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R343990 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24030143-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**240**				246.0	2.47	03/05/2024

Batch R344057 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	03/06/2024

Batch R344057 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**936**	1000	0	93.6	90	110	03/06/2024

Batch R344057 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24021452-015ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**652**				674.0	3.32	03/06/2024

Batch R344057 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24030297-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**3020**				3045	0.99	03/06/2024

Batch R344057 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24030298-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**2220**				2190	1.45	03/06/2024

Batch R344141 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	03/07/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	03/07/2024

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R344141 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**950**	1000	0	95.0	90	110	03/07/2024
Total Dissolved Solids		20		**966**	1000	0	96.6	90	110	03/07/2024

Batch R344141 **SampType:** DUP Units mg/L RPD Limit 10
SampID: 24021452-024ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**765**				750.0	1.98	03/07/2024

Batch R344178 **SampType:** MBLK Units mg/L
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	03/08/2024

Batch R344178 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**948**	1000	0	94.8	90	110	03/08/2024

Batch R344178 **SampType:** DUP Units mg/L RPD Limit 10
SampID: 24020001-047ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**1050**				1008	4.46	03/08/2024

Batch R344178 **SampType:** DUP Units mg/L RPD Limit 10
SampID: 24030421-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**490**				460.0	6.32	03/08/2024

Batch R344178 **SampType:** DUP Units mg/L RPD Limit 10
SampID: 24030547-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**3490**				3655	4.62	03/08/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R343963 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	03/05/2024
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	03/05/2024

Batch R343963 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.32**	0.3045	0	105.1	90	110	03/05/2024
Nitrogen, Nitrite (as N)		0.05		**0.32**	0.3045	0	105.1	90	110	03/05/2024

Batch R343963 **SampType:** MS Units mg/L

SampID: 24021452-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.52**	0.5000	0	103.2	85	115	03/05/2024

Batch R343963 **SampType:** MSD Units mg/L RPD Limit **10**

SampID: 24021452-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0	101.0	0.5160	2.15	03/05/2024

Batch R343963 **SampType:** MS Units mg/L

SampID: 24021452-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0	101.0	85	115	03/05/2024

Batch R343963 **SampType:** MSD Units mg/L RPD Limit **10**

SampID: 24021452-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.52**	0.5000	0	103.6	0.5050	2.54	03/05/2024

Batch R343963 **SampType:** MS Units mg/L

SampID: 24030249-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.53**	0.5000	0	105.4	85	115	03/05/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R343963 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030249-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.53**	0.5000	0	105.4	0.5270	0.00	03/05/2024

Batch R344017 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	03/06/2024
Nitrogen, Nitrite (as N)		0.05		**< 0.05**	0.0250	0	0	-100	100	03/06/2024

Batch R344017 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.32**	0.3045	0	106.4	90	110	03/06/2024
Nitrogen, Nitrite (as N)		0.05		**0.32**	0.3045	0	106.4	90	110	03/06/2024

Batch R344017 **SampType:** MS Units mg/L

SampID: 24030316-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.47**	0.5000	0	94.4	85	115	03/06/2024

Batch R344017 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030316-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0	95.6	0.4720	1.26	03/06/2024

Batch R344017 **SampType:** MS Units mg/L

SampID: 24030336-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.51**	0.5000	0	102.2	85	115	03/06/2024

Batch R344017 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030336-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.51**	0.5000	0	101.8	0.5110	0.39	03/06/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R344017 **SampType:** MS Units mg/L

SampID: 24030361-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.46**	0.5000	0.02900	86.2	85	115	03/06/2024

Batch R344017 **SampType:** MSD Units mg/L RPD Limit **10**

SampID: 24030361-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.46**	0.5000	0.02900	86.4	0.4600	0.22	03/06/2024

Batch R344017 **SampType:** MS Units mg/L

SampID: 24030361-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.25	E	**3.96**	2.500	1.535	97.0	85	115	03/06/2024

Batch R344017 **SampType:** MSD Units mg/L RPD Limit **10**

SampID: 24030361-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.25	E	**3.96**	2.500	1.535	97.0	3.960	0.00	03/06/2024

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R343933 **SampType:** MBLK Units mg/L

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate (as N)		0.050		**< 0.050**						03/05/2024
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	03/05/2024

Batch R343933 **SampType:** LCS Units mg/L

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.511**	0.5000	0	102.2	90	110	03/05/2024

Batch R343933 **SampType:** MS Units mg/L

SampID: 24022012-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.250		**1.96**	1.250	0.7050	100.4	90	110	03/05/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R343933 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24022012-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.250		**1.98**	1.250	0.7050	101.6	1.960	0.76	03/05/2024

Batch R343933 **SampType:** MS Units **mg/L**

SampID: 24022134-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**6.96**	2.500	4.466	99.8	90	110	03/05/2024

Batch R343933 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24022134-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**6.83**	2.500	4.466	94.4	6.960	1.94	03/05/2024

Batch R343933 **SampType:** MS Units **mg/L**

SampID: 24030110-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**30.1**	12.50	17.98	96.7	90	110	03/05/2024

Batch R343933 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030110-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**30.1**	12.50	17.98	96.6	30.06	0.01	03/05/2024

Batch R343996 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate (as N)		0.050		**< 0.050**						03/06/2024
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	03/06/2024

Batch R343996 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.510**	0.5000	0	102.0	90	110	03/06/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R343996 **SampType:** MS Units mg/L

SampID: 24021452-009AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.283**	0.2500	0.05400	91.6	85	115	03/06/2024

Batch R343996 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24021452-009AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.284**	0.2500	0.05400	92.0	0.2830	0.35	03/06/2024

Batch R343996 **SampType:** MS Units mg/L

SampID: 24030108-001JMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**28.5**	12.50	16.70	94.6	90	110	03/06/2024

Batch R343996 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030108-001JMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**28.4**	12.50	16.70	93.3	28.53	0.59	03/06/2024

Batch R343996 **SampType:** MS Units mg/L

SampID: 24030231-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**9.58**	5.000	4.948	92.7	90	110	03/06/2024

Batch R343996 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030231-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**9.72**	5.000	4.948	95.5	9.583	1.44	03/06/2024

Batch R343996 **SampType:** MS Units mg/L

SampID: 24030236-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**3.93**	2.500	1.512	96.6	90	110	03/06/2024

Batch R343996 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24030236-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**3.88**	2.500	1.512	94.6	3.926	1.26	03/06/2024

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R343996 **SampType:** MS Units **mg/L**

SampID: 24030297-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500	S	**2.19**	2.500	0.09600	83.8	90	110	03/06/2024

Batch R343996 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030297-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500	S	**2.12**	2.500	0.09600	80.9	2.191	3.39	03/06/2024

Batch R343996 **SampType:** MS Units **mg/L**

SampID: 24030316-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**19.8**	5.000	14.90	98.6	90	110	03/06/2024

Batch R343996 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030316-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**20.0**	5.000	14.90	101.0	19.83	0.60	03/06/2024

SW-846 9012A (TOTAL)

Batch 219527 **SampType:** MBLK Units **mg/L**

SampID: MBLK 240305 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	03/06/2024

Batch 219527 **SampType:** LCS Units **mg/L**

SampID: LCS 240305 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	98.9	90	110	03/06/2024

Batch 219527 **SampType:** MS Units **µg/L**

SampID: 24030177-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		5.00		**25.8**	25.00	1.490	97.0	90	110	03/06/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q1

Work Order: 24021452
Report Date: 20-Mar-24

SW-846 9012A (TOTAL)

Batch 219527 **SampType:** MSD Units **µg/L** RPD Limit **15**
SampID: 24030177-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		5.00		**26.6**	25.00	1.490	100.2	25.75	3.06	03/06/2024

Batch 219580 **SampType:** MBLK Units **mg/L**
SampID: MBLK 240306 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	03/07/2024

Batch 219580 **SampType:** LCS Units **mg/L**
SampID: LCS 240306 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.024**	0.0250	0	96.3	90	110	03/07/2024

Batch 219580 **SampType:** MS Units **mg/L**
SampID: 24030248-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005	S	**0.022**	0.0250	0	88.3	90	110	03/07/2024

Batch 219580 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030248-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005		**0.023**	0.0250	0	92.4	0.02207	4.60	03/07/2024

Batch 219580 **SampType:** MS Units **mg/L**
SampID: 24030319-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	98.3	90	110	03/07/2024

Batch 219580 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030319-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005		**0.026**	0.0250	0	103.4	0.02458	5.08	03/07/2024

Batch 219640 **SampType:** MBLK Units **mg/L**
SampID: MBLK 240307 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	03/08/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9012A (TOTAL)

Batch 219640 **SampType:** LCS Units **mg/L**
SampID: LCS 240307 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.024**	0.0250	0	97.6	90	110	03/08/2024

Batch 219640 **SampType:** MS Units **mg/L**
SampID: 24030366-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	99.9	90	110	03/08/2024

Batch 219640 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030366-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	100.1	0.02496	0.22	03/08/2024

Batch 219640 **SampType:** MS Units **mg/L**
SampID: 24030461-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.025		**0.128**	0.1250	0.01330	91.6	90	110	03/08/2024

Batch 219640 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030461-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.025		**0.129**	0.1250	0.01330	92.5	0.1278	0.86	03/08/2024

SW-846 9036 (TOTAL)

Batch R343934 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	03/05/2024

Batch R343934 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**20**	20.00	0	98.2	90	110	03/05/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9036 (TOTAL)

Batch R343934 **SampType:** MS Units **mg/L**

SampID: 24021452-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**37**	20.00	19.81	87.9	85	115	03/05/2024

Batch R343934 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24021452-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**38**	20.00	19.81	89.5	37.39	0.85	03/05/2024

Batch R343934 **SampType:** MS Units **mg/L**

SampID: 24030097-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**88**	40.00	49.36	96.1	85	115	03/05/2024

Batch R343934 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030097-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**88**	40.00	49.36	97.4	87.81	0.58	03/05/2024

Batch R343934 **SampType:** MS Units **mg/L**

SampID: 24030108-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		1000		**4010**	2000	2086	96.4	90	110	03/05/2024

Batch R343934 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030108-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		1000		**4000**	2000	2086	95.5	4014	0.47	03/05/2024

Batch R344022 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	03/06/2024

Batch R344022 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	97.5	90	110	03/06/2024

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

SW-846 9036 (TOTAL)

Batch R344022 **SampType:** MS Units **mg/L**
SampID: 24021452-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		**320**	200.0	143.5	88.3	85	115	03/06/2024

Batch R344022 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24021452-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**323**	200.0	143.5	89.8	320.2	0.90	03/06/2024

Batch R344022 **SampType:** MS Units **mg/L**
SampID: 24021452-017AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**85**	40.00	48.02	93.0	85	115	03/06/2024

Batch R344022 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24021452-017AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**86**	40.00	48.02	94.8	85.20	0.84	03/06/2024

Batch R344022 **SampType:** MS Units **mg/L**
SampID: 24030067-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50		**193**	100.0	98.68	94.4	85	115	03/06/2024

Batch R344022 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24030067-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50		**197**	100.0	98.68	98.2	193.1	1.98	03/06/2024

Batch R344022 **SampType:** MS Units **mg/L**
SampID: 24030297-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		500		**2120**	1000	1213	90.7	90	110	03/06/2024

Batch R344022 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24030297-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		500	S	**2090**	1000	1213	87.5	2120	1.50	03/06/2024

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

SW-846 9036 (TOTAL)

Batch R344091 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	03/07/2024

Batch R344091 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	96.2	90	110	03/07/2024

Batch R344091 **SampType:** MS Units **mg/L**

SampID: 24021452-020AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10	S	**20**	20.00	8.560	58.7	85	115	03/07/2024

Batch R344091 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24021452-020AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	S	**20**	20.00	8.560	57.6	20.30	1.04	03/07/2024

Batch R344091 **SampType:** MS Units **mg/L**

SampID: 24030421-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50	S	**156**	100.0	75.26	80.9	90	110	03/07/2024

Batch R344091 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030421-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50		**166**	100.0	75.26	90.4	156.2	5.87	03/07/2024

Batch R344091 **SampType:** MS Units **mg/L**

SampID: 24030421-007AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50	S	**150**	100.0	62.72	87.6	90	110	03/07/2024

Batch R344091 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24030421-007AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50	S	**153**	100.0	62.72	89.9	150.3	1.51	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9036 (TOTAL)

Batch R344209 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	03/11/2024

Batch R344209 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	97.0	90	110	03/11/2024

Batch R344209 **SampType:** MS Units **mg/L**
SampID: 24030670-006BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50	S	**151**	100.0	66.53	84.9	90	110	03/11/2024

Batch R344209 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24030670-006BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50	S	**154**	100.0	66.53	87.9	151.5	1.95	03/11/2024

Batch R344209 **SampType:** MS Units **mg/L**
SampID: 24030674-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100	S	**352**	200.0	174.9	88.6	90	110	03/11/2024

Batch R344209 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24030674-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**355**	200.0	174.9	90.1	352.2	0.84	03/11/2024

SW-846 9214 (TOTAL)

Batch R343920 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0500	0	0	-100	100	03/11/2024

Client: Ramboll **Work Order:** 24021452
Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9214 (TOTAL)

Batch R343920 **SampType:** LCS **Units** mg/L
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.92**	1.000	0	91.8	90	110	03/05/2024

Batch R343920 **SampType:** MS **Units** mg/L
SampID: 24021452-022AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.44**	2.000	0.2940	107.4	75	125	03/05/2024

Batch R343920 **SampType:** MSD **Units** mg/L RPD Limit **15**
SampID: 24021452-022AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.28**	2.000	0.2940	99.5	2.441	6.65	03/05/2024

Batch R343920 **SampType:** MS **Units** mg/L
SampID: 24030152-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.86**	2.000	0.8110	102.4	75	125	03/05/2024

Batch R343920 **SampType:** MSD **Units** mg/L RPD Limit **15**
SampID: 24030152-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.98**	2.000	0.8110	108.4	2.858	4.18	03/05/2024

Batch R344013 **SampType:** MBLK **Units** mg/L
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0500	0	0	-100	100	03/06/2024

Batch R344013 **SampType:** LCS **Units** mg/L
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.97**	1.000	0	97.0	90	110	03/06/2024

Batch R344013 **SampType:** MS **Units** mg/L
SampID: 24021452-011AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.07**	2.000	0.1400	96.5	75	125	03/06/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9214 (TOTAL)

Batch R344013 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24021452-011AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.04**	2.000	0.1400	94.9	2.070	1.56	03/06/2024

Batch R344013 **SampType:** MS Units mg/L

SampID: 24021452-017AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.28**	2.000	0.3410	96.8	75	125	03/06/2024

Batch R344013 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24021452-017AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.36**	2.000	0.3410	100.8	2.276	3.50	03/06/2024

Batch R344013 **SampType:** MS Units mg/L

SampID: 24030297-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.36**	2.000	0.3470	100.8	75	125	03/06/2024

Batch R344013 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24030297-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.25**	2.000	0.3470	95.0	2.364	5.07	03/06/2024

Batch R344072 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0500	0	0	-100	100	03/07/2024

Batch R344072 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.94**	1.000	0	94.4	90	110	03/07/2024

Batch R344072 **SampType:** MS Units mg/L

SampID: 24021452-029AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.32**	2.000	0.3410	99.2	75	125	03/07/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9214 (TOTAL)

Batch R344072 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24021452-029AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.31**	2.000	0.3410	98.6	2.324	0.52	03/07/2024

Batch R344072 **SampType:** MS Units **mg/L**

SampID: 24021452-032AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**1.91**	2.000	0	95.5	75	125	03/07/2024

Batch R344072 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24021452-032AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**1.89**	2.000	0	94.5	1.910	1.05	03/07/2024

Batch R344072 **SampType:** MS Units **mg/L**

SampID: 24030433-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.29**	2.000	0.3070	99.2	75	125	03/07/2024

Batch R344072 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24030433-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.27**	2.000	0.3070	98.0	2.292	1.10	03/07/2024

SW-846 9251 (TOTAL)

Batch R343967 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	03/05/2024

Batch R343967 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	101.6	90	110	03/05/2024

Client: Ramboll **Work Order:** 24021452
Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9251 (TOTAL)

Batch R343967 **SampType:** MS Units mg/L
SampID: 24021452-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**49**	20.00	30.72	89.4	85	115	03/05/2024

Batch R343967 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 24021452-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**49**	20.00	30.72	89.7	48.61	0.08	03/05/2024

Batch R343967 **SampType:** MS Units mg/L
SampID: 24030097-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**37**	20.00	19.35	90.7	85	115	03/05/2024

Batch R343967 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 24030097-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**38**	20.00	19.35	91.4	37.48	0.37	03/05/2024

Batch R344025 **SampType:** MBLK Units mg/L
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	03/06/2024

Batch R344025 **SampType:** LCS Units mg/L
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	102.4	90	110	03/06/2024

Batch R344025 **SampType:** MS Units mg/L
SampID: 24021452-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**23**	20.00	2.940	98.0	85	115	03/06/2024

Batch R344025 **SampType:** MSD Units mg/L RPD Limit 15
SampID: 24021452-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**22**	20.00	2.940	96.9	22.54	0.98	03/06/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q1
Work Order: 24021452
Report Date: 20-Mar-24

SW-846 9251 (TOTAL)

Batch R344025 **SampType:** MS Units **mg/L**
SampID: 24021452-017AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**44**	20.00	26.60	89.1	85	115	03/06/2024

Batch R344025 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24021452-017AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**44**	20.00	26.60	89.4	44.41	0.14	03/06/2024

Batch R344025 **SampType:** MS Units **mg/L**
SampID: 24030297-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		200		**1710**	1000	786.6	92.5	85	115	03/06/2024

Batch R344025 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030297-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		200		**1680**	1000	786.6	89.2	1711	1.93	03/06/2024

Batch R344096 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	03/07/2024

Batch R344096 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	101.7	90	110	03/07/2024

Batch R344096 **SampType:** MS Units **mg/L**
SampID: 24021452-020AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4	E	**60**	20.00	42.24	91.2	85	115	03/07/2024

Batch R344096 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24021452-020AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4	E	**60**	20.00	42.24	89.2	60.47	0.65	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9251 (TOTAL)

Batch R344096 **SampType:** MS Units **mg/L**
SampID: 24030421-007AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		20		**223**	100.0	131.5	91.6	85	115	03/07/2024

Batch R344096 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030421-007AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		20		**220**	100.0	131.5	88.8	223.0	1.24	03/07/2024

Batch R344214 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	03/11/2024

Batch R344214 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	102.1	90	110	03/11/2024

Batch R344214 **SampType:** MS Units **mg/L**
SampID: 24030421-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		40		**291**	200.0	108.3	91.5	85	115	03/11/2024

Batch R344214 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030421-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		40		**287**	200.0	108.3	89.4	291.2	1.40	03/11/2024

Batch R344214 **SampType:** MS Units **mg/L**
SampID: 24030425-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		80		**597**	400.0	238.0	89.7	85	115	03/11/2024

Batch R344214 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24030425-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		80		**594**	400.0	238.0	89.0	596.9	0.50	03/11/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 9251 (TOTAL)

Batch R344214 **SampType:** MS Units mg/L

SampID: 24030657-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**39**	20.00	21.65	87.3	85	115	03/11/2024

Batch R344214 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24030657-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**39**	20.00	21.65	88.6	39.11	0.69	03/11/2024

Batch R344214 **SampType:** MS Units mg/L

SampID: 24030674-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		40		**480**	200.0	307.1	86.5	85	115	03/11/2024

Batch R344214 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24030674-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		40		**477**	200.0	307.1	85.2	480.1	0.55	03/11/2024

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219478 **SampType:** MBLK Units mg/L

SampID: MBLK-219478

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	03/05/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	03/05/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	03/05/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	03/05/2024

Batch 219478 **SampType:** LCS Units mg/L

SampID: LCS-219478

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.38**	2.500	0	95.2	85	115	03/05/2024
Magnesium		0.0500		**2.31**	2.500	0	92.4	85	115	03/05/2024
Potassium		0.100		**2.55**	2.500	0	102.1	85	115	03/05/2024
Sodium		0.0500		**2.51**	2.500	0	100.2	85	115	03/05/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219478 **SampType:** MS Units **mg/L**

SampID: 24021452-008BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**171**	2.500	171.9	-22.0	75	125	03/05/2024
Magnesium		0.0500	S	**71.7**	2.500	70.26	56.1	75	125	03/05/2024
Potassium		0.100		**4.85**	2.500	2.274	103.2	75	125	03/05/2024
Sodium		0.0500	S	**95.5**	2.500	93.91	63.6	75	125	03/05/2024

Batch 219478 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-008BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**177**	2.500	171.9	189.6	171.4	3.04	03/05/2024
Magnesium		0.0500	S	**73.9**	2.500	70.26	143.8	71.66	3.02	03/05/2024
Potassium		0.100		**4.86**	2.500	2.274	103.5	4.854	0.15	03/05/2024
Sodium		0.0500	S	**98.3**	2.500	93.91	177.2	95.50	2.93	03/05/2024

Batch 219540 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219540

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	03/06/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	03/06/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	03/06/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	03/06/2024

Batch 219540 **SampType:** LCS Units **mg/L**

SampID: LCS-219540

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.67**	2.500	0	106.7	85	115	03/06/2024
Magnesium		0.0500		**2.56**	2.500	0	102.6	85	115	03/06/2024
Potassium		0.100		**2.54**	2.500	0	101.4	85	115	03/06/2024
Sodium		0.0500		**2.60**	2.500	0	104.1	85	115	03/06/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q1

Work Order: 24021452
Report Date: 20-Mar-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219558 **SampType:** MBLK Units **mg/L**
SampID: MBLK-219558

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**< 0.0500**	0.0068	0	0	-100	100	03/07/2024
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	03/07/2024
Barium		0.0025		**< 0.0025**	0.0007	0	0	-100	100	03/07/2024
Beryllium		0.0005		**< 0.0005**	0.0002	0	0	-100	100	03/07/2024
Boron		0.0200		**< 0.0200**	0.0090	0	0	-100	100	03/07/2024
Cadmium		0.0020	J	**0.0005**	0.0005	0	100.0	-100	100	03/07/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	03/07/2024
Chromium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	03/07/2024
Cobalt		0.0050		**< 0.0050**	0.0020	0	0	-100	100	03/07/2024
Copper		0.0050		**< 0.0050**	0.0013	0	0	-100	100	03/07/2024
Iron		0.0400		**< 0.0400**	0.0200	0	0	-100	100	03/07/2024
Lead		0.0150		**< 0.0150**	0.0014	0	0	-100	100	03/07/2024
Lithium		0.0050		**< 0.0050**	0.0019	0	0	-100	100	03/07/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	03/07/2024
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	03/07/2024
Molybdenum		0.0100		**< 0.0100**	0.0037	0	0	-100	100	03/07/2024
Nickel		0.0050		**< 0.0050**	0.0016	0	0	-100	100	03/07/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	03/07/2024
Selenium		0.0400		**< 0.0400**	0.0170	0	0	-100	100	03/07/2024
Silver		0.0070		**< 0.0070**	0.0027	0	0	-100	100	03/07/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	03/07/2024
Thallium		0.0500		**< 0.0500**	0.0111	0	0	-100	100	03/07/2024
Vanadium		0.0100		**< 0.0100**	0.0009	0	0	-100	100	03/07/2024
Zinc		0.0100		**< 0.0100**	0.0050	0	0	-100	100	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219558 **SampType:** LCS Units **mg/L**

SampID: LCS-219558

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**0.506**	0.5000	0	101.2	85	115	03/07/2024
Arsenic		0.0250		**0.528**	0.5000	0	105.6	85	115	03/07/2024
Barium		0.0025		**1.96**	2.000	0	98.0	85	115	03/07/2024
Beryllium		0.0005		**0.0523**	0.0500	0	104.6	85	115	03/07/2024
Boron		0.0200		**0.497**	0.5000	0	99.4	85	115	03/07/2024
Cadmium		0.0020		**0.0486**	0.0500	0	97.2	85	115	03/07/2024
Calcium		0.100		**2.58**	2.500	0	103.1	85	115	03/07/2024
Chromium		0.0050		**0.198**	0.2000	0	98.8	85	115	03/07/2024
Cobalt		0.0050		**0.510**	0.5000	0	102.0	85	115	03/07/2024
Copper		0.0050		**0.266**	0.2500	0	106.3	85	115	03/07/2024
Iron		0.0400		**2.08**	2.000	0	104.0	85	115	03/07/2024
Lead		0.0150		**0.500**	0.5000	0	100.1	85	115	03/07/2024
Lithium		0.0050		**0.516**	0.5000	0	103.2	85	115	03/07/2024
Magnesium		0.0500		**2.42**	2.500	0	96.9	85	115	03/07/2024
Manganese		0.0070		**0.510**	0.5000	0	102.0	85	115	03/07/2024
Molybdenum		0.0100		**0.490**	0.5000	0	98.1	85	115	03/07/2024
Nickel		0.0050		**0.504**	0.5000	0	100.8	85	115	03/07/2024
Potassium		0.100		**2.59**	2.500	0	103.8	85	115	03/07/2024
Selenium		0.0400		**0.513**	0.5000	0	102.6	85	115	03/07/2024
Silver		0.0070		**0.0483**	0.0500	0	96.6	85	115	03/07/2024
Sodium		0.0500		**2.57**	2.500	0	102.9	85	115	03/07/2024
Thallium		0.0500		**0.252**	0.2500	0	100.8	85	115	03/07/2024
Vanadium		0.0100		**0.497**	0.5000	0	99.4	85	115	03/07/2024
Zinc		0.0100		**0.501**	0.5000	0	100.1	85	115	03/07/2024

Batch 219558 **SampType:** MS Units **mg/L**

SampID: 24021452-033BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**160**	2.500	156.2	158.8	75	125	03/07/2024
Magnesium		0.0500		**74.7**	2.500	71.68	121.9	75	125	03/07/2024
Potassium		0.100		**3.30**	2.500	0.5643	109.4	75	125	03/07/2024
Sodium		0.0500		**30.3**	2.500	27.72	104.4	75	125	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219558 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-033BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**157**	2.500	156.2	52.4	160.1	1.68	03/07/2024
Magnesium		0.0500		**73.7**	2.500	71.68	81.2	74.73	1.37	03/07/2024
Potassium		0.100		**3.26**	2.500	0.5643	107.8	3.300	1.23	03/07/2024
Sodium		0.0500		**29.8**	2.500	27.72	84.0	30.33	1.70	03/07/2024

Batch 219587 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219587

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	03/07/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	03/07/2024
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	03/07/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	03/07/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	03/07/2024

Batch 219587 **SampType:** LCS Units **mg/L**

SampID: LCS-219587

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.62**	2.500	0	104.8	85	115	03/07/2024
Magnesium		0.0500		**2.40**	2.500	0	95.8	85	115	03/07/2024
Manganese		0.0070		**0.523**	0.5000	0	104.6	85	115	03/07/2024
Potassium		0.100		**2.74**	2.500	0	109.6	85	115	03/07/2024
Sodium		0.0500		**2.64**	2.500	0	105.5	85	115	03/07/2024

Batch 219587 **SampType:** MS Units **mg/L**

SampID: 24021452-025BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**117**	2.500	112.7	159.2	75	125	03/07/2024
Magnesium		0.0500		**46.7**	2.500	43.80	115.5	75	125	03/07/2024
Potassium		0.100		**3.91**	2.500	1.202	108.2	75	125	03/07/2024
Sodium		0.0500	S	**38.0**	2.500	34.74	129.2	75	125	03/07/2024

Client: Ramboll

Client Project: KIN-24Q1

Work Order: 24021452

Report Date: 20-Mar-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 219587 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-025BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**116**	2.500	112.7	127.6	116.7	0.68	03/07/2024
Magnesium		0.0500		**46.3**	2.500	43.80	100.6	46.69	0.80	03/07/2024
Potassium		0.100		**3.87**	2.500	1.202	106.8	3.908	0.94	03/07/2024
Sodium		0.0500		**37.3**	2.500	34.74	104.0	37.97	1.67	03/07/2024

Batch 219587 **SampType:** MS Units **mg/L**

SampID: 24030380-003CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Manganese		0.0070		**0.726**	0.5000	0.2217	100.8	75	125	03/07/2024

Batch 219587 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24030380-003CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Manganese		0.0070		**0.728**	0.5000	0.2217	101.3	0.7255	0.37	03/07/2024

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219478 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219478

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/06/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/05/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	03/06/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	03/05/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	03/06/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/05/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	03/05/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/05/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	03/05/2024
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	03/06/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/05/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	03/05/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	03/05/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	03/06/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/05/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/05/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/06/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	03/05/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	03/06/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	03/06/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219478 **SampType:** LCS Units **mg/L**

SampID: LCS-219478

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.552**	0.5000	0	110.5	80	120	03/06/2024
Arsenic		0.0010		**0.495**	0.5000	0	99.0	80	120	03/05/2024
Barium		0.0010		**1.99**	2.000	0	99.6	80	120	03/06/2024
Beryllium		0.0010		**0.0494**	0.0500	0	98.8	80	120	03/05/2024
Boron		0.0250		**0.486**	0.5000	0	97.3	80	120	03/06/2024
Cadmium		0.0010		**0.0471**	0.0500	0	94.2	80	120	03/05/2024
Chromium		0.0015		**0.180**	0.2000	0	90.2	80	120	03/05/2024
Cobalt		0.0010		**0.465**	0.5000	0	93.0	80	120	03/05/2024
Copper		0.0010		**0.236**	0.2500	0	94.6	80	120	03/05/2024
Iron		0.0250		**2.08**	2.000	0	104.1	80	120	03/06/2024
Lead		0.0010		**0.504**	0.5000	0	100.7	80	120	03/05/2024
Lithium	*	0.0030		**0.500**	0.5000	0	100.0	80	120	03/06/2024
Manganese		0.0020		**0.459**	0.5000	0	91.8	80	120	03/05/2024
Molybdenum		0.0015		**0.512**	0.5000	0	102.4	80	120	03/06/2024
Nickel		0.0010		**0.460**	0.5000	0	92.0	80	120	03/05/2024
Selenium		0.0010		**0.477**	0.5000	0	95.4	80	120	03/05/2024
Silver		0.0010		**0.0527**	0.0500	0	105.4	80	120	03/06/2024
Thallium		0.0020		**0.201**	0.2500	0	80.4	80	120	03/05/2024
Vanadium		0.0050		**0.497**	0.5000	0	99.4	80	120	03/06/2024
Zinc		0.0150		**0.509**	0.5000	0	101.8	80	120	03/06/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219478 **SampType:** MS Units **mg/L**

SampID: 24021452-008BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.581**	0.5000	0	116.3	75	125	03/06/2024
Arsenic		0.0010		**0.519**	0.5000	0.006877	102.4	75	125	03/06/2024
Barium		0.0010		**2.09**	2.000	0.03896	102.7	75	125	03/06/2024
Beryllium		0.0010		**0.0519**	0.0500	0	103.8	75	125	03/06/2024
Boron		0.0250		**4.97**	0.5000	4.414	111.5	75	125	03/06/2024
Cadmium		0.0010		**0.0524**	0.0500	0	104.7	75	125	03/06/2024
Chromium		0.0015		**0.206**	0.2000	0.002549	101.9	75	125	03/06/2024
Cobalt		0.0010		**0.475**	0.5000	0.0007634	94.9	75	125	03/06/2024
Lead		0.0010		**0.513**	0.5000	0	102.6	75	125	03/06/2024
Lithium	*	0.0030		**0.502**	0.5000	0	100.4	75	125	03/06/2024
Molybdenum		0.0015		**0.517**	0.5000	0.001366	103.1	75	125	03/06/2024
Selenium		0.0010		**0.496**	0.5000	0	99.2	75	125	03/06/2024
Thallium		0.0020		**0.249**	0.2500	0	99.4	75	125	03/07/2024

Batch 219478 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-008BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.536**	0.5000	0	107.2	0.5813	8.08	03/06/2024
Arsenic		0.0010		**0.500**	0.5000	0.006877	98.7	0.5188	3.63	03/06/2024
Barium		0.0010		**1.96**	2.000	0.03896	95.9	2.093	6.67	03/06/2024
Beryllium		0.0010		**0.0486**	0.0500	0	97.3	0.05188	6.44	03/06/2024
Boron		0.0250		**4.84**	0.5000	4.414	85.2	4.971	2.68	03/06/2024
Cadmium		0.0010		**0.0471**	0.0500	0	94.3	0.05237	10.54	03/06/2024
Chromium		0.0015		**0.189**	0.2000	0.002549	93.4	0.2064	8.59	03/06/2024
Cobalt		0.0010		**0.460**	0.5000	0.0007634	91.9	0.4752	3.23	03/06/2024
Lead		0.0010		**0.469**	0.5000	0	93.9	0.5132	8.92	03/06/2024
Lithium	*	0.0030		**0.473**	0.5000	0	94.6	0.5019	5.92	03/06/2024
Molybdenum		0.0015		**0.494**	0.5000	0.001366	98.6	0.5169	4.48	03/06/2024
Selenium		0.0010		**0.478**	0.5000	0	95.5	0.4962	3.81	03/06/2024
Thallium		0.0020		**0.239**	0.2500	0	95.8	0.2485	3.74	03/07/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q1
Work Order: 24021452
Report Date: 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219540 **SampType:** MBLK Units **mg/L**
SampID: MBLK-219540

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/06/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/06/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	03/06/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	03/06/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	03/06/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/06/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	03/07/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/06/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	03/07/2024
Iron	*	0.0250		**< 0.0250**	0.0115	0	0	-100	100	03/06/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/07/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	03/06/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	03/06/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	03/06/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/07/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/06/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/06/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	03/07/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	03/06/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	03/07/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q1

Work Order: 24021452

Report Date: 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219540 **SampType:** LCS Units **mg/L**

SampID: LCS-219540

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.546**	0.5000	0	109.3	85	115	03/06/2024
Arsenic		0.0010		**0.489**	0.5000	0	97.8	85	115	03/06/2024
Barium		0.0010		**1.97**	2.000	0	98.7	85	115	03/06/2024
Beryllium		0.0010		**0.0493**	0.0500	0	98.6	85	115	03/06/2024
Boron		0.0250		**0.482**	0.5000	0	96.4	80	120	03/07/2024
Cadmium		0.0010		**0.0498**	0.0500	0	99.7	85	115	03/06/2024
Chromium		0.0015		**0.201**	0.2000	0	100.7	80	120	03/07/2024
Cobalt		0.0010		**0.490**	0.5000	0	98.1	85	115	03/06/2024
Copper		0.0010		**0.255**	0.2500	0	102.0	80	120	03/07/2024
Iron		0.0250		**1.98**	2.000	0	98.8	80	120	03/07/2024
Lead		0.0010		**0.507**	0.5000	0	101.4	80	120	03/07/2024
Lithium	*	0.0030		**0.493**	0.5000	0	98.7	80	120	03/07/2024
Manganese		0.0020		**0.496**	0.5000	0	99.1	85	115	03/06/2024
Molybdenum		0.0015		**0.458**	0.5000	0	91.6	80	120	03/07/2024
Nickel		0.0010		**0.499**	0.5000	0	99.8	80	120	03/07/2024
Selenium		0.0010		**0.480**	0.5000	0	96.0	85	115	03/06/2024
Silver		0.0010		**0.0522**	0.0500	0	104.3	85	115	03/06/2024
Thallium		0.0020		**0.236**	0.2500	0	94.5	80	120	03/07/2024
Vanadium		0.0050		**0.485**	0.5000	0	97.0	85	115	03/06/2024
Zinc		0.0150		**0.538**	0.5000	0	107.6	80	120	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219540 **SampType:** MS Units **mg/L**

SampID: 24021452-012BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.570**	0.5000	0	114.0	75	125	03/07/2024
Arsenic		0.0010		**0.508**	0.5000	0.0007511	101.5	75	125	03/07/2024
Barium		0.0010		**2.06**	2.000	0.03619	101.2	75	125	03/07/2024
Beryllium		0.0010		**0.0535**	0.0500	0	107.0	75	125	03/07/2024
Boron		0.0250		**1.56**	0.5000	1.028	107.2	75	125	03/07/2024
Cadmium		0.0010		**0.0511**	0.0500	0	102.3	75	125	03/07/2024
Chromium		0.0015		**0.196**	0.2000	0.003414	96.3	75	125	03/07/2024
Cobalt		0.0010		**0.481**	0.5000	0.0007586	96.1	75	125	03/07/2024
Copper		0.0010		**0.244**	0.2500	0.003011	96.3	75	125	03/07/2024
Iron		0.0250		**3.64**	2.000	1.647	99.5	75	125	03/07/2024
Lead		0.0010		**0.493**	0.5000	0.001553	98.4	75	125	03/07/2024
Manganese		0.0020		**0.523**	0.5000	0.02617	99.4	75	125	03/07/2024
Nickel		0.0010		**0.484**	0.5000	0.002237	96.3	75	125	03/07/2024
Selenium		0.0010		**0.526**	0.5000	0.02564	100.1	75	125	03/07/2024
Silver		0.0010		**0.0515**	0.0500	0	102.9	75	125	03/07/2024
Thallium		0.0020		**0.247**	0.2500	0	98.7	75	125	03/07/2024
Vanadium		0.0050		**0.502**	0.5000	0.004019	99.5	75	125	03/07/2024
Zinc		0.0150		**0.533**	0.5000	0.006907	105.3	75	125	03/07/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219540 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24021452-012BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.558**	0.5000	0	111.5	0.5700	2.21	03/07/2024
Arsenic		0.0010		**0.508**	0.5000	0.0007511	101.4	0.5080	0.10	03/07/2024
Barium		0.0010		**2.01**	2.000	0.03619	98.9	2.061	2.25	03/07/2024
Beryllium		0.0010		**0.0527**	0.0500	0	105.3	0.05349	1.56	03/07/2024
Boron		0.0250		**1.55**	0.5000	1.028	104.9	1.564	0.71	03/07/2024
Cadmium		0.0010		**0.0507**	0.0500	0	101.4	0.05114	0.82	03/07/2024
Chromium		0.0015		**0.194**	0.2000	0.003414	95.1	0.1960	1.18	03/07/2024
Cobalt		0.0010		**0.476**	0.5000	0.0007586	95.1	0.4815	1.04	03/07/2024
Copper		0.0010		**0.238**	0.2500	0.003011	93.9	0.2438	2.56	03/07/2024
Iron		0.0250		**3.53**	2.000	1.647	94.0	3.638	3.12	03/07/2024
Lead		0.0010		**0.480**	0.5000	0.001553	95.7	0.4935	2.74	03/07/2024
Manganese		0.0020		**0.519**	0.5000	0.02617	98.6	0.5234	0.78	03/07/2024
Nickel		0.0010		**0.472**	0.5000	0.002237	93.9	0.4839	2.50	03/07/2024
Selenium		0.0010		**0.524**	0.5000	0.02564	99.7	0.5261	0.35	03/07/2024
Silver		0.0010		**0.0532**	0.0500	0	106.4	0.05147	3.27	03/07/2024
Thallium		0.0020		**0.246**	0.2500	0	98.4	0.2468	0.32	03/07/2024
Vanadium		0.0050		**0.495**	0.5000	0.004019	98.1	0.5017	1.42	03/07/2024
Zinc		0.0150		**0.514**	0.5000	0.006907	101.5	0.5332	3.58	03/07/2024

Batch 219540 **SampType:** MS Units mg/L

SampID: 24030248-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Selenium		0.0010		**0.487**	0.5000	0	97.3	70	130	03/07/2024

Batch 219540 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24030248-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Selenium		0.0010		**0.513**	0.5000	0	102.7	0.4867	5.34	03/07/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219558 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219558

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/09/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/09/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	03/09/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	03/09/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	03/09/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/09/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	03/09/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	03/11/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/09/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	03/09/2024
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	03/09/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/09/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	03/09/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	03/09/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	03/11/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/09/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/09/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/09/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	03/09/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	03/11/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	03/09/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219558 **SampType:** LCS Units **mg/L**

SampID: LCS-219558

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.514**	0.5000	0	102.7	80	120	03/11/2024
Arsenic		0.0010		**0.511**	0.5000	0	102.1	80	120	03/09/2024
Barium		0.0010		**2.23**	2.000	0	111.7	80	120	03/11/2024
Beryllium		0.0010		**0.0491**	0.0500	0	98.2	80	120	03/09/2024
Boron		0.0250		**0.488**	0.5000	0	97.6	80	120	03/09/2024
Cadmium		0.0010		**0.0538**	0.0500	0	107.6	80	120	03/09/2024
Chromium		0.0015		**0.200**	0.2000	0	99.8	80	120	03/11/2024
Cobalt		0.0010		**0.475**	0.5000	0	95.1	80	120	03/09/2024
Copper		0.0010		**0.253**	0.2500	0	101.3	80	120	03/09/2024
Iron		0.0250		**1.97**	2.000	0	98.5	80	120	03/11/2024
Lead		0.0010		**0.468**	0.5000	0	93.6	80	120	03/09/2024
Lithium	*	0.0030		**0.486**	0.5000	0	97.1	80	120	03/09/2024
Manganese		0.0020		**0.486**	0.5000	0	97.3	80	120	03/09/2024
Molybdenum		0.0015		**0.454**	0.5000	0	90.8	80	120	03/11/2024
Nickel		0.0010		**0.487**	0.5000	0	97.4	80	120	03/09/2024
Selenium		0.0010		**0.492**	0.5000	0	98.3	80	120	03/09/2024
Silver		0.0010		**0.0526**	0.0500	0	105.1	80	120	03/09/2024
Thallium		0.0020		**0.203**	0.2500	0	81.1	80	120	03/09/2024
Vanadium		0.0050		**0.501**	0.5000	0	100.2	80	120	03/11/2024
Zinc		0.0150		**0.526**	0.5000	0	105.2	80	120	03/09/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q1

Work Order: 24021452

Report Date: 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219558 **SampType:** MS Units mg/L

SampID: 24021452-033BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.508**	0.5000	0	101.5	75	125	03/11/2024
Arsenic		0.0010		**0.510**	0.5000	0.0005554	101.9	75	125	03/11/2024
Barium		0.0010		**2.23**	2.000	0.02078	110.7	75	125	03/11/2024
Beryllium		0.0010		**0.0492**	0.0500	0	98.5	75	125	03/11/2024
Boron		0.0250		**1.40**	0.5000	0.9584	88.4	75	125	03/11/2024
Cadmium		0.0010		**0.0482**	0.0500	0	96.5	75	125	03/11/2024
Chromium		0.0015		**0.193**	0.2000	0.001001	95.9	75	125	03/11/2024
Cobalt		0.0010		**0.472**	0.5000	0.001230	94.1	75	125	03/11/2024
Copper		0.0010		**0.232**	0.2500	0.0009294	92.6	75	125	03/11/2024
Iron		0.0250		**2.03**	2.000	0.1366	94.7	75	125	03/11/2024
Lead		0.0010		**0.500**	0.5000	0	100.0	75	125	03/11/2024
Lithium	*	0.0030		**0.575**	0.5000	0.001876	114.5	75	125	03/09/2024
Manganese		0.0080	S	**5.63**	0.5000	5.503	24.8	75	125	03/12/2024
Molybdenum		0.0015		**0.463**	0.5000	0.0009224	92.4	75	125	03/11/2024
Nickel		0.0010		**0.466**	0.5000	0.002307	92.8	75	125	03/11/2024
Selenium		0.0010		**0.577**	0.5000	0	115.3	75	125	03/09/2024
Silver		0.0010		**0.0483**	0.0500	0	96.7	75	125	03/11/2024
Thallium		0.0020		**0.245**	0.2500	0	98.1	75	125	03/09/2024
Vanadium		0.0050		**0.492**	0.5000	0	98.3	75	125	03/11/2024
Zinc		0.0150		**0.545**	0.5000	0	109.1	75	125	03/12/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219558 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-033BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.505**	0.5000	0	101.0	0.5077	0.52	03/11/2024
Arsenic		0.0010		**0.530**	0.5000	0.0005554	105.9	0.5101	3.82	03/11/2024
Barium		0.0010		**2.20**	2.000	0.02078	109.2	2.234	1.34	03/11/2024
Beryllium		0.0010		**0.0502**	0.0500	0	100.4	0.04925	1.96	03/11/2024
Boron		0.0250		**1.44**	0.5000	0.9584	95.7	1.400	2.56	03/11/2024
Cadmium		0.0010		**0.0474**	0.0500	0	94.7	0.04823	1.79	03/11/2024
Chromium		0.0015		**0.195**	0.2000	0.001001	96.8	0.1928	0.94	03/11/2024
Cobalt		0.0010		**0.478**	0.5000	0.001230	95.4	0.4716	1.42	03/11/2024
Copper		0.0010		**0.243**	0.2500	0.0009294	96.9	0.2323	4.58	03/11/2024
Iron		0.0250		**2.08**	2.000	0.1366	97.0	2.031	2.19	03/11/2024
Lead		0.0010		**0.504**	0.5000	0	100.9	0.4999	0.87	03/11/2024
Lithium	*	0.0030		**0.471**	0.5000	0.001876	93.9	0.5746	19.72	03/09/2024
Manganese		0.0080	S	**5.54**	0.5000	5.503	6.8	5.627	1.61	03/12/2024
Molybdenum		0.0015		**0.474**	0.5000	0.0009224	94.6	0.4630	2.34	03/11/2024
Nickel		0.0010		**0.480**	0.5000	0.002307	95.5	0.4662	2.87	03/11/2024
Selenium		0.0010		**0.476**	0.5000	0	95.3	0.5766	19.02	03/09/2024
Silver		0.0010		**0.0486**	0.0500	0	97.3	0.04835	0.58	03/11/2024
Thallium		0.0020		**0.205**	0.2500	0	82.0	0.2453	17.85	03/09/2024
Vanadium		0.0050		**0.497**	0.5000	0	99.4	0.4916	1.06	03/11/2024
Zinc		0.0150		**0.538**	0.5000	0	107.6	0.5455	1.34	03/12/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch **219587** **SampType:** **MBLK** Units **mg/L**

SampID: MBLK-219587

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/09/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/07/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	03/07/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	03/07/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	03/07/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/07/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	03/07/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/07/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	03/07/2024
Iron	*	0.0250		**< 0.0250**	0.0115	0	0	-100	100	03/07/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/07/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	03/07/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	03/07/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	03/07/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/07/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/07/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/07/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	03/07/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	03/07/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	03/07/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q1

Work Order: 24021452

Report Date: 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219587 **SampType:** LCS Units **mg/L**

SampID: LCS-219587

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.524**	0.5000	0	104.9	80	120	03/11/2024
Arsenic		0.0010		**0.554**	0.5000	0	110.8	85	115	03/07/2024
Barium		0.0010		**2.32**	2.000	0	115.9	80	120	03/11/2024
Beryllium		0.0010		**0.0548**	0.0500	0	109.6	85	115	03/07/2024
Boron	*	0.0250		**0.538**	0.5000	0	107.6	85	115	03/07/2024
Cadmium		0.0010	S	**0.0582**	0.0500	0	116.4	85	115	03/07/2024
Chromium		0.0015		**0.210**	0.2000	0	104.8	85	115	03/07/2024
Cobalt		0.0010		**0.516**	0.5000	0	103.1	85	115	03/07/2024
Copper		0.0010		**0.272**	0.2500	0	108.6	85	115	03/07/2024
Iron	*	0.0250		**2.10**	2.000	0	105.1	85	115	03/07/2024
Lead		0.0010	E	**0.513**	0.5000	0	102.6	85	115	03/07/2024
Lithium	*	0.0030		**0.538**	0.5000	0	107.5	85	115	03/07/2024
Manganese		0.0020		**0.524**	0.5000	0	104.8	85	115	03/07/2024
Molybdenum		0.0015		**0.481**	0.5000	0	96.3	85	115	03/07/2024
Nickel		0.0010		**0.530**	0.5000	0	106.0	85	115	03/07/2024
Selenium		0.0010		**0.526**	0.5000	0	105.2	85	115	03/07/2024
Silver		0.0010		**0.0513**	0.0500	0	102.6	85	115	03/07/2024
Thallium		0.0020		**0.252**	0.2500	0	100.6	85	115	03/07/2024
Vanadium		0.0050		**0.518**	0.5000	0	103.5	85	115	03/07/2024
Zinc		0.0150	S	**0.575**	0.5000	0	115.1	85	115	03/07/2024

Batch 219587 **SampType:** MS Units **mg/L**

SampID: 24021452-025BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.531**	0.5000	0.002681	105.7	75	125	03/11/2024
Arsenic		0.0010		**0.542**	0.5000	0.001773	108.1	75	125	03/07/2024
Barium		0.0010		**2.69**	2.000	0.2474	121.9	75	125	03/11/2024
Beryllium		0.0010		**0.0517**	0.0500	0	103.4	75	125	03/07/2024
Cadmium		0.0010		**0.0568**	0.0500	0	113.6	75	125	03/07/2024
Chromium		0.0015		**0.195**	0.2000	0.001486	96.7	75	125	03/07/2024
Cobalt		0.0010		**0.483**	0.5000	0.0002321	96.6	75	125	03/07/2024
Lead		0.0010		**0.498**	0.5000	0.0006276	99.5	75	125	03/07/2024
Lithium	*	0.0030		**0.502**	0.5000	0.009853	98.4	75	125	03/07/2024
Molybdenum		0.0015		**0.469**	0.5000	0.001738	93.5	75	125	03/07/2024
Selenium		0.0010		**0.501**	0.5000	0	100.1	75	125	03/07/2024
Thallium		0.0020		**0.251**	0.2500	0	100.4	75	125	03/07/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219587 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24021452-025BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.526**	0.5000	0.002681	104.6	0.5312	1.01	03/11/2024
Arsenic		0.0010		**0.534**	0.5000	0.001773	106.4	0.5421	1.56	03/07/2024
Barium		0.0010		**2.67**	2.000	0.2474	121.2	2.685	0.50	03/11/2024
Beryllium		0.0010		**0.0525**	0.0500	0	105.0	0.05172	1.48	03/07/2024
Cadmium		0.0010		**0.0581**	0.0500	0	116.2	0.05680	2.31	03/07/2024
Chromium		0.0015		**0.198**	0.2000	0.001486	98.0	0.1948	1.37	03/07/2024
Cobalt		0.0010		**0.494**	0.5000	0.0002321	98.7	0.4833	2.09	03/07/2024
Lead		0.0010		**0.490**	0.5000	0.0006276	97.9	0.4984	1.69	03/07/2024
Lithium	*	0.0030		**0.513**	0.5000	0.009853	100.6	0.5017	2.21	03/07/2024
Molybdenum		0.0015		**0.473**	0.5000	0.001738	94.2	0.4693	0.76	03/07/2024
Selenium		0.0010		**0.493**	0.5000	0	98.6	0.5005	1.52	03/07/2024
Thallium		0.0020		**0.246**	0.2500	0	98.3	0.2510	2.14	03/07/2024

Batch 219755 **SampType:** MBLK Units **mg/L**
SampID: MBLK-219755

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/13/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	03/12/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	03/13/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	03/12/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	03/12/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/12/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	03/12/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	03/12/2024

Batch 219755 **SampType:** LCS Units **mg/L**
SampID: LCS-219755

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.533**	0.5000	0	106.5	85	115	03/13/2024
Arsenic		0.0010		**0.521**	0.5000	0	104.2	85	115	03/12/2024
Boron	*	0.0250		**0.484**	0.5000	0	96.9	85	115	03/13/2024
Cadmium		0.0010		**0.0489**	0.0500	0	97.7	85	115	03/13/2024
Copper		0.0010		**0.264**	0.2500	0	105.5	85	115	03/12/2024
Lead		0.0010	E	**0.527**	0.5000	0	105.4	85	115	03/13/2024
Selenium		0.0010		**0.499**	0.5000	0	99.7	85	115	03/12/2024
Thallium		0.0020		**0.265**	0.2500	0	105.8	85	115	03/12/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 219755 **SampType:** MS Units **mg/L**

SampID: 24021452-025BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron		0.0250		**2.07**	0.5000	1.482	116.9	75	125	03/13/2024

Batch 219755 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24021452-025BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron		0.0250		**2.02**	0.5000	1.482	107.7	2.067	2.26	03/13/2024

Batch 219755 **SampType:** MS Units **mg/L**

SampID: 24030297-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Selenium		0.0010		**0.827**	1.000	0.01935	80.7	70	130	03/13/2024

Batch 219755 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24030297-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Selenium		0.0010		**0.821**	1.000	0.01935	80.1	0.8266	0.71	03/13/2024

Batch 219755 **SampType:** MS Units **mg/L**

SampID: 24030674-003EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.525**	0.5000	0.004209	104.1	70	130	03/13/2024
Arsenic		0.0010		**0.545**	0.5000	0.01296	106.3	70	130	03/12/2024
Cadmium		0.0010		**0.0513**	0.0500	0.003552	95.4	70	130	03/13/2024
Lead		0.0010	E	**0.662**	0.5000	0.1816	96.2	70	130	03/13/2024
Selenium		0.0010		**0.463**	0.5000	0.001096	92.4	70	130	03/13/2024
Thallium		0.0020		**0.219**	0.2500	0	87.8	70	130	03/12/2024

Batch 219755 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24030674-003EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.508**	0.5000	0.004209	100.7	0.5245	3.22	03/13/2024
Arsenic		0.0010		**0.525**	0.5000	0.01296	102.4	0.5446	3.64	03/12/2024
Cadmium		0.0010		**0.0501**	0.0500	0.003552	93.2	0.05126	2.23	03/13/2024
Lead		0.0010	E	**0.659**	0.5000	0.1816	95.5	0.6624	0.52	03/13/2024
Selenium		0.0010		**0.443**	0.5000	0.001096	88.4	0.4629	4.42	03/13/2024
Thallium		0.0020		**0.234**	0.2500	0	93.5	0.2194	6.30	03/12/2024

Client: Ramboll | **Work Order:** 24021452

Client Project: KIN-24Q1 | **Report Date:** 20-Mar-24

SW-846 7470A (TOTAL)

Batch 219518 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219518

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	03/06/2024

Batch 219518 **SampType:** LCS Units **mg/L**

SampID: LCS-219518

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00429**	0.0050	0	85.8	85	115	03/06/2024

Batch 219518 **SampType:** MS Units **mg/L**

SampID: 24021452-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00470**	0.0050	0	94.1	75	125	03/06/2024

Batch 219518 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24021452-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00479**	0.0050	0	95.9	0.004705	1.89	03/06/2024

Batch 219518 **SampType:** MS Units **mg/L**

SampID: 24021452-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00481**	0.0050	0	96.2	75	125	03/06/2024

Batch 219518 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24021452-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00463**	0.0050	0	92.7	0.004809	3.69	03/06/2024

Batch 219560 **SampType:** MBLK Units **mg/L**

SampID: MBLK-219560

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	03/06/2024

Batch 219560 **SampType:** LCS Units **mg/L**

SampID: LCS-219560

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00474**	0.0050	0	94.9	85	115	03/06/2024

SW-846 7470A (TOTAL)

Batch 219560 **SampType:** MS **Units** mg/L
SampID: 24021452-007BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00454**	0.0050	0	90.7	75	125	03/06/2024

Batch 219560 **SampType:** MSD **Units** mg/L **RPD Limit** 15
SampID: 24021452-007BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00416**	0.0050	0	83.3	0.004536	8.54	03/06/2024

Batch 219560 **SampType:** MS **Units** mg/L
SampID: 24021452-027BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00542**	0.0050	0	108.5	75	125	03/07/2024

Batch 219560 **SampType:** MSD **Units** mg/L **RPD Limit** 15
SampID: 24021452-027BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00555**	0.0050	0	110.9	0.005425	2.23	03/07/2024

Batch 219610 **SampType:** MBLK **Units** mg/L
SampID: MBLK-219610

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	03/07/2024

Batch 219610 **SampType:** LCS **Units** mg/L
SampID: LCS-219610

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00508**	0.0050	0	101.5	85	115	03/07/2024

Batch 219610 **SampType:** MS **Units** mg/L
SampID: 24021452-021BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00418**	0.0050	0	83.6	75	125	03/07/2024

Batch 219610 **SampType:** MSD **Units** mg/L **RPD Limit** 15
SampID: 24021452-021BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00387**	0.0050	0	77.4	0.004182	7.68	03/07/2024

Client: Ramboll **Work Order:** 24021452

Client Project: KIN-24Q1 **Report Date:** 20-Mar-24

SW-846 7470A (TOTAL)

Batch 219610 **SampType:** MS Units **mg/L**

SampID: 24021452-028BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00492**	0.0050	0	98.3	75	125	03/07/2024

Batch 219610 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24021452-028BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00486**	0.0050	0	97.1	0.004916	1.21	03/07/2024

Receiving Check List

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q1
Work Order: 24021452
Report Date: 20-Mar-24

Carrier: Justin Colp
Received By: NR

Completed by: Nick Reed
On: 04-Mar-24

Reviewed by: Ellie Hopkins
On: 06-Mar-24

Pages to follow: Chain of custody 7 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 12.1
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.				
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

Samples were received on 3/4/24 at 1645 on ice [12.1C - LTG#7]. Additional Nitric Acid (96331) preservative was needed in MW-04, MW-05, MW-07S, MW-20S, and MW-31S upon arrival at the laboratory. Additional Soduim Hydroxide (95443) was needed in MW-05 upon arrival at the laboratory. pH strip 90719/89660. - nickreed - 3/4/2024 5:31:10 PM

Samples were received on 3/5/24 at 1535 on ice [8.5C - LTG#7]. - AMD 3/5/24

Additional Nitric Acid (96331) was needed in MW-09, MW-08, MW11, MW-12, MW-20, MW-23, MW-27, MW-08DUP, and XPW02 upon arrival at the laboratory. Additional Sodium Hydroxide (95443) was needed in MW-08, MW-12, and MW-08DUP upon arrival at the laboratory. - ES/pschultz - 3/5/2024 4:37:48 PM

Samples were received on 3/6/24 at 1505 on ice [8.5C - LTG5]. Additional Nitric Acid (96331) was needed in MW-31, MW-32 and PZ4!Cupon arrival at the laboratory. pH strip #90719. - amberdilallo - 3/6/2024 3:28:57 PM

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A Required Client Information:
- Company: Vistra Corp-Kincaid
- Address: 199 IL 104, Kincaid, IL 62540
- Email To: Brian.Voelker@VistraCorp.com, Tim.Arnold@vistracorp.com
- Phone: (217) 753-8911 Fax:
- Requested Due Date/TAT: 10 day

Section B Required Project Information:
- Report To: Brian Voelker, Sam Davies
- Copy To: Tim Arnold
- Purchase Order No.:
- Project Name:
- Project Number:

Section C Invoice Information:
- Attention: Brian Voelker, Tim Arnold
- Company Name: Vistra Corp
- Address: see Section A
- Quote Reference:
- Project Manager: Liz Hurley
- Profile #:

REGULATORY AGENCY: NPDES, GROUND WATER, DRINKING WATER, UST, RCRA, OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes (MATRIX / CODE): DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G	3-4-24	1426		3	1		1		1					X	X	X			24021452-001
2	MW-02	WT	G	3-4-24	1230		3	1		1		1					X	X	X			24021452-002
3	MW-03	WT	G	3-4-24	1300		3	1		1		1					X	X	X			24021452-003
4	MW-04 *	WT	G	3-4-24	1323		3	1		1		1					X	X	X			24021452-004
5	MW-05 *	WT	G	3-4-24	1446		3	1		1		1					X	X	X			24021452-005
6	MW-06	WT	G				3	1		1		1					X	X	X			24021452-006
7	MW-07	WT	G				3	1		1		1					X	X	X			24021452-007
8	MW-07S *	WT	G	3-4-24	1248		2	1		1							X	X				24021452-008
9	MW-08	WT	G				3	1		1		1					X	X	X			24021452-009
10	MW-08S	WT	G	3-4-24	DRY		2	1		1							X	X				24021452-010
11	MW-09	WT	G				3	1		1		1							X			24021452-011
12	MW-10	WT	G				3	1		1		1							X			24021452-012
13	MW-11	WT	G				3	1		1		1					X	X	X			24021452-013
14	MW-12	WT	G				3	1		1		1					X	X	X			24021452-014
15	MW-20	WT	G				2	1		1							X	X				24021452-015
16	MW-20S *	WT	G	3-4-24	1109		2	1		1							X	X				24021452-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
KIN-24Q1 Rev 0	J. Cole	3-4	1645	Nick Reed	3/4/24	1645	12.1 LT67	(Y)	N	

SAMPLER NAME AND SIGNATURE
- PRINT Name of SAMPLER: Justin Cole
- SIGNATURE of SAMPLER: Justin Cole
- DATE Signed (MM/DD/YY): 3-4-24

90719/89660

Added HNO_3 + NaOH to samples NR 3/4

Confidential

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104, Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com, Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911
Fax:	
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER | UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-23	WT	G				2	1		1							X	X				24021452-017
2	MW-27	WT	G				2	1		1							X	X				24021452-018
3	MW-28	WT	G				2	1		1							X	X				24021452-019
4	MW-30	WT	G				2	1		1							X	X				24021452-020
5	MW-31	WT	G				2	1		1							X	X				24021452-021
6	MW-31S *	WT	G	3-4-24	1155		2	1		1							X	X				24021452-022
7	MW-32	WT	G				2	1		1							X	X				24021452-023
8	PZ4!A	WT	G				2	1		1										X		24021452-024
9	PZ4!C	WT	G				2	1		1							X	X				24021452-025
10	XPW01_pore	WT	G				2	1		1							X	X				24021452-026
11	XPW02_pore	WT	G				2	1		1							X	X				24021452-027
12	XPW03_pore	WT	G				2	1		1							X	X				24021452-028
13	XPW04_pore	WT	G				2	1		1							X	X				24021452-029
14	XSG-01	WT	G				0										X	X	X			24021452-030
15	YSG-02	WT	G				0										X	X	X			24021452-031
16	Field Blank	WT	G				3	1		1		1					X	X	X	X		24021452-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-24Q1 Rev 0	J. Colp	3-4	1645	Trish Reed	3/4/24	1645	Y N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: Justin Colp

DATE Signed (MM/DD/YY): 3-4-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes — MATRIX / CODE: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G				3	1		1		1					X	X	X			24021452-001
2	MW-02	WT	G				3	1		1		1					X	X	X			24021452-002
3	MW-03	WT	G				3	1		1		1					X	X	X			24021452-003
4	MW-04	WT	G				3	1		1		1					X	X	X			24021452-004
5	MW-05	WT	G				3	1		1		1					X	X	X			24021452-005
6	MW-06	WT	G	3-5-24	1124		3	1		1		1					X	X	X			24021452-006
7	MW-07	WT	G	3-5-24	1326		3	1		1		1					X	X	X			24021452-007
8	MW-07S	WT	G				2	1		1							X	X				24021452-008
9	MW-08	WT	G	3-5-24	1348		3	1		1		1					X	X	X			24021452-009
10	MW-08S	WT	G				2	1		1							X	X				24021452-010
11	MW-09	WT	G	3-5-24	1023		3	1		1		1							X			24021452-011
12	MW-10	WT	G	3-5-24	1106		3	1		1		1							X			24021452-012
13	MW-11	WT	G	3-5-24	0932		3	1		1		1					X	X	X			24021452-013
14	MW-12	WT	G	3-5-24	1257		3	1		1		1					X	X	X			24021452-014
15	MW-20	WT	G	3-5-24	1048		2	1		1							X	X				24021452-015
16	MW-20S	WT	G				2	1		1							X	X				24021452-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
KIN-24Q1 Rev 0	J. Colp	3-5	1535	Amber Dillard	3/5/24	1535	8.5 / 1007	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 3-5-24

ph✓ 90719 + 89660
added HNO3 (96331) and NaOH (95443)
to samples
ES 3/5/24 ice 8.5 LTG 7

HNO3 (96331) added to MW-08, -09, -11, -12, -20, -28, -27, XPull,
NaOH (95511) added to MW-08, -12, -08 Dup

Confidential

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Tim Arnold	Company Name:	Vistra Corp
	Kincaid, IL 62540			Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com	Purchase Order No.:		Quote Reference:	
Phone: (217) 753-8911	Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY: NPDES | **GROUND WATER** | DRINKING WATER | UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information — Valid Matrix Codes: MATRIX / CODE: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-23	WT	G	3-5-24	1008		2	1		1							X	X				24021452-017
2	MW-27	WT	G	3-5-24	1135		2	1		1							X	X				24021452-018
3	MW-28	WT	G				2	1		1							X	X				24021452-019
4	MW-30	WT	G				2	1		1							X	X				24021452-020
5	MW-31	WT	G				2	1		1							X	X				24021452-021
6	MW-31S	WT	G				2	1		1							X	X				24021452-022
7	MW-32	WT	G				2	1		1							X	X				24021452-023
8	PZ4!A	WT	G				2	1		1										X		24021452-024
9	PZ4!C	WT	G				2	1		1							X	X				24021452-025
10	XPW01_pore	WT	G	3-5-24	1217		2	1		1							X	X				24021452-026
11	XPW02_pore	WT	G	3-5-24	1258		2	1		1							X	X				24021452-027
12	XPW03_pore	WT	G				2	1		1							X	X				24021452-028
13	XPW04_pore	WT	G				2	1		1							X	X				24021452-029
14	XSG-01	WT	G				0										X	X	X			24021452-030
15	YSG-02	WT	G				0										X	X	X			24021452-031
16	Field Blank	WT	G				3	1		1		1					X	X	X	X		24021452-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-24Q1 Rev 0	J. Colp	3-5	1535	[signature]	3/5/24	1535	Y N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 3-5-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 3 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-08 Duplicate	WT	G	3-5-24	1348		3	1		1		1					X	X	X			24021452-033
2	Equipment Blank 1	WT	G				3	1		1		1					X	X	X	X		24021452-034
3	Equipment Blank 2	WT	G				3	1		1		1					X	X	X	X		24021452-035
4	Equipment Blank 3	WT	G				3	1		1		1					X	X	X	X		24021452-036
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q1 Rev 0	J. Colp	3-5	1535	[illegible signature]	3/5/24	1535		Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 3-5-24

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104, Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com; Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911
Fax:	
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference	
Project Manager	Liz Hurley
Profile #:	

REGULATORY AGENCY: NPDES | **GROUND WATER** | DRINKING WATER | UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-23	WT	G				2	1		1							X	X				24021452-017
2	MW-27	WT	G				2	1		1							X	X				24021452-018
3	MW-28	WT	G	3-6-24	1123		2	1		1							X	X				24021452-019
4	MW-30	WT	G	3-6-24	1053		2	1		1							X	X				24021452-020
5	MW-31	WT	G	3-6-24	1125		2	1		1							X	X				24021452-021
6	MW-31S	WT	G				2	1		1							X	X				24021452-022
7	MW-32	WT	G	3-6-24	1153		2	1		1							X	X				24021452-023
8	PZ4!A	WT	G	3-6-24	0943		2	1		1										X		24021452-024
9	PZ4!C	WT	G	3-6-24	1004		2	1		1							X	X				24021452-025
10	XPW01_pore	WT	G				2	1		1							X	X				24021452-026
11	XPW02_pore	WT	G				2	1		1							X	X				24021452-027
12	XPW03_pore	WT	G	3-6-24	1019		2	1		1							X	X				24021452-028
13	XPW04_pore	WT	G	3-6-24	1048		2	1		1							X	X				24021452-029
14	XSG-01	WT	G				0										X	X	X			24021452-030
15	YSG-02	WT	G				0										X	X	X			24021452-031
16	Field Blank	WT	G	3-6-24	1211		3	1		1		1					X	X	X	X		24021452-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q1 Rev 0	J. Colp	3-6	1505	[signature]	3/6/24	1505	8.5	>	N	Y
							UC5			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 3-6-24

Added HNO3(9L331) to MW31, MW32 & PZ4!C.
pH ✓ 90719. Sm 3/6/24

CHAIN-OF-CUSTODY / Analytical Request Document

24021452

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Tim Arnold	Company Name:	Vistra Corp
	Kincaid, IL 62540			Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com	Purchase Order No.:		Quote Reference:	
Phone:	(217) 753-8911 Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY		
NPDES	GROUND WATER	DRINKING WATER
UST	RCRA	OTHER
Site Location STATE:	IL	

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN_620_141	KIN-SUP-000									Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-08 Duplicate	WT	G				3	1		1		1					X	X	X											24021452-033
2	Equipment Blank 1	WT	G	3-6-24	1214		3	1		1		1					X	X	X	X										24021452-034
3	Equipment Blank 2	WT	G				3	1		1		1					X	X	X	X										24021452-035
4	Equipment Blank 3	WT	G				3	1		1		1					X	X	X	X										24021452-036
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														
13																														
14																														
15																														
16																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q1 Rev 0	J. Colp	3-6	1505	[illegible signature]	3/6/24	1505		Y	N	

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Justin Colp		
SIGNATURE of SAMPLER:	[signature]	DATE Signed (MM/DD/YY):	3-6-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

http://www.teklabinc.com/

June 11, 2024

Eric Bauer
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
TEL: (414) 837-3607
FAX: (414) 837-3608

Illinois	100226
Illinois	1004652024-2
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: KIN-24Q2 **WorkOrder:** 24050124

Dear Eric Bauer:

TEKLAB, INC received 3 samples for KIN_SUP_000 on 5/21/2024 2:15:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report,Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR.
All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Teklab, Inc. Environmental Laboratory

Report Contents

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q2

Work Order: 24050124

Report Date: 11-Jun-24

This reporting package includes the following:

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- C - RL shown is a Client Requested Quantitation Limit
- H - Holding times exceeded
- J - Analyte detected below quantitation limits
- ND - Not Detected at the Reporting Limit
- S - Spike Recovery outside recovery limits
- X - Value exceeds Maximum Contaminant Level
- B - Analyte detected in associated Method Blank
- E - Value above quantitation range
- I - Associated internal standard was outside method criteria
- M - Manual Integration used to determine area response
- R - RPD outside accepted recovery limits
- T - TIC(Tentatively identified compound)

Teklab, Inc. Environmental Laboratory

Case Narrative

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

Cooler Receipt Temp: 8.7 °C

An employee of Teklab, Inc. collected the sample(s).

MW-08S could not be collected; the well was dry. Equipment Blanks 2 and 3 were not needed.

MW-30 collection time per field file(s). FB/EAH 5/22/24

MW-27 collection time per field file(s). FB/EAH 5/31/24

Date/time of measurement for MW-08S, XSG-01, YSG-02, and YSG-03 depths per field file. EAH 6/6/24

Per Eric Bauer's request, only KIN_SUP_000 data is included in this report. EAH 6/11/24

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	arenner@teklabinc.com

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2025	Collinsville
Illinois	IEPA	1004652024-2	NELAP	4/30/2025	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2025	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2024	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2024	Collinsville
Oklahoma	ODEQ	9978	NELAP	8/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2025	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2026	Collinsville
Kentucky	UST	0073		1/31/2025	Collinsville
Mississippi	MSDH			4/30/2025	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville
Missouri	MDNR	00930		10/31/2026	Collinsville

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

Lab ID: 24050124-021 **Client Sample ID:** PZ4!A

Matrix: GROUNDWATER **Collection Date:** 05/21/2024 11:04

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**7.85**	ft	1	05/21/2024 11:04	R347671
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**33**	NTU	1	05/21/2024 11:04	R347671
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**272**	mV	1	05/21/2024 11:04	R347671
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1210**	µS/cm	1	05/21/2024 11:04	R347671
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**20.7**	°C	1	05/21/2024 11:04	R347671
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.22**	mg/L	1	05/21/2024 11:04	R347671
SW-846 9040B FIELD									
pH	*	0	1.00		**6.79**		1	05/21/2024 11:04	R347671
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**517**	mg/L	1	05/22/2024 9:36	R347693
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	05/22/2024 9:36	R347693
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	40	50		**785**	mg/L	2.5	05/23/2024 11:57	R347839
SW-846 9036 (TOTAL)									
Sulfate	NELAP	61	100		**145**	mg/L	10	05/25/2024 1:53	R347894
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**0.31**	mg/L	1	05/23/2024 10:35	R347780
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**16**	mg/L	1	05/25/2024 1:48	R347900
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**127**	mg/L	1	05/22/2024 20:05	223273
Magnesium	NELAP	0.0055	0.0500		**75.2**	mg/L	1	05/22/2024 20:05	223273
Potassium	NELAP	0.0400	0.100		**0.323**	mg/L	1	05/22/2024 20:05	223273
Sodium	NELAP	0.0180	0.0500		**24.0**	mg/L	1	05/22/2024 20:05	223273
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	B	**< 0.0010**	mg/L	5	05/23/2024 15:58	223273
Arsenic	NELAP	0.0004	0.0010	J	**0.0006**	mg/L	5	05/23/2024 15:58	223273
Barium	NELAP	0.0007	0.0010		**0.0639**	mg/L	5	05/23/2024 15:58	223273
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 15:58	223273
Boron	NELAP	0.0133	0.0250		**0.706**	mg/L	5	05/23/2024 15:58	223273
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 15:58	223273
Chromium	NELAP	0.0007	0.0015		**0.0026**	mg/L	5	05/23/2024 15:58	223273
Cobalt	NELAP	0.0001	0.0010	J	**0.0005**	mg/L	5	05/23/2024 15:58	223273
Lead	NELAP	0.0006	0.0010	J	**0.0007**	mg/L	5	05/23/2024 15:58	223273
Lithium	*	0.0015	0.0030	J	**0.0015**	mg/L	5	05/23/2024 15:58	223273
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	05/23/2024 15:58	223273
Selenium	NELAP	0.0006	0.0010	J	**0.0006**	mg/L	5	05/23/2024 15:58	223273
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	05/23/2024 15:58	223273

Contamination present in the MBLK for Sb. Sample results below the reporting limit are reportable per the TNI Standard.

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll
Work Order: 24050124
Client Project: KIN-24Q2
Report Date: 11-Jun-24
Lab ID: 24050124-021
Client Sample ID: PZ4!A
Matrix: GROUNDWATER
Collection Date: 05/21/2024 11:04

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	05/29/2024 11:09	223500

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

Lab ID: 24050124-026 **Client Sample ID:** Field Blank

Matrix: AQUEOUS **Collection Date:** 05/21/2024 11:31

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	05/22/2024 10:08	R347693
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	05/22/2024 10:08	R347693
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**34**	mg/L	1	05/23/2024 11:57	R347839
SW-846 9036 (TOTAL)									
Sulfate	NELAP	6	10		**< 10**	mg/L	1	05/25/2024 2:04	R347894
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**< 0.10**	mg/L	1	05/23/2024 10:39	R347780
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**< 4**	mg/L	1	05/25/2024 2:04	R347900
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	05/22/2024 20:06	223273
Magnesium	NELAP	0.0055	0.0500		**< 0.0500**	mg/L	1	05/22/2024 20:06	223273
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	05/22/2024 20:06	223273
Sodium	NELAP	0.0180	0.0500		**< 0.0500**	mg/L	1	05/22/2024 20:06	223273
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	B	**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Boron	NELAP	0.0133	0.0250		**< 0.0250**	mg/L	5	05/23/2024 16:11	223273
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	05/23/2024 16:11	223273
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	05/23/2024 16:11	223273
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	05/23/2024 16:11	223273
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	05/23/2024 16:11	223273
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	05/23/2024 16:11	223273
Contamination present in the MBLK for Sb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	05/29/2024 11:14	223500

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

Lab ID: 24050124-028 **Client Sample ID:** Equipment Blank 1

Matrix: AQUEOUS **Collection Date:** 05/21/2024 11:37

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**4**	mg/L	1	05/22/2024 9:49	R347693
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	05/22/2024 9:49	R347693
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**34**	mg/L	1	05/23/2024 12:28	R347839
SW-846 9036 (TOTAL)									
Sulfate	NELAP	6	10	J	**9**	mg/L	1	05/25/2024 2:14	R347894
SW-846 9214 (TOTAL)									
Fluoride	NELAP	0.04	0.10		**< 0.10**	mg/L	1	05/23/2024 10:42	R347780
SW-846 9251 (TOTAL)									
Chloride	NELAP	1	4		**< 4**	mg/L	1	05/25/2024 2:15	R347900
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**0.327**	mg/L	1	05/22/2024 20:08	223273
Magnesium	NELAP	0.0055	0.0500		**0.149**	mg/L	1	05/22/2024 20:08	223273
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	05/22/2024 20:08	223273
Sodium	NELAP	0.0180	0.0500		**0.0618**	mg/L	1	05/22/2024 20:08	223273
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	05/24/2024 9:14	223273
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Boron	NELAP	0.0133	0.0250		**< 0.0250**	mg/L	5	05/23/2024 17:12	223273
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	05/23/2024 17:12	223273
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	05/23/2024 17:12	223273
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	05/23/2024 17:12	223273
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	05/23/2024 17:12	223273
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	05/23/2024 17:12	223273
Contamination present in the MBLK for Sb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	05/29/2024 11:27	223500

Client: Ramboll

Client Project: KIN-24Q2

Work Order: 24050124

Report Date: 11-Jun-24

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
24050124-021	PZ4!A	Groundwater	2	05/21/2024 11:04
24050124-026	Field Blank	Aqueous	2	05/21/2024 11:31
24050124-028	Equipment Blank 1	Aqueous	2	05/21/2024 11:37

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

STANDARD METHODS 2510 B FIELD

Batch R347671 **SampType:** LCS Units **µS/cm**
SampID: LCS-1B

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	05/20/2024

Batch R347671 **SampType:** LCS Units **µS/cm**
SampID: LCS-1J

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.7	90	110	05/20/2024

Batch R347671 **SampType:** LCS Units **µS/cm**
SampID: LCS-1T

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	05/20/2024

Batch R347671 **SampType:** LCS Units **µS/cm**
SampID: LCS-2B

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1420**	1412	0	100.4	90	110	05/21/2024

Batch R347671 **SampType:** LCS Units **µS/cm**
SampID: LCS-2J

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	05/21/2024

SW-846 9040B FIELD

Batch R347671 **SampType:** LCS Units
SampID: LCS-1B

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.02**	7.000	0	100.3	98.57	101.4	05/20/2024

Batch R347671 **SampType:** LCS Units
SampID: LCS-1J

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**6.98**	7.000	0	99.7	98.57	101.4	05/20/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24050124

Client Project: KIN-24Q2 | **Report Date:** 11-Jun-24

SW-846 9040B FIELD

Batch R347671 **SampType:** LCS Units
SampID: LCS-1T

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.03**	7.000	0	100.4	98.57	101.4	05/20/2024

Batch R347671 **SampType:** LCS Units
SampID: LCS-2B

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	05/21/2024

Batch R347671 **SampType:** LCS Units
SampID: LCS-2J

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**6.99**	7.000	0	99.9	98.57	101.4	05/21/2024

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R347839 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/23/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/23/2024

Batch R347839 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**986**	1000	0	98.6	90	110	05/23/2024
Total Dissolved Solids		20		**958**	1000	0	95.8	90	110	05/23/2024

Batch R347839 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24050124-005ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**434**				450.0	3.62	05/23/2024

Batch R347839 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24050451-006BDUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50	RH	**410**				345.0	17.22	05/23/2024

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R347839 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24051552-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**370**				395.0	6.54	05/23/2024

Batch R347839 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24051552-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**444**				454.0	2.23	05/23/2024

Batch R347911 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/24/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/24/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/24/2024

Batch R347911 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**956**	1000	0	95.6	90	110	05/24/2024
Total Dissolved Solids		20		**930**	1000	0	93.0	90	110	05/24/2024
Total Dissolved Solids		20		**954**	1000	0	95.4	90	110	05/24/2024

Batch R347911 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24051776-015ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**< 20**				0	0.00	05/24/2024

Batch R347911 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24051779-003ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		1000		**51700**				51200	0.97	05/24/2024

Batch R348148 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/31/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	05/31/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R348148 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**956**	1000	0	95.6	90	110	05/31/2024
Total Dissolved Solids		20		**994**	1000	0	99.4	90	110	05/31/2024

Batch R348148 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24052371-004ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**502**				508.0	1.19	05/31/2024

Batch R348148 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24052414-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**580**				615.0	5.86	05/31/2024

Batch R348256 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	06/03/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	06/03/2024

Batch R348256 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**954**	1000	0	95.4	90	110	06/03/2024
Total Dissolved Solids		20		**948**	1000	0	94.8	90	110	06/03/2024

Batch R348256 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24050124-010ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**632**				636.0	0.63	06/03/2024

Batch R348256 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24050124-020ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**1030**				1034	0.78	06/03/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R348256 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24050124-022ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50	H	**675**				625.0	7.69	06/03/2024

Batch R348256 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24052341-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**825**				855.0	3.57	06/03/2024

Batch R348256 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24052388-006HDUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**4550**				4480	1.55	06/03/2024

Batch R348379 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	06/05/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	06/05/2024

Batch R348379 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**952**	1000	0	95.2	90	110	06/05/2024
Total Dissolved Solids		20		**902**	1000	0	90.2	90	110	06/05/2024

Batch R348379 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24050124-004ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50	H	**715**				785.0	9.33	06/05/2024

Batch R348379 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24050124-017ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50	H	**580**				570.0	1.74	06/05/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24050124
Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R348379 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24052388-004HDUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**1710**				1615	5.71	06/05/2024

Batch R348379 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24060011-019ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		100		**9420**				9240	1.93	06/05/2024

Batch R348379 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24060130-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**1920**				1892	1.36	06/05/2024

Batch R348379 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24060133-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**3910**				3566	9.15	06/05/2024

SW-846 9036 (TOTAL)

Batch R347894 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	05/24/2024

Batch R347894 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	94.8	90	110	05/24/2024

Batch R347894 **SampType:** MS Units **mg/L**
SampID: 24050124-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10	S	**29**	20.00	13.19	77.1	85	115	05/24/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q2

Work Order: 24050124
Report Date: 11-Jun-24

SW-846 9036 (TOTAL)

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24050124-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	S	**29**	20.00	13.19	77.0	28.61	0.03	05/24/2024

Batch R347894 **SampType:** MS Units **mg/L**
SampID: 24050124-014AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**86**	40.00	49.59	89.9	85	115	05/25/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24050124-014AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**89**	40.00	49.59	99.5	85.55	4.39	05/25/2024

Batch R347894 **SampType:** MS Units **mg/L**
SampID: 24050124-019AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10	S	**27**	20.00	12.07	76.5	85	115	05/25/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24050124-019AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	R	**32**	20.00	12.07	101.8	27.36	16.99	05/25/2024

Batch R347894 **SampType:** MS Units **mg/L**
SampID: 24051304-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20	E	**114**	40.00	77.49	91.8	85	115	05/24/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24051304-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20	E	**118**	40.00	77.49	100.0	114.2	2.82	05/24/2024

Batch R347894 **SampType:** MS Units **mg/L**
SampID: 24051304-010AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**86**	40.00	48.70	94.1	85	115	05/24/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9036 (TOTAL)

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24051304-010AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**88**	40.00	48.70	99.2	86.34	2.32	05/24/2024

Batch R347894 **SampType:** MS Units **mg/L**

SampID: 24051304-014AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10	E	**58**	20.00	40.32	88.7	85	115	05/24/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24051304-014AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10	E	**59**	20.00	40.32	92.5	58.05	1.32	05/24/2024

Batch R347894 **SampType:** MS Units **mg/L**

SampID: 24051948-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100	S	**295**	200.0	130.3	82.3	85	115	05/25/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24051948-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**304**	200.0	130.3	86.9	294.9	3.08	05/25/2024

Batch R347894 **SampType:** MS Units **mg/L**

SampID: 24051948-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**39**	20.00	21.86	86.2	85	115	05/25/2024

Batch R347894 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24051948-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**40**	20.00	21.86	90.0	39.09	1.95	05/25/2024

Batch R348027 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**< 10**	6.140	0	0	-100	100	05/29/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9036 (TOTAL)

Batch R348027 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**19**	20.00	0	95.0	90	110	05/29/2024

Batch R348027 **SampType:** MS Units **mg/L**

SampID: 24050651-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**18**	20.00	0	91.0	85	115	05/29/2024

Batch R348027 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24050651-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**19**	20.00	0	93.2	18.21	2.28	05/29/2024

Batch R348027 **SampType:** MS Units **mg/L**

SampID: 24050651-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		50		**173**	100.0	80.33	92.2	85	115	05/29/2024

Batch R348027 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24050651-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		50		**179**	100.0	80.33	98.9	172.5	3.83	05/29/2024

Batch R348027 **SampType:** MS Units **mg/L**

SampID: 24051942-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		**449**	200.0	257.6	95.6	85	115	05/29/2024

Batch R348027 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24051942-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**452**	200.0	257.6	97.0	448.8	0.60	05/29/2024

Batch R348027 **SampType:** MS Units **mg/L**

SampID: 24052005-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		20		**58**	40.00	22.78	87.6	85	115	05/29/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9036 (TOTAL)

Batch R348027 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24052005-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		20		**59**	40.00	22.78	90.1	57.81	1.73	05/29/2024

Batch R348027 **SampType:** MS Units mg/L

SampID: 24052005-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		10		**29**	20.00	11.48	87.4	85	115	05/29/2024

Batch R348027 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24052005-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		10		**30**	20.00	11.48	90.3	28.95	2.02	05/29/2024

SW-846 9214 (TOTAL)

Batch R347625 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0500	0	0	-100	100	05/21/2024

Batch R347625 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**1.06**	1.000	0	105.9	90	110	05/21/2024

Batch R347625 **SampType:** MS Units mg/L

SampID: 24050124-008AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.42**	2.000	0.2180	110.0	75	125	05/21/2024

Batch R347625 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24050124-008AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.34**	2.000	0.2180	106.2	2.418	3.19	05/21/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9214 (TOTAL)

Batch R347625 **SampType:** MS Units **mg/L**

SampID: 24050124-027AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.52**	2.000	0.2040	115.6	75	125	05/21/2024

Batch R347625 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-027AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.18**	2.000	0.2040	98.6	2.515	14.45	05/21/2024

Batch R347625 **SampType:** MS Units **mg/L**

SampID: 24051408-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**9.71**	2.000	7.463	112.2	75	125	05/21/2024

Batch R347625 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051408-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**9.85**	2.000	7.463	119.5	9.706	1.50	05/21/2024

Batch R347780 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**< 0.10**	0.0500	0	0	-100	100	05/23/2024

Batch R347780 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**0.98**	1.000	0	98.4	90	110	05/23/2024

Batch R347780 **SampType:** MS Units **mg/L**

SampID: 24050124-028AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.38**	2.000	0	118.8	75	125	05/23/2024

Batch R347780 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-028AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.24**	2.000	0	112.0	2.377	5.89	05/23/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9214 (TOTAL)

Batch R347780 **SampType:** MS Units **mg/L**

SampID: 24051870-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**3.02**	2.000	0.6830	116.8	75	125	05/23/2024

Batch R347780 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051870-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.88**	2.000	0.6830	110.1	3.019	4.54	05/23/2024

Batch R347780 **SampType:** MS Units **mg/L**

SampID: 24051901-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.10		**2.91**	2.000	0.7340	108.6	75	125	05/23/2024

Batch R347780 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051901-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.10		**2.77**	2.000	0.7340	102.0	2.907	4.68	05/23/2024

SW-846 9251 (TOTAL)

Batch R347900 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	05/24/2024

Batch R347900 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	99.6	90	110	05/24/2024

Batch R347900 **SampType:** MS Units **mg/L**

SampID: 24050124-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		8		**79**	40.00	43.81	87.4	85	115	05/24/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9251 (TOTAL)

Batch R347900 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24050124-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		8		**81**	40.00	43.81	91.9	78.75	2.27	05/24/2024

Batch R347900 **SampType:** MS Units mg/L

SampID: 24050124-014AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**44**	20.00	25.50	91.9	85	115	05/24/2024

Batch R347900 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24050124-014AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**44**	20.00	25.50	90.4	43.88	0.71	05/24/2024

Batch R347900 **SampType:** MS Units mg/L

SampID: 24050124-019AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		8		**74**	40.00	40.17	85.2	85	115	05/25/2024

Batch R347900 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24050124-019AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		8		**77**	40.00	40.17	90.9	74.26	3.01	05/25/2024

Batch R347900 **SampType:** MS Units mg/L

SampID: 24051948-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**24**	20.00	5.570	94.4	85	115	05/25/2024

Batch R347900 **SampType:** MSD Units mg/L RPD Limit 15

SampID: 24051948-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**24**	20.00	5.570	92.8	24.45	1.32	05/25/2024

Batch R347900 **SampType:** MS Units mg/L

SampID: 24051948-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**25**	20.00	6.790	91.9	85	115	05/25/2024

SW-846 9251 (TOTAL)

Batch R347900 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051948-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**25**	20.00	6.790	93.2	25.17	1.03	05/25/2024

Batch R348033 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**< 4**	0.5000	0	0	-100	100	05/29/2024

Batch R348033 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**20**	20.00	0	101.7	90	110	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24050651-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4	E	**59**	20.00	39.68	98.7	85	115	05/29/2024

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050651-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4	E	**59**	20.00	39.68	96.2	59.42	0.83	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24050651-009BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		20		**153**	100.0	64.22	88.5	85	115	05/29/2024

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050651-009BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		20		**155**	100.0	64.22	90.9	152.7	1.59	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24051910-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		20		**248**	100.0	160.2	87.4	85	115	05/29/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 9251 (TOTAL)

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051910-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		20	E	**259**	100.0	160.2	99.1	247.7	4.61	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24051942-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		40		**299**	200.0	119.6	89.8	85	115	05/29/2024

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24051942-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		40		**297**	200.0	119.6	88.9	299.2	0.65	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24052005-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		8		**53**	40.00	15.24	93.6	85	115	05/29/2024

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24052005-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		8		**52**	40.00	15.24	92.5	52.70	0.88	05/29/2024

Batch R348033 **SampType:** MS Units **mg/L**

SampID: 24052005-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Chloride		4		**30**	20.00	11.41	91.8	85	115	05/29/2024

Batch R348033 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24052005-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Chloride		4		**30**	20.00	11.41	91.9	29.78	0.03	05/29/2024

Client: Ramboll **Work Order:** 24050124
Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 223268 **SampType:** MBLK Units **mg/L**
SampID: MBLK-223268

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	05/22/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	05/22/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	05/22/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	05/22/2024

Batch 223268 **SampType:** LCS Units **mg/L**
SampID: LCS-223268

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.29**	2.500	0	91.8	85	115	05/22/2024
Magnesium		0.0500		**2.33**	2.500	0	93.4	85	115	05/22/2024
Potassium		0.100		**2.62**	2.500	0	105.0	85	115	05/22/2024
Sodium		0.0500		**2.40**	2.500	0	96.0	85	115	05/22/2024

Batch 223268 **SampType:** MS Units **mg/L**
SampID: 24050124-013BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**193**	2.500	191.5	74.8	75	125	05/22/2024
Magnesium		0.0500		**103**	2.500	100.7	104.8	75	125	05/22/2024
Potassium		0.100		**2.99**	2.500	0.2942	107.7	75	125	05/22/2024
Sodium		0.0500		**37.3**	2.500	34.94	95.2	75	125	05/22/2024

Batch 223268 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24050124-013BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**190**	2.500	191.5	-74.0	193.4	1.94	05/22/2024
Magnesium		0.0500	S	**102**	2.500	100.7	34.1	103.3	1.73	05/22/2024
Potassium		0.100		**2.99**	2.500	0.2942	107.7	2.986	0.03	05/22/2024
Sodium		0.0500	S	**36.7**	2.500	34.94	69.2	37.32	1.76	05/22/2024

Client: Ramboll | **Work Order:** 24050124

Client Project: KIN-24Q2 | **Report Date:** 11-Jun-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 223273 **SampType:** MBLK Units **mg/L**

SampID: MBLK-223273

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**< 0.0500**	0.0068	0	0	-100	100	05/22/2024
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	05/22/2024
Barium		0.0025		**< 0.0025**	0.0007	0	0	-100	100	05/22/2024
Beryllium		0.0005		**< 0.0005**	0.0002	0	0	-100	100	05/22/2024
Boron		0.0200		**< 0.0200**	0.0090	0	0	-100	100	05/22/2024
Cadmium		0.0020		**< 0.0020**	0.0005	0	0	-100	100	05/22/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	05/22/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	05/23/2024
Chromium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	05/22/2024
Cobalt		0.0050		**< 0.0050**	0.0020	0	0	-100	100	05/22/2024
Lead		0.0150		**< 0.0150**	0.0040	0	0	-100	100	05/22/2024
Magnesium		0.0500	J	**0.0055**	0.0055	0	100.0	-100	100	05/23/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	05/22/2024
Molybdenum		0.0100		**< 0.0100**	0.0037	0	0	-100	100	05/22/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	05/23/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	05/22/2024
Selenium		0.0400		**< 0.0400**	0.0170	0	0	-100	100	05/22/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	05/23/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	05/22/2024

Client: Ramboll

Client Project: KIN-24Q2

Work Order: 24050124

Report Date: 11-Jun-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 223273 **SampType:** LCS Units **mg/L**

SampID: LCS-223273

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**0.497**	0.5000	0	99.4	85	115	05/22/2024
Arsenic		0.0250		**0.511**	0.5000	0	102.1	85	115	05/22/2024
Barium		0.0025		**1.92**	2.000	0	96.2	85	115	05/22/2024
Beryllium		0.0005		**0.0496**	0.0500	0	99.2	85	115	05/22/2024
Boron		0.0200		**0.472**	0.5000	0	94.5	85	115	05/22/2024
Cadmium		0.0020		**0.0520**	0.0500	0	104.0	85	115	05/22/2024
Calcium		0.100		**2.48**	2.500	0	99.3	85	115	05/23/2024
Calcium		0.100		**2.35**	2.500	0	93.9	85	115	05/22/2024
Chromium		0.0050		**0.189**	0.2000	0	94.5	85	115	05/22/2024
Cobalt		0.0050		**0.477**	0.5000	0	95.3	85	115	05/22/2024
Lead		0.0150		**0.476**	0.5000	0	95.2	85	115	05/22/2024
Magnesium		0.0500		**2.36**	2.500	0	94.2	85	115	05/22/2024
Magnesium		0.0500		**2.50**	2.500	0	99.8	85	115	05/23/2024
Molybdenum		0.0100		**0.467**	0.5000	0	93.4	85	115	05/22/2024
Potassium		0.100		**2.69**	2.500	0	107.6	85	115	05/23/2024
Potassium		0.100		**2.65**	2.500	0	106.1	85	115	05/22/2024
Selenium		0.0400		**0.483**	0.5000	0	96.6	85	115	05/22/2024
Sodium		0.0500		**2.43**	2.500	0	97.0	85	115	05/22/2024
Sodium		0.0500		**2.65**	2.500	0	106.2	85	115	05/23/2024

Batch 223273 **SampType:** MS Units **mg/L**

SampID: 24050124-018BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**121**	2.500	119.1	58.8	75	125	05/22/2024
Magnesium		0.0500		**61.9**	2.500	59.82	84.0	75	125	05/22/2024
Potassium		0.100		**3.58**	2.500	0.8929	107.6	75	125	05/22/2024
Sodium		0.0500		**29.7**	2.500	27.53	85.2	75	125	05/22/2024

Batch 223273 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24050124-018BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**123**	2.500	119.1	145.2	120.5	1.78	05/22/2024
Magnesium		0.0500		**62.9**	2.500	59.82	125.0	61.93	1.64	05/22/2024
Potassium		0.100		**3.62**	2.500	0.8929	109.0	3.583	0.96	05/22/2024
Sodium		0.0500		**30.3**	2.500	27.53	110.8	29.66	2.13	05/22/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 223273 **SampType:** MS Units mg/L

SampID: 24051286-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0500		**0.511**	0.5000	0.009300	100.2	75	125	05/22/2024
Arsenic		0.0250		**0.518**	0.5000	0	103.6	75	125	05/22/2024
Barium		0.0025		**2.05**	2.000	0.06720	99.1	75	125	05/22/2024
Beryllium		0.0005		**0.0507**	0.0500	0	101.4	75	125	05/22/2024
Cadmium		0.0020		**0.0507**	0.0500	0	101.4	75	125	05/22/2024
Chromium		0.0050		**0.196**	0.2000	0.004100	96.0	75	125	05/22/2024
Lead		0.0150		**0.483**	0.5000	0.007100	95.2	75	125	05/22/2024

Batch 223273 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24051286-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0500		**0.501**	0.5000	0.009300	98.3	0.5105	1.90	05/22/2024
Arsenic		0.0250		**0.509**	0.5000	0	101.8	0.5178	1.75	05/22/2024
Barium		0.0025		**2.02**	2.000	0.06720	97.6	2.050	1.47	05/22/2024
Beryllium		0.0005		**0.0497**	0.0500	0	99.4	0.05070	1.99	05/22/2024
Cadmium		0.0020		**0.0504**	0.0500	0	100.8	0.05070	0.59	05/22/2024
Chromium		0.0050		**0.194**	0.2000	0.004100	94.8	0.1962	1.28	05/22/2024
Lead		0.0150		**0.477**	0.5000	0.007100	93.9	0.4833	1.38	05/22/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223268 **SampType:** MBLK Units mg/L

SampID: MBLK-223268

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	05/23/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	05/23/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	05/23/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	05/23/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	05/23/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	05/23/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	05/23/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	05/23/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	05/23/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	05/23/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	05/23/2024

Client: Ramboll | **Work Order:** 24050124

Client Project: KIN-24Q2 | **Report Date:** 11-Jun-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223268 **SampType:** LCS Units **mg/L**

SampID: LCS-223268

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.529**	0.5000	0	105.9	80	120	05/28/2024
Antimony		0.0010	S	**0.612**	0.5000	0	122.3	80	120	05/23/2024
Arsenic		0.0010		**0.563**	0.5000	0	112.5	80	120	05/23/2024
Barium		0.0010		**2.07**	2.000	0	103.4	80	120	05/24/2024
Beryllium		0.0010		**0.0573**	0.0500	0	114.7	80	120	05/23/2024
Boron		0.0250		**0.557**	0.5000	0	111.4	80	120	05/23/2024
Cadmium	*	0.0010		**0.0485**	0.0500	0	97.0	80	120	05/24/2024
Chromium		0.0015		**0.237**	0.2000	0	118.7	80	120	05/23/2024
Cobalt		0.0010		**0.573**	0.5000	0	114.5	80	120	05/23/2024
Lead		0.0010		**0.556**	0.5000	0	111.3	80	120	05/23/2024
Lithium	*	0.0030		**0.558**	0.5000	0	111.6	80	120	05/23/2024
Molybdenum		0.0015		**0.531**	0.5000	0	106.1	80	120	05/23/2024
Selenium		0.0010		**0.564**	0.5000	0	112.8	80	120	05/23/2024
Thallium		0.0020		**0.267**	0.2500	0	106.8	80	120	05/23/2024

Batch 223268 **SampType:** MS Units **mg/L**

SampID: 24050124-013BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.540**	0.5000	0.0004531	107.8	75	125	05/24/2024
Arsenic		0.0010		**0.575**	0.5000	0.0004352	114.9	75	125	05/23/2024
Barium		0.0010		**1.96**	2.000	0.03586	96.1	75	125	05/24/2024
Beryllium		0.0010		**0.0589**	0.0500	0	117.8	75	125	05/23/2024
Boron		0.0250	S	**2.21**	0.5000	1.838	74.3	75	125	05/24/2024
Cadmium	*	0.0010		**0.0481**	0.0500	0	96.2	75	125	05/24/2024
Chromium		0.0015		**0.191**	0.2000	0.001323	95.1	75	125	05/24/2024
Cobalt		0.0010		**0.546**	0.5000	0.0003330	109.1	75	125	05/23/2024
Lead		0.0010		**0.578**	0.5000	0.0007620	115.5	75	125	05/23/2024
Lithium	*	0.0030		**0.567**	0.5000	0	113.4	75	125	05/23/2024
Molybdenum		0.0015		**0.553**	0.5000	0	110.6	75	125	05/23/2024
Selenium		0.0010		**0.573**	0.5000	0	114.6	75	125	05/23/2024
Thallium		0.0020		**0.272**	0.2500	0	108.7	75	125	05/23/2024

Client: Ramboll
Client Project: KIN-24Q2

Work Order: 24050124
Report Date: 11-Jun-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223268 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24050124-013BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.538**	0.5000	0.0004531	107.5	0.5396	0.33	05/24/2024
Arsenic		0.0010		**0.491**	0.5000	0.0004352	98.1	0.5751	15.79	05/23/2024
Barium		0.0010		**1.94**	2.000	0.03586	95.4	1.959	0.73	05/24/2024
Beryllium		0.0010		**0.0491**	0.0500	0	98.1	0.05892	18.28	05/23/2024
Boron		0.0250		**2.25**	0.5000	1.838	82.9	2.209	1.93	05/24/2024
Cadmium	*	0.0010		**0.0478**	0.0500	0	95.7	0.04811	0.57	05/24/2024
Chromium		0.0015		**0.192**	0.2000	0.001323	95.4	0.1915	0.29	05/24/2024
Cobalt		0.0010		**0.464**	0.5000	0.0003330	92.8	0.5460	16.19	05/23/2024
Lead		0.0010		**0.476**	0.5000	0.0007620	95.0	0.5784	19.47	05/23/2024
Lithium	*	0.0030		**0.478**	0.5000	0	95.7	0.5670	16.93	05/23/2024
Molybdenum		0.0015		**0.467**	0.5000	0	93.5	0.5529	16.77	05/23/2024
Selenium		0.0010		**0.494**	0.5000	0	98.9	0.5732	14.76	05/23/2024
Thallium		0.0020		**0.232**	0.2500	0	92.8	0.2718	15.79	05/23/2024

Batch 223273 **SampType:** MBLK Units mg/L

SampID: MBLK-223273

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	05/24/2024
Antimony		0.0010	S	**0.0025**	0.0004	0	558.7	-100	100	05/23/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	05/23/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	05/23/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	05/23/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	05/23/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	05/23/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	05/23/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	05/23/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	05/23/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	05/23/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	05/23/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	05/23/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	05/23/2024

Client: Ramboll

Client Project: KIN-24Q2

Work Order: 24050124

Report Date: 11-Jun-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223273 **SampType:** LCS Units **mg/L**

SampID: LCS-223273

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	B	**0.534**	0.5000	0	106.9	80	120	05/23/2024
Arsenic		0.0010		**0.482**	0.5000	0	96.3	80	120	05/23/2024
Barium		0.0010		**1.93**	2.000	0	96.5	80	120	05/23/2024
Beryllium		0.0010		**0.0502**	0.0500	0	100.4	80	120	05/23/2024
Boron		0.0250		**0.490**	0.5000	0	97.9	80	120	05/23/2024
Cadmium	*	0.0010		**0.0515**	0.0500	0	103.0	80	120	05/23/2024
Cadmium	*	0.0010		**0.0515**	0.0500	0	103.0	85	115	05/23/2024
Chromium		0.0015		**0.202**	0.2000	0	100.9	80	120	05/23/2024
Cobalt		0.0010		**0.481**	0.5000	0	96.3	80	120	05/23/2024
Lead		0.0010		**0.483**	0.5000	0	96.5	80	120	05/23/2024
Lead		0.0010		**0.483**	0.5000	0	96.5	85	115	05/23/2024
Lithium	*	0.0030		**0.494**	0.5000	0	98.8	80	120	05/23/2024
Molybdenum		0.0015		**0.453**	0.5000	0	90.5	80	120	05/23/2024
Selenium		0.0010		**0.503**	0.5000	0	100.7	85	115	05/23/2024
Selenium		0.0010		**0.503**	0.5000	0	100.7	80	120	05/23/2024
Thallium		0.0020		**0.233**	0.2500	0	93.0	80	120	05/23/2024

Batch 223273 **SampType:** MS Units **mg/L**

SampID: 24050124-018BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	B	**0.527**	0.5000	0	105.4	75	125	05/23/2024
Arsenic		0.0010		**0.489**	0.5000	0.003160	97.1	75	125	05/23/2024
Barium		0.0010		**2.20**	2.000	0.2036	100.0	75	125	05/23/2024
Beryllium		0.0010		**0.0489**	0.0500	0	97.8	75	125	05/23/2024
Boron		0.0250		**0.673**	0.5000	0.2560	83.4	75	125	05/23/2024
Cadmium	*	0.0010		**0.0512**	0.0500	0	102.5	75	125	05/23/2024
Chromium		0.0015		**0.193**	0.2000	0	96.7	75	125	05/23/2024
Cobalt		0.0010		**0.461**	0.5000	0.001293	92.0	75	125	05/23/2024
Lead		0.0010		**0.479**	0.5000	0	95.8	75	125	05/23/2024
Lithium	*	0.0030		**0.475**	0.5000	0.003433	94.4	75	125	05/23/2024
Molybdenum		0.0015		**0.459**	0.5000	0.0007189	91.7	75	125	05/23/2024
Selenium		0.0010		**0.499**	0.5000	0	99.7	75	125	05/23/2024
Thallium		0.0020		**0.233**	0.2500	0	93.3	75	125	05/23/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223273 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24050124-018BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010	B	**0.533**	0.5000	0	106.6	0.5271	1.10	05/23/2024
Arsenic		0.0010		**0.480**	0.5000	0.003160	95.4	0.4887	1.77	05/23/2024
Barium		0.0010		**2.20**	2.000	0.2036	100.0	2.203	0.01	05/23/2024
Beryllium		0.0010		**0.0493**	0.0500	0	98.7	0.04888	0.96	05/23/2024
Boron		0.0250		**0.671**	0.5000	0.2560	82.9	0.6733	0.39	05/23/2024
Cadmium	*	0.0010		**0.0516**	0.0500	0	103.1	0.05124	0.61	05/23/2024
Chromium		0.0015		**0.193**	0.2000	0	96.3	0.1935	0.39	05/23/2024
Cobalt		0.0010		**0.463**	0.5000	0.001293	92.4	0.4612	0.47	05/23/2024
Lead		0.0010		**0.468**	0.5000	0	93.7	0.4788	2.19	05/23/2024
Lithium	*	0.0030		**0.472**	0.5000	0.003433	93.8	0.4753	0.60	05/23/2024
Molybdenum		0.0015		**0.451**	0.5000	0.0007189	90.1	0.4595	1.77	05/23/2024
Selenium		0.0010		**0.491**	0.5000	0	98.3	0.4986	1.47	05/23/2024
Thallium		0.0020		**0.228**	0.2500	0	91.2	0.2331	2.23	05/23/2024

Batch 223273 **SampType:** MS Units **mg/L**
SampID: 24051286-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Selenium		0.0010		**0.547**	0.5000	0.001503	109.0	70	130	05/23/2024

Batch 223273 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24051286-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Selenium		0.0010		**0.523**	0.5000	0.001503	104.3	0.5466	4.41	05/23/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 223769 **SampType:** MBLK Units **mg/L**

SampID: MBLK-223769

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	06/04/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	06/04/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	06/05/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	06/04/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	06/04/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	06/04/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	06/05/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	06/04/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	06/04/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	06/04/2024

Batch 223769 **SampType:** LCS Units **mg/L**

SampID: LCS-223769

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		**0.480**	0.5000	0	96.0	80	120	06/04/2024
Barium		0.0010		**1.90**	2.000	0	95.1	80	120	06/04/2024
Boron		0.0250		**0.473**	0.5000	0	94.6	80	120	06/05/2024
Cadmium	*	0.0010		**0.0477**	0.0500	0	95.3	80	120	06/04/2024
Cobalt		0.0010		**0.462**	0.5000	0	92.4	80	120	06/04/2024
Lead		0.0010		**0.468**	0.5000	0	93.6	80	120	06/04/2024
Lithium	*	0.0030		**0.495**	0.5000	0	99.0	80	120	06/05/2024
Molybdenum		0.0015		**0.430**	0.5000	0	86.0	80	120	06/04/2024
Selenium		0.0010		**0.482**	0.5000	0	96.4	80	120	06/04/2024
Thallium		0.0020		**0.201**	0.2500	0	80.5	80	120	06/05/2024

Batch 223769 **SampType:** MS Units **mg/L**

SampID: 24052446-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Selenium		0.0010		**0.479**	0.5000	0	95.8	70	130	06/04/2024

Batch 223769 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24052446-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Selenium		0.0010		**0.474**	0.5000	0	94.8	0.4791	1.04	06/04/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24050124

Client Project: KIN-24Q2 | **Report Date:** 11-Jun-24

SW-846 7470A (TOTAL)

Batch 223499 **SampType:** MBLK Units **mg/L**

SampID: MBLK-223499

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	05/28/2024

Batch 223499 **SampType:** LCS Units **mg/L**

SampID: LCS-223499

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00486**	0.0050	0	97.3	85	115	05/28/2024

Batch 223499 **SampType:** MS Units **mg/L**

SampID: 24050124-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00468**	0.0050	0.00005940	92.4	75	125	05/28/2024

Batch 223499 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00463**	0.0050	0.00005940	91.5	0.004678	0.94	05/28/2024

Batch 223499 **SampType:** MS Units **mg/L**

SampID: 24050124-005BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00463**	0.0050	0.00008830	90.8	75	125	05/28/2024

Batch 223499 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-005BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00445**	0.0050	0.00008830	87.1	0.004628	4.03	05/28/2024

Batch 223500 **SampType:** MBLK Units **mg/L**

SampID: MBLK-223500

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	05/29/2024

Batch 223500 **SampType:** LCS Units **mg/L**

SampID: LCS-223500

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00469**	0.0050	0	93.7	85	115	05/29/2024

Client: Ramboll **Work Order:** 24050124

Client Project: KIN-24Q2 **Report Date:** 11-Jun-24

SW-846 7470A (TOTAL)

Batch 223500 **SampType:** MS Units **mg/L**

SampID: 24050124-020BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00441**	0.0050	0	88.1	75	125	05/29/2024

Batch 223500 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-020BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00432**	0.0050	0	86.4	0.004406	1.97	05/29/2024

Batch 223500 **SampType:** MS Units **mg/L**

SampID: 24050124-026BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00466**	0.0050	0	93.2	75	125	05/29/2024

Batch 223500 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24050124-026BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00450**	0.0050	0	89.9	0.004660	3.56	05/29/2024

Receiving Check List

Teklab Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q2

Work Order: 24050124

Report Date: 11-Jun-24

Carrier: Tracy Carroll

Received By: PRS

Completed by: Paul Schultz
On: 21-May-24

Reviewed by: Ellie Hopkins
On: 21-May-24

Pages to follow: Chain of custody 4 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C	8.7
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice	☐
Chain of custody present?	Yes ☑	No ☐			
Chain of custody signed when relinquished and received?	Yes ☑	No ☐			
Chain of custody agrees with sample labels?	Yes ☑	No ☐			
Samples in proper container/bottle?	Yes ☑	No ☐			
Sample containers intact?	Yes ☑	No ☐			
Sufficient sample volume for indicated test?	Yes ☑	No ☐			
All samples received within holding time?	Yes ☑	No ☐			
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐		
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐			
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.					
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑		
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑		
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐		
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑		

Any No responses must be detailed below or on the COC.

Samples were received on 5/20/2024 at 18:03 on ice [8.7C - LTG#5]. - pschultz - 5/21/2024 8:29:10 AM

pH strip #96651. LH - pschultz - 5/21/2024 8:29:13 AM

Additional Nitric Acid (97737) was needed in MW-05 and MW-12 upon arrival at the laboratory. LH - pschultz - 5/21/2024 8:29:16 AM

Samples were received on 5/21/2024 at 14:15 on ice [4.3C - LTG#7]. - pschultz - 5/21/2024 2:57:50 PM

pH strip #96651. - pschultz - 5/21/2024 2:58:03 PM

Additional Nitric Acid (97737) was needed in MW-27 and MW-31S upon arrival at the laboratory. - pschultz - 5/21/2024 2:58:05 PM

24050124

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES **GROUND WATER** DRINKING WATER
UST RCRA OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G	5-20-24	1312		2	1		1							X	X			24050124-001
2	MW-02	WT	G	5-20-24	1002		2	1		1							X	X			24050124-002
3	MW-03	WT	G	5-20-24	1215		2	1		1							X	X			24050124-003
4	MW-05	WT	G	5-20-24	1416		2	1		1							X	X			24050124-004
5	MW-06	WT	G	5/20/24	1248		2	1		1							X	X			24050124-005
6	MW-07	WT	G	5/20/24	1340		2	1		1							X	X			24050124-006
7	MW-07S	WT	G	5/20/24	1431		2	1		1							X	X			24050124-007
8	MW-08	WT	G	5-20-24	1342		2	1		1							X	X			24050124-008
9	MW-08S	WT	G	5-20-24	DRY		2	1		1							X	X			24050124-009
10	MW-11	WT	G	5-20-24	1124		2	1		1							X	X			24050124-010
11	MW-12	WT	G	5/20/24	1106		2	1		1							X	X			24050124-011
12	MW-20	WT	G	5-20-24	1251		2	1		1							X	X			24050124-012
13	MW-20S	WT	G				2	1		1							X	X			24050124-013
14	MW-23	WT	G	5-20-24	1050		2	1		1							X	X			24050124-014
15	MW-27	WT	G				2	1		1							X	X			24050124-015
16	MW-28	WT	G	5/20/24	1156		2	1		1							X	X			24050124-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q2 Rev 0	[signature]	5/20/24	1803	[signature]	5/20/24	1803	4.7 UGS	Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Orr

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5-20-24

Added HNO_3 (97737) to MW05 + MW12
PHV 96651 LH/PS 5/21

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

24050124

Page: 2 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Tim Arnold	Company Name:	Vistra Corp
	Kincaid, IL 62540			Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com	Purchase Order No.:		Quote Reference:	
Phone:	(217) 753-8911 Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes — MATRIX: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-30	WT	G	5-20-24	1400		2	1		1							X	X			24050124-017
2	MW-31	WT	G				2	1		1							X	X			24050124-018
3	MW-31S	WT	G				2	1		1							X	X			24050124-019
4	MW-32	WT	G	5-20-24	1340		2	1		1							X	X			24050124-020
5	PZ4!A	WT	G				2	1		1									X		24050124-021
6	PZ4!C	WT	G				2	1		1							X	X			24050124-022
7	XSG-01	WT	G				0										X	X			24050124-023
8	YSG-02	WT	G				0										X	X			24050124-024
9	YSG-03	WT	G				0										X	X			24050124-025
10	Field Blank	WT	G				2	1		1							X	X	X		24050124-026
11	MW-08 Duplicate	WT	G	5-20-24	1342		2	1		1							X	X			24050124-027
12	Equipment Blank 1	WT	G				2	1		1							X	X	X		24050124-028
13	Equipment Blank 2	WT	G				2	1		1							X	X	X		24050124-029
14	Equipment Blank 3	WT	G				2	1		1							X	X	X		24050124-030
15																					
16																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q2 Rev 0	[illegible]	5/20/24	1803	[illegible]	5/20/24	1803		Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cole

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 5-20-24

CHAIN-OF-CUSTODY / Analytical Request Document

24050124

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes — MATRIX: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G				2	1		1							X	X			24050124-001
2	MW-02	WT	G				2	1		1							X	X			24050124-002
3	MW-03	WT	G				2	1		1							X	X			24050124-003
4	MW-05	WT	G				2	1		1							X	X			24050124-004
5	MW-06	WT	G				2	1		1							X	X			24050124-005
6	MW-07	WT	G				2	1		1							X	X			24050124-006
7	MW-07S	WT	G				2	1		1							X	X			24050124-007
8	MW-08	WT	G				2	1		1							X	X			24050124-008
9	MW-08S	WT	G				2	1		1							X	X			24050124-009
10	MW-11	WT	G				2	1		1							X	X			24050124-010
11	MW-12	WT	G				2	1		1							X	X			24050124-011
12	MW-20	WT	G				2	1		1							X	X			24050124-012
13	MW-20S	WT	G	5-21-24	1009		2	1		1							X	X			24050124-013
14	MW-23	WT	G				2	1		1							X	X			24050124-014
15	MW-27	WT	G	5-21-24	1022		2	1		1							X	X			24050124-015
16	MW-28	WT	G				2	1		1							X	X			24050124-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q2 Rev 0	J. Colp	5-21	1415	[signature]	5/21/24	1415	LTG7 4.3	Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5-21-24

pH 94651
Added HNO_3 (97737) to MW27 + MW31S
PS 5/21

CHAIN-OF-CUSTODY / Analytical Request Document

24050124

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com Tim.Arnold@vistracorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Tim Arnold
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY: NPDES, **GROUND WATER**, DRINKING WATER, UST, RCRA, OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-SUP-000	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-30	WT	G				2	1		1							X	X			24050124-017
2	MW-31	WT	G	5-21-24	1053		2	1		1							X	X			24050124-018
3	MW-31S	WT	G	5-21-24	1136		2	1		1							X	X			24050124-019
4	MW-32	WT	G				2	1		1							X	X			24050124-020
5	PZ4!A	WT	G	5-21-24	1104		2	1		1									X		24050124-021
6	PZ4!C	WT	G	5-21-24	1123		2	1		1							X	X			24050124-022
7	XSG-01	WT	G				0										X	X			24050124-023
8	YSG-02	WT	G				0										X	X			24050124-024
9	YSG-03	WT	G				0										X	X			24050124-025
10	Field Blank	WT	G	5-21-24	1131		2	1		1							X	X	X		24050124-026
11	MW-08 Duplicate	WT	G				2	1		1							X	X			24050124-027
12	Equipment Blank 1	WT	G	5-21-24	1137		2	1		1							X	X	X		24050124-028
13	Equipment Blank 2	WT	G				2	1		1							X	X	X		24050124-029
14	Equipment Blank 3	WT	G				2	1		1							X	X	X		24050124-030
15																					
16																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q2 Rev 0	J. Colp	5-21	1415	[signature]	5/21/24	1415		Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 5-21-24

September 12, 2024

Eric Bauer
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
TEL: (414) 837-3607
FAX: (414) 837-3608

Illinois	100226
Illinois	1004652024-2
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: KIN-24Q3 **WorkOrder:** 24080169

Dear Eric Bauer:

TEKLAB, INC received 28 samples for KIN_NE_141 on 8/21/2024 2:40:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report,Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

This reporting package includes the following:

Abbr Definition

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

# -	Unknown hydrocarbon	B -	Analyte detected in associated Method Blank
C -	RL shown is a Client Requested Quantitation Limit	E -	Value above quantitation range
H -	Holding times exceeded	I -	Associated internal standard was outside method criteria
J -	Analyte detected below quantitation limits	M -	Manual Integration used to determine area response
ND -	Not Detected at the Reporting Limit	R -	RPD outside accepted recovery limits
S -	Spike Recovery outside recovery limits	T -	TIC(Tentatively identified compound)
X -	Value exceeds Maximum Contaminant Level		

Client: Ramboll

Client Project: KIN-24Q3

Work Order: 24080169

Report Date: 12-Sep-24

Cooler Receipt Temp: 19.1 °C

An employee of Teklab, Inc. collected the sample(s).

MW-08S could not be collected; the well was dry.

PZ-4C collection date/time per field file. EAH 8/26/24

Per Eric Bauer's request, only KIN_NE_141 data is included in this report. EAH 9/12/24

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	arenner@teklabinc.com

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2025	Collinsville
Illinois	IEPA	1004652024-2	NELAP	4/30/2025	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2025	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2025	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2025	Collinsville
Oklahoma	ODEQ	9978	NELAP	12/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2025	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2026	Collinsville
Kentucky	UST	0073		1/31/2025	Collinsville
Mississippi	MSDH			4/30/2025	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville
Missouri	MDNR	00930		10/31/2026	Collinsville

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-001
Client Sample ID: MW-01
Matrix: GROUNDWATER
Collection Date: 08/19/2024 10:26

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**16.24**	ft	1	08/19/2024 10:26	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**8.1**	NTU	1	08/19/2024 10:26	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**144**	mV	1	08/19/2024 10:26	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**558**	µS/cm	1	08/19/2024 10:26	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.8**	°C	1	08/19/2024 10:26	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**2.60**	mg/L	1	08/19/2024 10:26	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.13**		1	08/19/2024 10:26	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	09/03/2024 14:59	227396
Manganese	NELAP	0.0008	0.0020		**0.476**	mg/L	5	08/30/2024 11:51	227396

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-002 **Client Sample ID:** MW-02

Matrix: GROUNDWATER **Collection Date:** 08/19/2024 10:29

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**17.49**	ft	1	08/19/2024 10:29	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**200**	NTU	1	08/19/2024 10:29	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**84**	mV	1	08/19/2024 10:29	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**750**	µS/cm	1	08/19/2024 10:29	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**21.1**	°C	1	08/19/2024 10:29	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.10**	mg/L	1	08/19/2024 10:29	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**7.06**		1	08/19/2024 10:29	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.194**	mg/L	5	09/03/2024 15:05	227396
Manganese	NELAP	0.0008	0.0020		**0.213**	mg/L	5	08/30/2024 11:57	227396

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll | **Work Order:** 24080169
Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24
Lab ID: 24080169-003 | **Client Sample ID:** MW-03
Matrix: GROUNDWATER | **Collection Date:** 08/19/2024 11:32

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**8.70**	ft	1	08/19/2024 11:32	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**1.4**	NTU	1	08/19/2024 11:32	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**89**	mV	1	08/19/2024 11:32	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**892**	µS/cm	1	08/19/2024 11:32	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.2**	°C	1	08/19/2024 11:32	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.57**	mg/L	1	08/19/2024 11:32	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.69**		1	08/19/2024 11:32	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	09/03/2024 15:11	227396
Manganese	NELAP	0.0008	0.0020		**0.0474**	mg/L	5	08/30/2024 12:03	227396

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-005 **Client Sample ID:** MW-05

Matrix: GROUNDWATER **Collection Date:** 08/19/2024 13:26

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**28.00**	ft	1	08/19/2024 13:26	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**18**	NTU	1	08/19/2024 13:26	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**2**	mV	1	08/19/2024 13:26	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1230**	µS/cm	1	08/19/2024 13:26	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.5**	°C	1	08/19/2024 13:26	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.36**	mg/L	1	08/19/2024 13:26	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.55**		1	08/19/2024 13:26	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.100**	mg/L	5	09/03/2024 13:56	227396
Manganese	NELAP	0.0008	0.0020		**0.237**	mg/L	5	08/30/2024 13:40	227396

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-006 **Client Sample ID:** MW-06

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 11:14

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**11.57**	ft	1	08/20/2024 11:14	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**3.7**	NTU	1	08/20/2024 11:14	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**88**	mV	1	08/20/2024 11:14	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**746**	µS/cm	1	08/20/2024 11:14	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.9**	°C	1	08/20/2024 11:14	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.96**	mg/L	1	08/20/2024 11:14	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.45**		1	08/20/2024 11:14	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	08/29/2024 11:58	227416
Manganese	NELAP	0.0008	0.0020		**0.0082**	mg/L	5	08/29/2024 11:58	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-007 **Client Sample ID:** MW-07

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 9:48

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**10.24**	ft	1	08/20/2024 9:48	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**7.0**	NTU	1	08/20/2024 9:48	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-140**	mV	1	08/20/2024 9:48	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1230**	µS/cm	1	08/20/2024 9:48	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.4**	°C	1	08/20/2024 9:48	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**0.72**	mg/L	1	08/20/2024 9:48	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.83**		1	08/20/2024 9:48	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**1.46**	mg/L	5	08/29/2024 12:03	227416
Manganese	NELAP	0.0038	0.0100		**4.71**	mg/L	25	08/30/2024 13:46	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-008 **Client Sample ID:** MW-07S

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 10:11

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**10.64**	ft	1	08/20/2024 10:11	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**10**	NTU	1	08/20/2024 10:11	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-66**	mV	1	08/20/2024 10:11	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1600**	µS/cm	1	08/20/2024 10:11	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**19.3**	°C	1	08/20/2024 10:11	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.00**	mg/L	1	08/20/2024 10:11	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.66**		1	08/20/2024 10:11	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**7.47**	mg/L	5	08/29/2024 12:07	227416
Manganese	NELAP	0.0075	0.0200		**10.1**	mg/L	50	08/30/2024 14:41	227416

Client: Ramboll | **Work Order:** 24080169

Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24

Lab ID: 24080169-009 | **Client Sample ID:** MW-08

Matrix: GROUNDWATER | **Collection Date:** 08/20/2024 10:19

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.33**	ft	1	08/20/2024 10:19	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**1.2**	NTU	1	08/20/2024 10:19	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**119**	mV	1	08/20/2024 10:19	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**763**	µS/cm	1	08/20/2024 10:19	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.7**	°C	1	08/20/2024 10:19	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**0.51**	mg/L	1	08/20/2024 10:19	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.41**		1	08/20/2024 10:19	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.012	0.025	J	**0.012**	mg/L	5	08/29/2024 12:44	227416
Manganese	NELAP	0.0030	0.0080		**5.76**	mg/L	20	08/30/2024 13:52	227416

Teklab, Inc. Environmental Laboratory

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-010 **Client Sample ID:** MW-08S

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 0:00

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.53**	ft	1	08/20/2024 10:29	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**Well dry**	NTU	1	08/20/2024 10:29	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**Well dry**	mV	1	08/20/2024 10:29	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**Well dry**	µS/cm	1	08/20/2024 10:29	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**Well dry**	°C	1	08/20/2024 10:29	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**Well dry**	mg/L	1	08/20/2024 10:29	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**Well dry**		1	08/20/2024 10:29	R352267

Client: Ramboll | **Work Order:** 24080169

Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24

Lab ID: 24080169-013 | **Client Sample ID:** MW-11

Matrix: GROUNDWATER | **Collection Date:** 08/20/2024 10:57

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**11.97**	ft	1	08/20/2024 10:57	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**2.4**	NTU	1	08/20/2024 10:57	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**36**	mV	1	08/20/2024 10:57	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1030**	µS/cm	1	08/20/2024 10:57	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.9**	°C	1	08/20/2024 10:57	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**0.77**	mg/L	1	08/20/2024 10:57	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.67**		1	08/20/2024 10:57	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.0461**	mg/L	5	08/29/2024 12:49	227416
Manganese	NELAP	0.0008	0.0020		**0.108**	mg/L	5	08/29/2024 12:49	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-014 **Client Sample ID:** MW-12

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 12:56

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**7.21**	ft	1	08/20/2024 12:56	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**16**	NTU	1	08/20/2024 12:56	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-67**	mV	1	08/20/2024 12:56	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1420**	µS/cm	1	08/20/2024 12:56	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.4**	°C	1	08/20/2024 12:56	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.52**	mg/L	1	08/20/2024 12:56	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.74**		1	08/20/2024 12:56	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**2.33**	mg/L	5	08/29/2024 12:54	227416
Manganese	NELAP	0.0008	0.0020		**0.365**	mg/L	5	08/29/2024 12:54	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-015 **Client Sample ID:** MW-20

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 11:18

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.80**	ft	1	08/21/2024 11:18	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**15**	NTU	1	08/21/2024 11:18	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-41**	mV	1	08/21/2024 11:18	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**980**	µS/cm	1	08/21/2024 11:18	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.9**	°C	1	08/21/2024 11:18	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.03**	mg/L	1	08/21/2024 11:18	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.90**		1	08/21/2024 11:18	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.115**	mg/L	5	08/30/2024 8:35	227476
Manganese	NELAP	0.0008	0.0020		**0.150**	mg/L	5	08/29/2024 14:03	227476

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-016 **Client Sample ID:** MW-20S

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 11:47

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.76**	ft	1	08/20/2024 11:47	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**8.8**	NTU	1	08/20/2024 11:47	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**30**	mV	1	08/20/2024 11:47	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1430**	µS/cm	1	08/20/2024 11:47	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**19.0**	°C	1	08/20/2024 11:47	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**1.60**	mg/L	1	08/20/2024 11:47	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.60**		1	08/20/2024 11:47	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.129**	mg/L	5	08/29/2024 12:58	227416
Manganese	NELAP	0.0008	0.0020		**0.141**	mg/L	5	08/29/2024 12:58	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-017 **Client Sample ID:** MW-23

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 10:19

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**16.59**	ft	1	08/21/2024 10:19	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**< 1.0**	NTU	1	08/21/2024 10:19	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-150**	mV	1	08/21/2024 10:19	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**954**	µS/cm	1	08/21/2024 10:19	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.2**	°C	1	08/21/2024 10:19	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.31**	mg/L	1	08/21/2024 10:19	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.80**		1	08/21/2024 10:19	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.563**	mg/L	5	08/30/2024 8:41	227476
Manganese	NELAP	0.0008	0.0020		**4.52**	mg/L	5	08/29/2024 14:07	227476

Laboratory Results

http://www.teklabinc.com/

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-018
Client Sample ID: MW-27
Matrix: GROUNDWATER
Collection Date: 08/21/2024 10:25

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**16.34**	ft	1	08/21/2024 10:25	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**43**	NTU	1	08/21/2024 10:25	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-6**	mV	1	08/21/2024 10:25	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**993**	µS/cm	1	08/21/2024 10:25	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.4**	°C	1	08/21/2024 10:25	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.69**	mg/L	1	08/21/2024 10:25	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.54**		1	08/21/2024 10:25	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**1.95**	mg/L	5	08/30/2024 8:47	227476
Manganese	NELAP	0.0008	0.0020		**4.39**	mg/L	5	08/29/2024 14:12	227476

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-019 **Client Sample ID:** MW-28

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 12:02

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**7.93**	ft	1	08/20/2024 12:02	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**< 1.0**	NTU	1	08/20/2024 12:02	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**77**	mV	1	08/20/2024 12:02	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**2290**	µS/cm	1	08/20/2024 12:02	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.5**	°C	1	08/20/2024 12:02	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.84**	mg/L	1	08/20/2024 12:02	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.73**		1	08/20/2024 12:02	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.012	0.025	J	**0.018**	mg/L	5	08/29/2024 13:03	227416
Manganese	NELAP	0.0008	0.0020		**1.87**	mg/L	5	08/29/2024 13:03	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-020 **Client Sample ID:** MW-30

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 10:09

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**25.29**	ft	1	08/20/2024 10:09	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**< 1.0**	NTU	1	08/20/2024 10:09	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-101**	mV	1	08/20/2024 10:09	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1030**	µS/cm	1	08/20/2024 10:09	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.3**	°C	1	08/20/2024 10:09	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.30**	mg/L	1	08/20/2024 10:09	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.61**		1	08/20/2024 10:09	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0460	0.100	S	**6.25**	mg/L	20	09/03/2024 12:26	227416
Manganese	NELAP	0.0030	0.0080	S	**4.01**	mg/L	20	08/30/2024 12:27	227416

Matrix spike did not recover within control limits due to sample composition. Verified by re-prep and re-analysis.

Client: Ramboll　　**Work Order:** 24080169

Client Project: KIN-24Q3　　**Report Date:** 12-Sep-24

Lab ID: 24080169-021　　**Client Sample ID:** MW-31

Matrix: GROUNDWATER　　**Collection Date:** 08/21/2024 12:17

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**32.18**	ft	1	08/21/2024 12:17	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**< 1.0**	NTU	1	08/21/2024 12:17	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-90**	mV	1	08/21/2024 12:17	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1040**	µS/cm	1	08/21/2024 12:17	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.7**	°C	1	08/21/2024 12:17	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**3.56**	mg/L	1	08/21/2024 12:17	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.69**		1	08/21/2024 12:17	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**4.61**	mg/L	5	09/03/2024 14:09	227476
Manganese	NELAP	0.0008	0.0020		**0.450**	mg/L	5	08/29/2024 14:26	227476

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-022 **Client Sample ID:** MW-31S

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 10:01

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**21.90**	ft	1	08/21/2024 10:01	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**19**	NTU	1	08/21/2024 10:01	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-68**	mV	1	08/21/2024 10:01	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1310**	µS/cm	1	08/21/2024 10:01	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**21.2**	°C	1	08/21/2024 10:01	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**5.58**	mg/L	1	08/21/2024 10:01	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.71**		1	08/21/2024 10:01	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**6.30**	mg/L	5	08/30/2024 8:53	227476
Manganese	NELAP	0.0008	0.0020		**1.02**	mg/L	5	08/29/2024 14:16	227476

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-023
Client Sample ID: MW-32
Matrix: GROUNDWATER
Collection Date: 08/20/2024 12:48

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**25.16**	ft	1	08/20/2024 12:48	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**2.3**	NTU	1	08/20/2024 12:48	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**16**	mV	1	08/20/2024 12:48	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1410**	µS/cm	1	08/20/2024 12:48	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.2**	°C	1	08/20/2024 12:48	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**1.10**	mg/L	1	08/20/2024 12:48	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.41**		1	08/20/2024 12:48	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.0321**	mg/L	5	08/29/2024 13:07	227416
Manganese	NELAP	0.0008	0.0020		**3.76**	mg/L	5	08/29/2024 13:07	227416

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-024 **Client Sample ID:** MW-33S

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 11:26

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**10.99**	ft	1	08/21/2024 11:26	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**4.0**	NTU	1	08/21/2024 11:26	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**134**	mV	1	08/21/2024 11:26	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**765**	µS/cm	1	08/21/2024 11:26	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.5**	°C	1	08/21/2024 11:26	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**2.81**	mg/L	1	08/21/2024 11:26	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.60**		1	08/21/2024 11:26	R352267
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**422**	mg/L	1	08/22/2024 10:25	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 10:25	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**796**	mg/L	1	08/23/2024 14:02	R352309
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50	J	**0.14**	mg/L	10	08/22/2024 8:44	R352127
Chloride	*	1.00	5.00		**24.7**	mg/L	10	08/22/2024 8:44	R352127
Sulfate	*	0.33	10.0		**169**	mg/L	10	08/22/2024 8:44	R352127
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**152**	mg/L	1	08/26/2024 18:48	227422
Magnesium	NELAP	0.0055	0.0500		**77.4**	mg/L	1	08/26/2024 18:48	227422
Potassium	NELAP	0.0400	0.100		**1.18**	mg/L	1	08/26/2024 18:48	227422
Sodium	NELAP	0.0180	0.0500		**21.8**	mg/L	1	08/26/2024 18:48	227422
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	08/30/2024 10:38	227476
Manganese	NELAP	0.0008	0.0020		**0.0340**	mg/L	5	08/29/2024 14:21	227476
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	08/23/2024 17:57	227422
Arsenic	NELAP	0.0004	0.0010	J	**0.0008**	mg/L	5	08/23/2024 17:57	227422
Barium	NELAP	0.0007	0.0010		**0.0723**	mg/L	5	08/23/2024 17:57	227422
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 17:57	227422
Boron	NELAP	0.0092	0.0250		**0.183**	mg/L	5	08/23/2024 17:57	227422
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 17:57	227422
Chromium	NELAP	0.0007	0.0015		**0.0038**	mg/L	5	08/23/2024 17:57	227422
Cobalt	*	0.0001	0.0010	J	**0.0003**	mg/L	5	08/23/2024 17:57	227422
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 17:57	227422
Lithium	*	0.0015	0.0030		**0.0032**	mg/L	5	08/23/2024 17:57	227422
Molybdenum	NELAP	0.0006	0.0015	J	**0.0007**	mg/L	5	08/23/2024 17:57	227422
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 17:57	227422
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/23/2024 17:57	227422

CCV recovered outside the upper control limits for Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-024
Client Sample ID: MW-33S
Matrix: GROUNDWATER
Collection Date: 08/21/2024 11:26

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 15:50	227494

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-025 **Client Sample ID:** MW-34S

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 11:56

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**10.54**	ft	1	08/20/2024 11:56	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**6.6**	NTU	1	08/20/2024 11:56	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**79**	mV	1	08/20/2024 11:56	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**827**	µS/cm	1	08/20/2024 11:56	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.7**	°C	1	08/20/2024 11:56	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.00**	mg/L	1	08/20/2024 11:56	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.60**		1	08/20/2024 11:56	R352267
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**349**	mg/L	1	08/22/2024 11:17	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 11:17	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**942**	mg/L	1	08/21/2024 10:20	R352173
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50	J	**0.21**	mg/L	10	08/21/2024 13:26	R352071
Chloride	*	1.00	5.00		**31.0**	mg/L	10	08/21/2024 13:26	R352071
Sulfate	*	0.33	10.0		**247**	mg/L	10	08/21/2024 13:26	R352071
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**173**	mg/L	1	08/26/2024 16:40	227390
Magnesium	NELAP	0.0055	0.0500		**80.3**	mg/L	1	08/26/2024 16:40	227390
Potassium	NELAP	0.0400	0.100		**1.81**	mg/L	1	08/22/2024 17:04	227390
Sodium	NELAP	0.0180	0.0500		**17.9**	mg/L	1	08/26/2024 16:40	227390
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	08/29/2024 13:12	227416
Manganese	NELAP	0.0008	0.0020		**0.0100**	mg/L	5	08/29/2024 13:12	227416
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	J	**0.0009**	mg/L	5	08/22/2024 14:21	227390
Arsenic	NELAP	0.0004	0.0010		**0.0012**	mg/L	5	08/22/2024 14:21	227390
Barium	NELAP	0.0007	0.0010		**0.118**	mg/L	5	08/22/2024 14:21	227390
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/22/2024 14:21	227390
Boron	NELAP	0.0092	0.0250		**0.297**	mg/L	5	08/23/2024 13:47	227390
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	08/22/2024 14:21	227390
Chromium	NELAP	0.0007	0.0015		**0.0058**	mg/L	5	08/22/2024 14:21	227390
Cobalt	*	0.0001	0.0010	J	**0.0002**	mg/L	5	08/22/2024 14:21	227390
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/22/2024 14:21	227390
Lithium	*	0.0015	0.0030	J	**0.0028**	mg/L	5	08/22/2024 14:21	227390
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	08/22/2024 14:21	227390
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/22/2024 14:21	227390
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/22/2024 14:21	227390

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-025
Client Sample ID: MW-34S
Matrix: GROUNDWATER
Collection Date: 08/20/2024 11:56

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
CCV recovered outside the upper control limits Be, Co, Pb, Li, and Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 13:15	227423

Laboratory Results

http://www.teklabinc.com/

Teklab, Inc. Environmental Laboratory

Client: Ramboll
Work Order: 24080169
Client Project: KIN-24Q3
Report Date: 12-Sep-24
Lab ID: 24080169-026
Client Sample ID: MW-35S
Matrix: GROUNDWATER
Collection Date: 08/21/2024 12:30

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.77**	ft	1	08/21/2024 12:30	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**31**	NTU	1	08/21/2024 12:30	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**130**	mV	1	08/21/2024 12:30	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**775**	µS/cm	1	08/21/2024 12:30	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**18.6**	°C	1	08/21/2024 12:30	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.39**	mg/L	1	08/21/2024 12:30	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.67**		1	08/21/2024 12:30	R352267
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**322**	mg/L	1	08/22/2024 9:27	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 9:27	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**774**	mg/L	1	08/23/2024 14:02	R352309
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50	J	**0.18**	mg/L	10	08/22/2024 12:02	R352127
Chloride	*	1.00	5.00		**40.3**	mg/L	10	08/22/2024 12:02	R352127
Sulfate	*	0.33	10.0		**133**	mg/L	10	08/22/2024 12:02	R352127
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**145**	mg/L	1	08/26/2024 18:49	227422
Magnesium	NELAP	0.0055	0.0500		**72.5**	mg/L	1	08/26/2024 18:49	227422
Potassium	NELAP	0.0400	0.100		**1.36**	mg/L	1	08/26/2024 18:49	227422
Sodium	NELAP	0.0180	0.0500		**18.6**	mg/L	1	08/26/2024 18:49	227422
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.012	0.025	J	**0.015**	mg/L	5	08/30/2024 10:45	227476
Manganese	NELAP	0.0008	0.0020		**0.0177**	mg/L	5	08/29/2024 14:58	227476
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:03	227422
Arsenic	NELAP	0.0004	0.0010	J	**0.0008**	mg/L	5	08/23/2024 18:03	227422
Barium	NELAP	0.0007	0.0010		**0.0790**	mg/L	5	08/23/2024 18:03	227422
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:03	227422
Boron	NELAP	0.0092	0.0250		**0.142**	mg/L	5	08/23/2024 18:03	227422
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:03	227422
Chromium	NELAP	0.0007	0.0015		**0.0040**	mg/L	5	08/23/2024 18:03	227422
Cobalt	*	0.0001	0.0010	J	**0.0002**	mg/L	5	08/23/2024 18:03	227422
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:03	227422
Lithium	*	0.0015	0.0030	J	**0.0024**	mg/L	5	08/23/2024 18:03	227422
Molybdenum	NELAP	0.0006	0.0015	J	**0.0009**	mg/L	5	08/23/2024 18:03	227422
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:03	227422
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/23/2024 18:03	227422

CCV recovered outside the upper control limits for Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: Ramboll | **Work Order:** 24080169

Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24

Lab ID: 24080169-026 | **Client Sample ID:** MW-35S

Matrix: GROUNDWATER | **Collection Date:** 08/21/2024 12:30

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 15:56	227494

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-027 **Client Sample ID:** PZ-4A

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 11:23

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.03**	ft	1	08/21/2024 11:23	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**4.1**	NTU	1	08/21/2024 11:23	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**27**	mV	1	08/21/2024 11:23	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1130**	µS/cm	1	08/21/2024 11:23	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**20.3**	°C	1	08/21/2024 11:23	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.32**	mg/L	1	08/21/2024 11:23	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.57**		1	08/21/2024 11:23	R352267
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**529**	mg/L	1	08/22/2024 9:33	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 9:33	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**710**	mg/L	1	08/23/2024 14:02	R352309
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50	J	**0.24**	mg/L	10	08/22/2024 9:19	R352127
Chloride	*	1.00	5.00		**17.6**	mg/L	10	08/22/2024 9:19	R352127
Sulfate	*	0.33	10.0		**113**	mg/L	10	08/22/2024 9:19	R352127
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**142**	mg/L	1	08/26/2024 18:59	227422
Magnesium	NELAP	0.0055	0.0500		**77.6**	mg/L	1	08/26/2024 18:59	227422
Potassium	NELAP	0.0400	0.100		**0.246**	mg/L	1	08/26/2024 18:59	227422
Sodium	NELAP	0.0180	0.0500		**19.1**	mg/L	1	08/26/2024 18:59	227422
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**0.0392**	mg/L	5	08/30/2024 10:57	227476
Manganese	NELAP	0.0008	0.0020		**0.0390**	mg/L	5	08/29/2024 15:30	227476
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	J	**0.0009**	mg/L	5	08/23/2024 18:54	227422
Arsenic	NELAP	0.0004	0.0010	J	**0.0004**	mg/L	5	08/23/2024 18:54	227422
Barium	NELAP	0.0007	0.0010		**0.0557**	mg/L	5	08/23/2024 18:54	227422
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:54	227422
Boron	NELAP	0.0092	0.0250		**0.672**	mg/L	5	08/23/2024 18:54	227422
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:54	227422
Chromium	NELAP	0.0007	0.0015	J	**0.0014**	mg/L	5	08/23/2024 18:54	227422
Cobalt	*	0.0001	0.0010	J	**0.0001**	mg/L	5	08/23/2024 18:54	227422
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:54	227422
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	08/23/2024 18:54	227422
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	08/23/2024 18:54	227422
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 18:54	227422
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/23/2024 18:54	227422

CCV recovered outside the upper control limits for Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-027 **Client Sample ID:** PZ-4A

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 11:23

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 15:59	227494

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-028 **Client Sample ID:** PZ-4C

Matrix: GROUNDWATER **Collection Date:** 08/21/2024 10:54

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.09**	ft	1	08/21/2024 10:54	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**96**	NTU	1	08/21/2024 10:54	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**-68**	mV	1	08/21/2024 10:54	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**950**	µS/cm	1	08/21/2024 10:54	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.6**	°C	1	08/21/2024 10:54	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**1.94**	mg/L	1	08/21/2024 10:54	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.83**		1	08/21/2024 10:54	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**1.78**	mg/L	5	08/30/2024 10:51	227476
Manganese	NELAP	0.0008	0.0020		**0.406**	mg/L	5	08/29/2024 15:02	227476

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-031 **Client Sample ID:** Field Blank

Matrix: AQUEOUS **Collection Date:** 08/21/2024 12:40

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**2**	mg/L	1	08/22/2024 9:47	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 9:47	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**< 20**	mg/L	1	08/23/2024 14:24	R352309
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50		**ND**	mg/L	10	08/22/2024 10:06	R352127
Chloride	*	1.00	5.00		**ND**	mg/L	10	08/22/2024 10:06	R352127
Sulfate	*	0.33	10.0		**ND**	mg/L	10	08/22/2024 10:06	R352127
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	08/26/2024 19:02	227422
Magnesium	NELAP	0.0055	0.050	J	**0.0076**	mg/L	1	08/26/2024 19:02	227422
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	08/26/2024 19:02	227422
Sodium	NELAP	0.0180	0.0500		**< 0.0500**	mg/L	1	08/26/2024 19:02	227422
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	09/03/2024 14:03	227476
Manganese	NELAP	0.0008	0.0020		**0.0057**	mg/L	5	08/29/2024 15:07	227476
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Boron	NELAP	0.0092	0.0250		**< 0.0250**	mg/L	5	08/23/2024 19:06	227422
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	08/23/2024 19:06	227422
Cobalt	*	0.0001	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	08/23/2024 19:06	227422
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	08/23/2024 19:06	227422
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:06	227422
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/23/2024 19:06	227422
CCV recovered outside the upper control limits for Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 16:03	227494

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-032 **Client Sample ID:** MW-08 Duplicate

Matrix: GROUNDWATER **Collection Date:** 08/20/2024 10:19

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**9.33**	ft	1	08/20/2024 10:19	R352267
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**1.2**	NTU	1	08/20/2024 10:19	R352267
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-300	-300		**119**	mV	1	08/20/2024 10:19	R352267
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**763**	µS/cm	1	08/20/2024 10:19	R352267
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.7**	°C	1	08/20/2024 10:19	R352267
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**0.51**	mg/L	1	08/20/2024 10:19	R352267
SW-846 9040B FIELD									
pH	*	0	1.00		**6.41**		1	08/20/2024 10:19	R352267
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	09/03/2024 15:42	227416
Manganese	NELAP	0.0038	0.0100	S	**5.67**	mg/L	25	08/30/2024 15:23	227416

Matrix spike did not recover within control limits due to sample composition. Verified by re-prep and re-analysis.

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

Lab ID: 24080169-033 **Client Sample ID:** Equipment Blank

Matrix: AQUEOUS **Collection Date:** 08/21/2024 12:45

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	08/22/2024 9:51	R352182
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	08/22/2024 9:51	R352182
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**< 20**	mg/L	1	08/26/2024 19:04	R352374
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	*	0.03	0.50		**ND**	mg/L	10	08/22/2024 10:17	R352127
Chloride	*	1.00	5.00		**ND**	mg/L	10	08/22/2024 10:17	R352127
Sulfate	*	0.33	10.0		**ND**	mg/L	10	08/22/2024 10:17	R352127
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.035	0.10	J	**0.081**	mg/L	1	08/26/2024 19:03	227422
Magnesium	NELAP	0.0055	0.050	J	**0.028**	mg/L	1	08/26/2024 19:03	227422
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	08/26/2024 19:03	227422
Sodium	NELAP	0.0180	0.0500		**0.0826**	mg/L	1	08/26/2024 19:03	227422
SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)									
Iron	NELAP	0.0115	0.0250		**< 0.0250**	mg/L	5	09/03/2024 14:52	227476
Manganese	NELAP	0.0008	0.0020	J	**0.0009**	mg/L	5	08/29/2024 15:12	227476
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010	J	**0.0006**	mg/L	5	08/23/2024 19:17	227422
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:17	227422
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	09/04/2024 13:03	227920
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:17	227422
Boron	NELAP	0.0092	0.0250		**< 0.0250**	mg/L	5	08/23/2024 19:17	227422
Cadmium	*	0.0002	0.0010		**< 0.0010**	mg/L	5	09/04/2024 13:03	227920
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	09/04/2024 13:03	227920
Cobalt	*	0.0001	0.0010	J	**0.0001**	mg/L	5	09/04/2024 13:03	227920
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	09/05/2024 8:14	227920
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	08/23/2024 19:17	227422
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	08/23/2024 19:17	227422
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	08/23/2024 19:17	227422
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	08/23/2024 19:17	227422
CCV recovered outside the upper control limits for Tl. Sample results are below the reporting limit. Data is reportable per the TNI standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	08/22/2024 16:06	227494

Sample Summary

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q3

Work Order: 24080169

Report Date: 12-Sep-24

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
24080169-001	MW-01	Groundwater	4	08/19/2024 10:26
24080169-002	MW-02	Groundwater	4	08/19/2024 10:29
24080169-003	MW-03	Groundwater	4	08/19/2024 11:32
24080169-005	MW-05	Groundwater	4	08/19/2024 13:26
24080169-006	MW-06	Groundwater	4	08/20/2024 11:14
24080169-007	MW-07	Groundwater	4	08/20/2024 9:48
24080169-008	MW-07S	Groundwater	3	08/20/2024 10:11
24080169-009	MW-08	Groundwater	4	08/20/2024 10:19
24080169-010	MW-08S	Groundwater	3	08/20/2024 0:00
24080169-013	MW-11	Groundwater	4	08/20/2024 10:57
24080169-014	MW-12	Groundwater	4	08/20/2024 12:56
24080169-015	MW-20	Groundwater	3	08/21/2024 11:18
24080169-016	MW-20S	Groundwater	3	08/20/2024 11:47
24080169-017	MW-23	Groundwater	3	08/21/2024 10:19
24080169-018	MW-27	Groundwater	3	08/21/2024 10:25
24080169-019	MW-28	Groundwater	3	08/20/2024 12:02
24080169-020	MW-30	Groundwater	3	08/20/2024 10:09
24080169-021	MW-31	Groundwater	3	08/21/2024 12:17
24080169-022	MW-31S	Groundwater	3	08/21/2024 10:01
24080169-023	MW-32	Groundwater	3	08/20/2024 12:48
24080169-024	MW-33S	Groundwater	3	08/21/2024 11:26
24080169-025	MW-34S	Groundwater	3	08/20/2024 11:56
24080169-026	MW-35S	Groundwater	3	08/21/2024 12:30
24080169-027	PZ-4A	Groundwater	3	08/21/2024 11:23
24080169-028	PZ-4C	Groundwater	3	08/21/2024 10:54
24080169-031	Field Blank	Aqueous	4	08/21/2024 12:40
24080169-032	MW-08 Duplicate	Groundwater	4	08/20/2024 10:19
24080169-033	Equipment Blank	Aqueous	4	08/21/2024 12:45

STANDARD METHODS 2510 B FIELD

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-1-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	08/19/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-1-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.6	90	110	08/19/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-1-TC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1420**	1412	0	100.8	90	110	08/20/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-2-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	08/20/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-2-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.9	90	110	08/20/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-2-TC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.1	90	110	08/21/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-3-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.9	90	110	08/21/2024

Batch R352267 **SampType:** LCS Units **µS/cm**
SampID: LCS-3-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.6	90	110	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 9040B FIELD

Batch R352267 **SampType:** LCS Units
SampID: LCS-1-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	08/19/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-1-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.00**	7.000	0	100.0	98.57	101.4	08/19/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-1-TC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.06**	7.000	0	100.9	98.57	101.4	08/20/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-2-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	08/20/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-2-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	08/20/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-2-TC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.03**	7.000	0	100.4	98.57	101.4	08/21/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-3-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.00**	7.000	0	100.0	98.57	101.4	08/21/2024

Batch R352267 **SampType:** LCS Units
SampID: LCS-3-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R352109 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/20/2024

Batch R352109 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**998**	1000	0	99.8	90	110	08/20/2024

Batch R352109 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24080169-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**524**				518.0	1.15	08/20/2024

Batch R352173 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/21/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/21/2024

Batch R352173 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**986**	1000	0	98.6	90	110	08/21/2024
Total Dissolved Solids		20		**984**	1000	0	98.4	90	110	08/21/2024

Batch R352173 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24071451-100ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**1440**				1394	3.11	08/21/2024

Batch R352173 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24071451-102ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**706**				706.0	0.00	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R352173 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24081724-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**430**				422.0	1.88	08/21/2024

Batch R352309 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/23/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/23/2024

Batch R352309 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**978**	1000	0	97.8	90	110	08/23/2024
Total Dissolved Solids		20		**964**	1000	0	96.4	90	110	08/23/2024

Batch R352309 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24080169-026ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**764**				774.0	1.30	08/23/2024

Batch R352309 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24081888-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**1070**				1104	2.94	08/23/2024

Batch R352374 **SampType:** MBLK Units **mg/L**

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/26/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	08/26/2024

Batch R352374 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**996**	1000	0	99.6	90	110	08/26/2024
Total Dissolved Solids		20		**934**	1000	0	93.4	90	110	08/26/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R352374 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24081839-003ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**395**				435.0	9.64	08/26/2024

Batch R352374 **SampType:** DUP Units mg/L RPD Limit 10

SampID: 24081865-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**2560**				2514	1.89	08/26/2024

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R351946 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/19/2024
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/19/2024

Batch R351946 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.31**	0.3045	0	103.1	90	110	08/19/2024
Nitrogen, Nitrite (as N)		0.05		**0.31**	0.3045	0	102.5	90	110	08/19/2024

Batch R351946 **SampType:** MS Units mg/L

SampID: 24080169-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.49**	0.5000	0.006000	97.0	85	115	08/19/2024

Batch R351946 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24080169-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0.006000	97.8	0.4910	0.81	08/19/2024

Batch R351946 **SampType:** MS Units mg/L

SampID: 24081553-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.55**	0.5000	0.05500	99.4	85	115	08/19/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R351946 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24081553-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.55**	0.5000	0.05500	99.4	0.5520	0.00	08/19/2024

Batch R351946 **SampType:** MS Units mg/L

SampID: 24081568-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.49**	0.5000	0.01800	94.8	85	115	08/19/2024

Batch R351946 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24081568-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.49**	0.5000	0.01800	93.8	0.4920	1.02	08/19/2024

Batch R352055 **SampType:** MBLK Units mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/20/2024
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/20/2024

Batch R352055 **SampType:** LCS Units mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.31**	0.3045	0	100.5	90	110	08/20/2024
Nitrogen, Nitrite (as N)		0.05		**0.31**	0.3045	0	100.8	90	110	08/20/2024

Batch R352055 **SampType:** MS Units mg/L

SampID: 24080169-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.51**	0.5000	0.008000	101.2	85	115	08/20/2024

Batch R352055 **SampType:** MSD Units mg/L RPD Limit 10

SampID: 24080169-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.52**	0.5000	0.008000	101.8	0.5140	0.58	08/20/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R352055 **SampType:** MS Units mg/L
SampID: 24081666-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.56**	0.5000	0.05900	100.8	85	115	08/20/2024

Batch R352055 **SampType:** MSD Units mg/L RPD Limit **10**
SampID: 24081666-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.56**	0.5000	0.05900	100.6	0.5630	0.18	08/20/2024

Batch R352055 **SampType:** MS Units mg/L
SampID: 24081724-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0	100.2	85	115	08/20/2024

Batch R352055 **SampType:** MSD Units mg/L RPD Limit **10**
SampID: 24081724-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0	100.0	0.5010	0.20	08/20/2024

Batch R352101 **SampType:** MBLK Units mg/L
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/21/2024
Nitrogen, Nitrite (as N)		0.05	J	**0.01**	0.0250	0	24.0	-100	100	08/21/2024

Batch R352101 **SampType:** LCS Units mg/L
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.30**	0.3045	0	99.5	90	110	08/21/2024
Nitrogen, Nitrite (as N)		0.05		**0.31**	0.3045	0	101.5	90	110	08/21/2024

Batch R352101 **SampType:** MS Units mg/L
SampID: 24080169-031AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0.006000	98.6	85	115	08/21/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q3
Work Order: 24080169
Report Date: 12-Sep-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24080169-031AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0.006000	98.2	0.4990	0.40	08/21/2024

Batch R352101 **SampType:** MS Units **mg/L**
SampID: 24081731-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.007000	94.8	85	115	08/21/2024

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081731-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.007000	94.2	0.4810	0.63	08/21/2024

Batch R352101 **SampType:** MS Units **mg/L**
SampID: 24081733-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.006000	95.8	85	115	08/21/2024

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081733-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.006000	95.2	0.4850	0.62	08/21/2024

Batch R352101 **SampType:** MS Units **mg/L**
SampID: 24081733-011BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.006000	95.8	85	115	08/21/2024

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081733-011BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.48**	0.5000	0.006000	94.4	0.4850	1.45	08/21/2024

Batch R352101 **SampType:** MS Units **mg/L**
SampID: 24081796-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.47**	0.5000	0.01400	91.0	85	115	08/21/2024

Client: Ramboll | **Work Order:** 24080169

Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO2 B (TOTAL) 2000, 2011

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081796-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.46**	0.5000	0.01400	90.2	0.4690	0.86	08/21/2024

Batch R352101 **SampType:** MS Units **mg/L**
SampID: 24081839-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.50**	0.5000	0.006000	98.6	85	115	08/21/2024

Batch R352101 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081839-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrite (as N)		0.05		**0.49**	0.5000	0.006000	97.6	0.4990	1.01	08/21/2024

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352067 **SampType:** MBLK Units **mg/L**
SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate (as N)		0.050		**< 0.050**						08/20/2024
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	08/20/2024

Batch R352067 **SampType:** LCS Units **mg/L**
SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.522**	0.5000	0	104.4	90	110	08/20/2024

Batch R352067 **SampType:** MS Units **mg/L**
SampID: 24081352-002CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**5.02**	2.500	2.495	101.1	90	110	08/20/2024

Batch R352067 **SampType:** MSD Units **mg/L** RPD Limit **10**
SampID: 24081352-002CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.500		**4.94**	2.500	2.495	97.6	5.023	1.77	08/20/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352067 **SampType:** MS Units **mg/L**

SampID: 24081469-002BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**18.2**	5.000	13.65	91.8	90	110	08/20/2024

Batch R352067 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081469-002BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		1.00		**18.9**	5.000	13.65	104.4	18.24	3.37	08/20/2024

Batch R352067 **SampType:** MS Units **mg/L**

SampID: 24081540-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**32.0**	12.50	19.19	102.4	90	110	08/20/2024

Batch R352067 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081540-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**31.9**	12.50	19.19	101.7	31.98	0.26	08/20/2024

Batch R352067 **SampType:** MS Units **mg/L**

SampID: 24081624-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.290**	0.2500	0.04200	99.2	90	110	08/20/2024

Batch R352067 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081624-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.297**	0.2500	0.04200	102.0	0.2900	2.39	08/20/2024

Batch R352134 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate (as N)		0.050		**< 0.050**						08/21/2024
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	08/21/2024

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352134 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.505**	0.5000	0	101.0	90	110	08/21/2024

Batch R352134 **SampType:** MS Units **mg/Kg-dry**

SampID: 24081186-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		13.8		**88.6**	68.76	26.40	90.5	90	110	08/21/2024

Batch R352134 **SampType:** MSD Units **mg/Kg-dry** RPD Limit **10**

SampID: 24081186-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		13.8	S	**87.4**	68.76	26.40	88.8	88.65	1.37	08/21/2024

Batch R352134 **SampType:** MS Units **mg/L**

SampID: 24081724-005AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.233**	0.2500	0	93.2	85	115	08/21/2024

Batch R352134 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081724-005AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.249**	0.2500	0	99.6	0.2330	6.64	08/21/2024

Batch R352134 **SampType:** MS Units **mg/L**

SampID: 24081731-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**38.1**	12.50	25.58	100.5	90	110	08/21/2024

Batch R352134 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081731-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**38.3**	12.50	25.58	101.9	38.15	0.46	08/21/2024

Batch R352134 **SampType:** MS Units **mg/L**

SampID: 24081733-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.216**	0.2500	0	86.4	85	115	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352134 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081733-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050	S	**0.211**	0.2500	0	84.4	0.2160	2.34	08/21/2024

Batch R352134 **SampType:** MS Units **mg/L**

SampID: 24081733-012BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.265**	0.2500	0.02200	97.2	85	115	08/21/2024

Batch R352134 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081733-012BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.243**	0.2500	0.02200	88.4	0.2650	8.66	08/21/2024

Batch R352134 **SampType:** DUP Units **mg/L** RPD Limit **0**

SampID: 24081662-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate (as N)		2.50		**< 2.50**				0	0.00	08/21/2024
Nitrogen, Nitrate-Nitrite (as N)		2.50		**28.5**				28.16	1.15	08/21/2024

Batch R352194 **SampType:** MBLK Units **mg/L**

SampID: ICB/MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate (as N)		0.050		**< 0.050**						08/22/2024
Nitrogen, Nitrate-Nitrite (as N)		0.050		**< 0.050**	0.0090	0	0	-100	100	08/22/2024

Batch R352194 **SampType:** LCS Units **mg/L**

SampID: ICV/LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.521**	0.5000	0	104.2	90	110	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081730-001HMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**37.5**	12.50	24.60	103.3	90	110	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081730-001HMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		2.50		**37.8**	12.50	24.60	105.3	37.52	0.65	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081839-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.223**	0.2500	0	89.2	85	115	08/22/2024

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081839-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.213**	0.2500	0	85.2	0.2230	4.59	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081854-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.470**	0.2500	0.2280	96.8	85	115	08/22/2024

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081854-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.469**	0.2500	0.2280	96.4	0.4700	0.21	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081870-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.618**	0.2500	0.3780	96.0	90	110	08/22/2024

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081870-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.617**	0.2500	0.3780	95.6	0.6180	0.16	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081920-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.377**	0.2500	0.1450	92.8	85	115	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

STANDARD METHODS 4500-NO3 F (TOTAL) 2000, 2011

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081920-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.382**	0.2500	0.1450	94.8	0.3770	1.32	08/22/2024

Batch R352194 **SampType:** MS Units **mg/L**

SampID: 24081949-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050	S	**0.216**	0.2500	0.009000	82.8	85	115	08/22/2024

Batch R352194 **SampType:** MSD Units **mg/L** RPD Limit **10**

SampID: 24081949-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Nitrogen, Nitrate-Nitrite (as N)		0.050		**0.222**	0.2500	0.009000	85.2	0.2160	2.74	08/22/2024

SW-846 9012A (TOTAL)

Batch 227393 **SampType:** MBLK Units **mg/L**

SampID: MBLK 240820 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	08/22/2024

Batch 227393 **SampType:** LCS Units **mg/L**

SampID: LCS 240820 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	101.4	90	110	08/22/2024

Batch 227393 **SampType:** MS Units **mg/L**

SampID: 24081349-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.025		**0.122**	0.1250	0	97.5	90	110	08/22/2024

Batch 227393 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081349-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.025		**0.123**	0.1250	0	98.5	0.1218	1.02	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 9012A (TOTAL)

Batch 227393 **SampType:** MS Units **mg/L**

SampID: 24081364-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005	S	**0.030**	0.0250	0.008085	88.0	90	110	08/22/2024

Batch 227393 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081364-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005	S	**0.028**	0.0250	0.008085	81.4	0.03008	5.66	08/22/2024

Batch 227465 **SampType:** MBLK Units **mg/L**

SampID: MBLK 240821 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	08/22/2024

Batch 227465 **SampType:** LCS Units **mg/L**

SampID: LCS 240821 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.027**	0.0250	0	106.8	90	110	08/22/2024

Batch 227465 **SampType:** MS Units **mg/L**

SampID: 24081569-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.025		**0.127**	0.1250	0	101.4	90	110	08/22/2024

Batch 227465 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081569-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.025		**0.127**	0.1250	0	101.7	0.1267	0.32	08/22/2024

Batch 227465 **SampType:** MS Units **mg/L**

SampID: 24081733-001EMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	101.7	75	125	08/22/2024

Batch 227465 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081733-001EMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005		**0.026**	0.0250	0	102.1	0.02542	0.47	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 9012A (TOTAL)

Batch 227573 **SampType:** MBLK Units **mg/L**

SampID: MBLK 240823 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**< 0.005**	0.0015	0	0	-100	100	08/26/2024

Batch 227573 **SampType:** LCS Units **mg/L**

SampID: LCS 240823 TCN1

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	100.5	90	110	08/26/2024

Batch 227573 **SampType:** MS Units **mg/L**

SampID: 24081879-001DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	99.2	75	125	08/26/2024

Batch 227573 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081879-001DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Cyanide		0.005		**0.025**	0.0250	0	100.6	0.02480	1.46	08/26/2024

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R351979 **SampType:** MBLK Units **mg/L**

SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						08/20/2024
Chloride		0.50		**ND**						08/20/2024
Sulfate		1.00		**ND**						08/20/2024

Batch R351979 **SampType:** LCS Units **mg/L**

SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**1.01**	1.000	0	100.7	90	110	08/20/2024
Chloride		0.50		**20.5**	20.00	0	102.4	90	110	08/20/2024
Sulfate		1.00		**18.6**	20.00	0	92.9	90	110	08/20/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R351979 **SampType:** MS Units **mg/L**

SampID: 24080169-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride	*	0.50		**10.3**	10.00	0.1190	101.4	80	120	08/20/2024
Chloride	*	5.00		**221**	200.0	14.12	103.5	80	120	08/20/2024
Sulfate	*	10.0		**279**	200.0	87.77	95.5	80	120	08/20/2024

Batch R351979 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride	*	0.50		**10.3**	10.00	0.1190	101.5	10.25	0.19	08/20/2024
Chloride	*	5.00		**222**	200.0	14.12	103.8	221.0	0.26	08/20/2024
Sulfate	*	10.0		**279**	200.0	87.77	95.5	278.7	0.03	08/20/2024

Batch R352071 **SampType:** MBLK Units **mg/L**

SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						08/21/2024
Chloride		0.50		**ND**						08/21/2024
Sulfate		1.00		**ND**						08/21/2024

Batch R352071 **SampType:** LCS Units **mg/L**

SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**1.01**	1.000	0	101.3	90	110	08/21/2024
Chloride		0.50		**20.6**	20.00	0	103.2	90	110	08/21/2024
Sulfate		1.00		**19.0**	20.00	0	95.2	90	110	08/21/2024

Batch R352071 **SampType:** MS Units **mg/L**

SampID: 24080169-006AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride	*	0.50		**10.3**	10.00	0.1180	101.6	80	120	08/21/2024
Chloride	*	5.00		**209**	200.0	3.288	103.1	80	120	08/21/2024
Sulfate	*	10.0		**340**	200.0	141.3	99.4	80	120	08/21/2024

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R352071 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-006AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride	*	0.50		**10.4**	10.00	0.1180	102.4	10.28	0.78	08/21/2024
Chloride	*	5.00		**211**	200.0	3.288	104.0	209.4	0.89	08/21/2024
Sulfate	*	10.0		**338**	200.0	141.3	98.5	340.0	0.51	08/21/2024

Batch R352071 **SampType:** MS Units **mg/L**

SampID: 24080169-007AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride	*	0.50		**10.4**	10.00	0.1940	102.0	80	120	08/21/2024
Chloride	*	5.00		**214**	200.0	6.501	103.9	80	120	08/21/2024
Sulfate	*	10.0		**549**	200.0	346.9	101.2	80	120	08/21/2024

Batch R352071 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-007AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride	*	0.50		**10.4**	10.00	0.1940	102.2	10.39	0.22	08/21/2024
Chloride	*	5.00		**214**	200.0	6.501	104.0	214.3	0.08	08/21/2024
Sulfate	*	10.0		**548**	200.0	346.9	100.4	549.3	0.28	08/21/2024

Batch R352127 **SampType:** MBLK Units **mg/L**

SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						08/22/2024
Chloride		0.50		**ND**						08/22/2024
Sulfate		1.00		**ND**						08/22/2024

Batch R352127 **SampType:** LCS Units **mg/L**

SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**1.00**	1.000	0	99.8	90	110	08/22/2024
Chloride		0.50		**20.6**	20.00	0	103.1	90	110	08/22/2024
Sulfate		1.00		**19.0**	20.00	0	94.8	90	110	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R352127 **SampType:** MS Units **mg/L**

SampID: 24080169-024AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride	*	0.50		**10.2**	10.00	0.1410	100.4	80	120	08/22/2024
Chloride	*	5.00		**233**	200.0	24.71	104.2	80	120	08/22/2024
Sulfate	*	10.0		**365**	200.0	168.9	98.2	80	120	08/22/2024

Batch R352127 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-024AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride	*	0.50		**10.2**	10.00	0.1410	100.7	10.18	0.25	08/22/2024
Chloride	*	5.00		**233**	200.0	24.71	104.3	233.1	0.04	08/22/2024
Sulfate	*	10.0		**365**	200.0	168.9	98.1	365.4	0.06	08/22/2024

Batch R352127 **SampType:** MS Units **mg/L**

SampID: 24080169-027AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride	*	0.50		**10.2**	10.00	0.2410	100.0	80	120	08/22/2024
Chloride	*	5.00		**224**	200.0	17.65	103.1	80	120	08/22/2024
Sulfate	*	10.0		**306**	200.0	113.3	96.5	80	120	08/22/2024

Batch R352127 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-027AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride	*	0.50		**10.3**	10.00	0.2410	100.5	10.24	0.50	08/22/2024
Chloride	*	5.00		**224**	200.0	17.65	103.4	223.9	0.18	08/22/2024
Sulfate	*	10.0		**306**	200.0	113.3	96.2	306.2	0.20	08/22/2024

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 227380 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227380

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	08/21/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	08/21/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	08/21/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 227380 **SampType:** LCS Units mg/L

SampID: LCS-227380

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.60**	2.500	0	104.1	85	115	08/21/2024
Magnesium		0.0500		**2.45**	2.500	0	98.1	85	115	08/21/2024
Potassium		0.100		**2.69**	2.500	0	107.6	85	115	08/21/2024
Sodium		0.0500		**2.64**	2.500	0	105.7	85	115	08/21/2024

Batch 227380 **SampType:** MS Units mg/L

SampID: 24080169-005BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**174**	2.500	172.8	37.2	75	125	08/21/2024
Magnesium		0.0500		**89.6**	2.500	87.51	82.0	75	125	08/21/2024
Potassium		0.100		**3.91**	2.500	1.330	103.3	75	125	08/21/2024
Sodium		0.0500		**27.7**	2.500	25.79	76.4	75	125	08/21/2024

Batch 227380 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24080169-005BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**175**	2.500	172.8	92.4	173.7	0.79	08/21/2024
Magnesium		0.0500		**90.3**	2.500	87.51	113.0	89.56	0.86	08/21/2024
Potassium		0.100		**3.91**	2.500	1.330	103.1	3.912	0.10	08/21/2024
Sodium		0.0500		**27.8**	2.500	25.79	81.6	27.70	0.47	08/21/2024

Batch 227380 **SampType:** MS Units mg/L

SampID: 24081597-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100	S	**234**	2.500	233.0	23.6	75	125	08/21/2024
Magnesium		0.0500		**93.8**	2.500	91.70	83.9	75	125	08/21/2024

Batch 227380 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24081597-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**244**	2.500	233.0	444.0	233.6	4.40	08/21/2024
Magnesium		0.0500	S	**97.8**	2.500	91.70	243.4	93.80	4.16	08/21/2024

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 227390 **SampType:** MBLK Units **mg/L**
SampID: MBLK-227390

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	08/21/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	08/22/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	08/22/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	08/21/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	08/22/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	08/21/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	08/22/2024

Batch 227390 **SampType:** LCS Units **mg/L**
SampID: LCS-227390

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.71**	2.500	0	108.5	85	115	08/22/2024
Calcium		0.100		**2.56**	2.500	0	102.5	85	115	08/21/2024
Magnesium		0.0500		**2.43**	2.500	0	97.3	85	115	08/22/2024
Potassium		0.100		**2.71**	2.500	0	108.2	85	115	08/21/2024
Potassium		0.100		**2.68**	2.500	0	107.0	85	115	08/22/2024
Sodium		0.0500		**2.67**	2.500	0	106.9	85	115	08/21/2024
Sodium		0.0500		**2.66**	2.500	0	106.2	85	115	08/22/2024

Batch 227422 **SampType:** MBLK Units **mg/L**
SampID: MBLK-227422

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	08/26/2024
Iron		0.0400		**< 0.0400**	0.0200	0	0	-100	100	08/26/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	08/26/2024
Manganese		0.0070		**< 0.0070**	0.0025	0	0	-100	100	08/26/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	08/26/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	08/26/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 227422 **SampType:** LCS Units **mg/L**

SampID: LCS-227422

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**2.74**	2.500	0	109.5	85	115	08/26/2024
Iron		0.0400		**2.16**	2.000	0	108.0	85	115	08/26/2024
Magnesium		0.0500		**2.47**	2.500	0	98.6	85	115	08/26/2024
Manganese		0.0070		**0.522**	0.5000	0	104.4	85	115	08/26/2024
Potassium		0.100		**2.82**	2.500	0	112.6	85	115	08/26/2024
Sodium		0.0500		**2.70**	2.500	0	108.1	85	115	08/26/2024

Batch 227422 **SampType:** MS Units **mg/L**

SampID: 24080169-015BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**140**	2.500	136.6	122.8	75	125	08/26/2024
Magnesium		0.0500		**70.9**	2.500	68.10	111.6	75	125	08/26/2024
Potassium		0.100		**3.85**	2.500	1.108	109.8	75	125	08/26/2024
Sodium		0.0500	S	**25.2**	2.500	23.67	59.2	75	125	08/26/2024

Batch 227422 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24080169-015BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**141**	2.500	136.6	175.2	139.6	0.93	08/26/2024
Magnesium		0.0500	S	**71.5**	2.500	68.10	137.6	70.89	0.91	08/26/2024
Potassium		0.100		**3.87**	2.500	1.108	110.6	3.852	0.51	08/26/2024
Sodium		0.0500	S	**25.4**	2.500	23.67	69.2	25.15	0.99	08/26/2024

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 227396 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227396

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/30/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/29/2024

Batch 227396 **SampType:** LCS Units **mg/L**

SampID: LCS-227396

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.73**	2.000	0	86.3	80	120	08/30/2024
Manganese		0.0020		**0.450**	0.5000	0	89.9	80	120	08/30/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 227396 **SampType:** MS Units mg/L

SampID: 24080169-003CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.72**	2.000	0	85.8	75	125	09/03/2024
Manganese		0.0020		**0.456**	0.5000	0.04739	81.7	75	125	08/30/2024

Batch 227396 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24080169-003CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Iron		0.0250		**1.77**	2.000	0	88.4	1.716	3.02	09/03/2024
Manganese		0.0020		**0.479**	0.5000	0.04739	86.3	0.4561	4.88	08/30/2024

Batch 227416 **SampType:** MBLK Units mg/L

SampID: MBLK-227416

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/29/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/29/2024

Batch 227416 **SampType:** LCS Units mg/L

SampID: LCS-227416

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.91**	2.000	0	95.6	80	120	08/29/2024
Manganese		0.0020		**0.502**	0.5000	0	100.3	80	120	08/29/2024

Batch 227416 **SampType:** MS Units mg/L

SampID: 24080169-020CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.100	S	**8.90**	2.000	6.250	132.7	75	125	09/03/2024
Manganese		0.0080	S	**3.05**	0.5000	4.005	-191.0	75	125	08/30/2024

Batch 227416 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24080169-020CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Iron		0.100	S	**8.88**	2.000	6.250	131.4	8.905	0.29	09/03/2024
Manganese		0.0080	S	**2.94**	0.5000	4.005	-213.0	3.050	3.68	08/30/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 227416 **SampType:** MS Units mg/L

SampID: 24080169-032CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.83**	2.000	0	91.6	75	125	09/03/2024
Manganese		0.0100	S	**5.99**	0.5000	5.667	64.8	75	125	08/30/2024

Batch 227416 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24080169-032CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Iron		0.0250		**1.81**	2.000	0	90.7	1.833	1.03	09/03/2024
Manganese		0.0100		**6.06**	0.5000	5.667	78.5	5.992	1.14	08/30/2024

Batch 227476 **SampType:** MBLK Units mg/L

SampID: MBLK-227476

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/29/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/29/2024

Batch 227476 **SampType:** LCS Units mg/L

SampID: LCS-227476

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.88**	2.000	0	93.8	80	120	08/29/2024
Manganese		0.0020		**0.471**	0.5000	0	94.2	80	120	08/29/2024

Batch 227476 **SampType:** MS Units mg/L

SampID: 24080169-021CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**6.30**	2.000	4.607	84.4	75	125	09/03/2024
Manganese		0.0020		**1.01**	0.5000	0.4502	111.0	75	125	08/29/2024

Batch 227476 **SampType:** MSD Units mg/L RPD Limit **20**

SampID: 24080169-021CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Iron		0.0250		**6.51**	2.000	4.607	95.0	6.296	3.31	09/03/2024
Manganese		0.0020		**0.991**	0.5000	0.4502	108.2	1.005	1.44	08/29/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q3

Work Order: 24080169
Report Date: 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (DISSOLVED)

Batch 227476 **SampType:** MS Units **mg/L**
SampID: 24080169-027CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Iron		0.0250		**1.71**	2.000	0.03920	83.5	75	125	08/30/2024
Manganese		0.0020		**0.460**	0.5000	0.03902	84.1	75	125	08/29/2024

Batch 227476 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24080169-027CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Iron		0.0250		**1.73**	2.000	0.03920	84.7	1.709	1.45	08/30/2024
Manganese		0.0020		**0.485**	0.5000	0.03902	89.2	0.4597	5.33	08/29/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227380 **SampType:** MBLK Units **mg/L**
SampID: MBLK-227380

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/21/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/21/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	08/21/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	08/21/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	08/21/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/21/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	08/21/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/21/2024
Copper	*	0.0010		**< 0.0010**	0.0003	0	0	-100	100	08/21/2024
Iron	*	0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/21/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/21/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	08/22/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/21/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	08/21/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/21/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/21/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/21/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	08/21/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	08/21/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227380 **SampType:** LCS Units **mg/L**

SampID: LCS-227380

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.556**	0.5000	0	111.1	85	115	08/21/2024
Arsenic		0.0010		**0.551**	0.5000	0	110.2	85	115	08/21/2024
Barium		0.0010		**2.16**	2.000	0	108.1	85	115	08/21/2024
Beryllium		0.0010		**0.0524**	0.0500	0	104.8	85	115	08/21/2024
Boron	*	0.0250		**0.505**	0.5000	0	101.0	85	115	08/21/2024
Cadmium	*	0.0010		**0.0505**	0.0500	0	101.1	85	115	08/21/2024
Chromium		0.0015		**0.197**	0.2000	0	98.3	85	115	08/21/2024
Cobalt		0.0010		**0.514**	0.5000	0	102.9	85	115	08/21/2024
Copper	*	0.0010		**0.249**	0.2500	0	99.6	85	115	08/21/2024
Iron	*	0.0250		**2.08**	2.000	0	104.1	85	115	08/21/2024
Lead		0.0010	E	**0.501**	0.5000	0	100.1	85	115	08/21/2024
Lithium	*	0.0030		**0.531**	0.5000	0	106.3	85	115	08/22/2024
Manganese		0.0020		**0.525**	0.5000	0	104.9	85	115	08/21/2024
Molybdenum		0.0015		**0.470**	0.5000	0	94.0	85	115	08/21/2024
Nickel		0.0010		**0.502**	0.5000	0	100.3	85	115	08/21/2024
Selenium		0.0010		**0.524**	0.5000	0	104.8	85	115	08/21/2024
Silver		0.0010		**0.0503**	0.0500	0	100.5	85	115	08/21/2024
Thallium		0.0020		**0.250**	0.2500	0	100.2	85	115	08/21/2024
Vanadium		0.0050		**0.502**	0.5000	0	100.3	85	115	08/21/2024
Zinc		0.0150		**0.504**	0.5000	0	100.7	85	115	08/21/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227380 **SampType:** MS Units **mg/L**

SampID: 24080169-005BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.531**	0.5000	0	106.3	75	125	08/22/2024
Arsenic		0.0010		**0.527**	0.5000	0.001415	105.1	75	125	08/22/2024
Barium		0.0010		**2.12**	2.000	0.1749	97.5	75	125	08/22/2024
Beryllium		0.0010		**0.0516**	0.0500	0	103.1	75	125	08/22/2024
Boron		0.0250		**0.955**	0.5000	0.5050	89.9	75	125	08/22/2024
Cadmium	*	0.0010		**0.0485**	0.0500	0	97.0	75	125	08/22/2024
Chromium		0.0015		**0.199**	0.2000	0.004831	97.0	75	125	08/23/2024
Cobalt	*	0.0010		**0.480**	0.5000	0.001636	95.7	75	125	08/23/2024
Copper		0.0010		**0.247**	0.2500	0.002759	97.6	75	125	08/22/2024
Iron		0.0250		**4.57**	2.000	2.807	88.3	75	125	08/23/2024
Lead		0.0010		**0.446**	0.5000	0.001431	89.0	75	125	08/22/2024
Lithium	*	0.0030		**0.517**	0.5000	0.005101	102.3	75	125	08/22/2024
Manganese		0.0020		**0.801**	0.5000	0.3150	97.3	75	125	08/22/2024
Molybdenum		0.0015		**0.482**	0.5000	0.0007477	96.3	75	125	08/23/2024
Nickel		0.0010		**0.501**	0.5000	0.005065	99.3	75	125	08/22/2024
Selenium		0.0010		**0.453**	0.5000	0	90.6	75	125	08/22/2024
Silver		0.0010		**0.0505**	0.0500	0	101.0	75	125	08/23/2024
Thallium		0.0020		**0.201**	0.2500	0	80.2	75	125	08/22/2024
Vanadium		0.0050		**0.508**	0.5000	0.005553	100.4	75	125	08/22/2024
Zinc		0.0150		**0.483**	0.5000	0	96.5	75	125	08/22/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch **227380** **SampType:** **MSD** Units **mg/L** RPD Limit **20**

SampID: 24080169-005BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.556**	0.5000	0	111.3	0.5314	4.59	08/22/2024
Arsenic		0.0010		**0.555**	0.5000	0.001415	110.7	0.5267	5.22	08/22/2024
Barium		0.0010		**2.19**	2.000	0.1749	100.8	2.124	3.07	08/22/2024
Beryllium		0.0010		**0.0540**	0.0500	0	108.0	0.05157	4.58	08/22/2024
Boron		0.0250		**1.02**	0.5000	0.5050	102.7	0.9547	6.45	08/22/2024
Cadmium	*	0.0010		**0.0521**	0.0500	0	104.3	0.04850	7.22	08/22/2024
Chromium		0.0015		**0.201**	0.2000	0.004831	98.2	0.1989	1.18	08/23/2024
Cobalt	*	0.0010		**0.463**	0.5000	0.001636	92.3	0.4799	3.55	08/23/2024
Copper		0.0010		**0.259**	0.2500	0.002759	102.6	0.2468	4.89	08/22/2024
Iron		0.0250		**4.67**	2.000	2.807	93.3	4.573	2.19	08/23/2024
Lead		0.0010		**0.483**	0.5000	0.001431	96.3	0.4465	7.87	08/22/2024
Lithium	*	0.0030		**0.553**	0.5000	0.005101	109.5	0.5168	6.68	08/22/2024
Manganese		0.0020		**0.837**	0.5000	0.3150	104.5	0.8014	4.40	08/22/2024
Molybdenum		0.0015		**0.494**	0.5000	0.0007477	98.7	0.4820	2.47	08/23/2024
Nickel		0.0010		**0.522**	0.5000	0.005065	103.4	0.5013	4.06	08/22/2024
Selenium		0.0010		**0.477**	0.5000	0	95.5	0.4532	5.17	08/22/2024
Silver		0.0010		**0.0524**	0.0500	0	104.8	0.05052	3.62	08/23/2024
Thallium		0.0020		**0.236**	0.2500	0	94.5	0.2005	16.39	08/22/2024
Vanadium		0.0050		**0.533**	0.5000	0.005553	105.4	0.5077	4.79	08/22/2024
Zinc		0.0150		**0.511**	0.5000	0	102.1	0.4825	5.67	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227390 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227390

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/22/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/22/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	08/22/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	08/22/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	08/22/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/22/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	08/22/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/22/2024
Copper	*	0.0010		**< 0.0010**	0.0003	0	0	-100	100	08/22/2024
Iron	*	0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/22/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/22/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	08/22/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/22/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	08/22/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/22/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/22/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/23/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	08/22/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	08/22/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	08/22/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch **227390** **SampType:** **LCS** Units **mg/L**

SampID: LCS-227390

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.533**	0.5000	0	106.6	85	115	08/22/2024
Arsenic		0.0010		**0.522**	0.5000	0	104.5	85	115	08/22/2024
Barium		0.0010		**2.02**	2.000	0	100.8	85	115	08/22/2024
Beryllium		0.0010		**0.0495**	0.0500	0	99.0	85	115	08/22/2024
Boron	*	0.0250		**0.479**	0.5000	0	95.7	85	115	08/22/2024
Cadmium	*	0.0010		**0.0483**	0.0500	0	96.7	85	115	08/22/2024
Chromium		0.0015		**0.191**	0.2000	0	95.5	85	115	08/22/2024
Cobalt		0.0010		**0.477**	0.5000	0	95.4	85	115	08/22/2024
Copper	*	0.0010		**0.245**	0.2500	0	97.9	85	115	08/22/2024
Iron	*	0.0250		**1.99**	2.000	0	99.4	85	115	08/22/2024
Lead		0.0010		**0.464**	0.5000	0	92.8	85	115	08/22/2024
Lithium	*	0.0030		**0.513**	0.5000	0	102.6	85	115	08/22/2024
Manganese		0.0020		**0.494**	0.5000	0	98.7	85	115	08/22/2024
Molybdenum		0.0015		**0.460**	0.5000	0	91.9	85	115	08/22/2024
Nickel		0.0010		**0.479**	0.5000	0	95.7	85	115	08/22/2024
Selenium		0.0010		**0.490**	0.5000	0	98.0	85	115	08/22/2024
Silver		0.0010		**0.0522**	0.0500	0	104.5	85	115	08/23/2024
Thallium		0.0020		**0.227**	0.2500	0	91.0	85	115	08/22/2024
Vanadium		0.0050		**0.490**	0.5000	0	98.1	85	115	08/22/2024
Zinc		0.0150		**0.486**	0.5000	0	97.3	85	115	08/22/2024

Client: Ramboll

Client Project: KIN-24Q3

Work Order: 24080169

Report Date: 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch **227422** **SampType:** **MBLK** Units **mg/L**

SampID: MBLK-227422

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/23/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/23/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	08/23/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	08/23/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	08/23/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/23/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	08/23/2024
Cobalt	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/23/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	08/23/2024
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	08/27/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/23/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	08/23/2024
Manganese		0.0020		**< 0.0020**	0.0008	0	0	-100	100	08/23/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	08/23/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	08/23/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	08/23/2024
Silver		0.0010		**< 0.0010**	0.0001	0	0	-100	100	08/23/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	08/23/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	08/23/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	08/23/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227422 **SampType:** LCS Units **mg/L**

SampID: LCS-227422

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.553**	0.5000	0	110.6	80	120	08/23/2024
Arsenic		0.0010		**0.552**	0.5000	0	110.5	80	120	08/23/2024
Barium		0.0010		**2.18**	2.000	0	109.2	80	120	08/23/2024
Beryllium		0.0010		**0.0484**	0.0500	0	96.8	80	120	08/23/2024
Boron		0.0250		**0.495**	0.5000	0	99.0	80	120	08/23/2024
Cadmium	*	0.0010		**0.0504**	0.0500	0	100.9	80	120	08/23/2024
Chromium		0.0015		**0.200**	0.2000	0	99.9	80	120	08/23/2024
Cobalt	*	0.0010		**0.503**	0.5000	0	100.6	80	120	08/23/2024
Copper		0.0010		**0.253**	0.2500	0	101.1	80	120	08/23/2024
Iron		0.0250		**2.06**	2.000	0	102.8	80	120	08/27/2024
Lead		0.0010		**0.530**	0.5000	0	105.9	80	120	08/23/2024
Lithium	*	0.0030		**0.492**	0.5000	0	98.4	80	120	08/23/2024
Manganese		0.0020		**0.518**	0.5000	0	103.6	80	120	08/23/2024
Molybdenum		0.0015		**0.503**	0.5000	0	100.6	80	120	08/23/2024
Nickel		0.0010		**0.510**	0.5000	0	101.9	80	120	08/23/2024
Selenium		0.0010		**0.514**	0.5000	0	102.8	80	120	08/23/2024
Silver		0.0010		**0.0567**	0.0500	0	113.4	80	120	08/23/2024
Thallium		0.0020		**0.242**	0.2500	0	97.0	80	120	08/23/2024
Vanadium		0.0050		**0.526**	0.5000	0	105.2	80	120	08/23/2024
Zinc		0.0150		**0.502**	0.5000	0	100.5	80	120	08/23/2024

Client: Ramboll | **Work Order:** 24080169

Client Project: KIN-24Q3 | **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227422 **SampType:** MS Units **mg/L**

SampID: 24080169-015BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.534**	0.5000	0	106.8	75	125	08/23/2024
Arsenic		0.0010		**0.536**	0.5000	0.0005576	107.2	75	125	08/23/2024
Barium		0.0010		**2.18**	2.000	0.09753	104.3	75	125	08/23/2024
Beryllium		0.0010		**0.0481**	0.0500	0	96.1	75	125	08/23/2024
Boron		0.0250		**1.23**	0.5000	0.7389	97.3	75	125	08/23/2024
Cadmium	*	0.0010		**0.0482**	0.0500	0	96.4	75	125	08/23/2024
Chromium		0.0015		**0.208**	0.2000	0.001815	103.2	75	125	08/23/2024
Cobalt	*	0.0010		**0.498**	0.5000	0.0005249	99.4	75	125	08/23/2024
Lead		0.0010		**0.517**	0.5000	0	103.5	75	125	08/23/2024
Lithium	*	0.0030		**0.496**	0.5000	0.004032	98.4	75	125	08/23/2024
Molybdenum		0.0015		**0.502**	0.5000	0.003440	99.8	75	125	08/27/2024
Selenium		0.0010		**0.495**	0.5000	0	99.0	75	125	08/23/2024
Thallium		0.0020		**0.232**	0.2500	0	92.9	75	125	08/23/2024

Batch 227422 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24080169-015BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.552**	0.5000	0	110.3	0.5339	3.25	08/23/2024
Arsenic		0.0010		**0.538**	0.5000	0.0005576	107.6	0.5365	0.35	08/23/2024
Barium		0.0010		**2.21**	2.000	0.09753	105.4	2.183	1.03	08/23/2024
Beryllium		0.0010		**0.0480**	0.0500	0	96.0	0.04806	0.09	08/23/2024
Boron		0.0250		**1.22**	0.5000	0.7389	97.0	1.226	0.12	08/23/2024
Cadmium	*	0.0010		**0.0491**	0.0500	0	98.2	0.04820	1.80	08/23/2024
Chromium		0.0015		**0.203**	0.2000	0.001815	100.5	0.2082	2.59	08/23/2024
Cobalt	*	0.0010		**0.461**	0.5000	0.0005249	92.1	0.4975	7.58	08/23/2024
Lead		0.0010		**0.508**	0.5000	0	101.7	0.5174	1.74	08/23/2024
Lithium	*	0.0030		**0.498**	0.5000	0.004032	98.9	0.4960	0.50	08/23/2024
Molybdenum		0.0015		**0.522**	0.5000	0.003440	103.7	0.5023	3.82	08/27/2024
Selenium		0.0010		**0.503**	0.5000	0	100.5	0.4950	1.54	08/23/2024
Thallium		0.0020		**0.226**	0.2500	0	90.4	0.2323	2.78	08/23/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 227920 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227920

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	09/04/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	09/04/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	09/04/2024
Cadmium	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	09/04/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	09/04/2024
Cobalt	*	0.0010		**< 0.0010**	0.0001	0	0	-100	100	09/04/2024
Copper		0.0010		**< 0.0010**	0.0003	0	0	-100	100	09/05/2024
Iron		0.0250		**< 0.0250**	0.0115	0	0	-100	100	09/05/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	09/05/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	09/04/2024
Nickel		0.0010		**< 0.0010**	0.0004	0	0	-100	100	09/04/2024
Vanadium		0.0050		**< 0.0050**	0.0028	0	0	-100	100	09/04/2024
Zinc		0.0150		**< 0.0150**	0.0059	0	0	-100	100	09/04/2024

Batch 227920 **SampType:** LCS Units **mg/L**

SampID: LCS-227920

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.511**	0.5000	0	102.1	80	120	09/04/2024
Arsenic		0.0010		**0.487**	0.5000	0	97.4	80	120	09/04/2024
Barium		0.0010		**1.91**	2.000	0	95.6	80	120	09/04/2024
Cadmium	*	0.0010		**0.0449**	0.0500	0	89.9	80	120	09/04/2024
Chromium		0.0015		**0.189**	0.2000	0	94.5	80	120	09/04/2024
Cobalt	*	0.0010		**0.444**	0.5000	0	88.8	80	120	09/04/2024
Copper		0.0010		**0.261**	0.2500	0	104.3	80	120	09/05/2024
Iron		0.0250		**2.03**	2.000	0	101.5	80	120	09/05/2024
Lead		0.0010		**0.524**	0.5000	0	104.8	80	120	09/05/2024
Lithium	*	0.0030		**0.450**	0.5000	0	90.1	80	120	09/04/2024
Nickel		0.0010		**0.452**	0.5000	0	90.4	80	120	09/04/2024
Vanadium		0.0050		**0.471**	0.5000	0	94.3	80	120	09/04/2024
Zinc		0.0150		**0.458**	0.5000	0	91.5	80	120	09/04/2024

SW-846 7470A (TOTAL)

Batch 227374 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227374

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	08/20/2024

SW-846 7470A (TOTAL)

Batch 227374 **SampType:** LCS Units **mg/L**
SampID: LCS-227374

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00540**	0.0050	0	108.0	85	115	08/20/2024

Batch 227374 **SampType:** MS Units **mg/L**
SampID: 24080169-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00511**	0.0050	0	102.2	75	125	08/20/2024

Batch 227374 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24080169-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00507**	0.0050	0	101.5	0.005110	0.70	08/20/2024

Batch 227423 **SampType:** MBLK Units **mg/L**
SampID: MBLK-227423

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	08/22/2024

Batch 227423 **SampType:** LCS Units **mg/L**
SampID: LCS-227423

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00448**	0.0050	0	89.7	85	115	08/22/2024

Batch 227423 **SampType:** MS Units **mg/L**
SampID: 24080169-008BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00455**	0.0050	0	91.0	75	125	08/22/2024

Batch 227423 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24080169-008BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00449**	0.0050	0	89.7	0.004550	1.39	08/22/2024

Batch 227423 **SampType:** MS Units **mg/L**
SampID: 24081733-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00514**	0.0050	0	102.9	75	125	08/22/2024

Client: Ramboll **Work Order:** 24080169

Client Project: KIN-24Q3 **Report Date:** 12-Sep-24

SW-846 7470A (TOTAL)

Batch 227423 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081733-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00506**	0.0050	0	101.3	0.005144	1.57	08/22/2024

Batch 227494 **SampType:** MBLK Units **mg/L**

SampID: MBLK-227494

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	08/22/2024

Batch 227494 **SampType:** LCS Units **mg/L**

SampID: LCS-227494

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00520**	0.0050	0	104.1	85	115	08/22/2024

Batch 227494 **SampType:** MS Units **mg/L**

SampID: 24080169-033BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00527**	0.0050	0	105.4	75	125	08/22/2024

Batch 227494 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24080169-033BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00514**	0.0050	0	102.8	0.005271	2.51	08/22/2024

Batch 227494 **SampType:** MS Units **mg/L**

SampID: 24081798-001CMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00453**	0.0050	0	90.6	75	125	08/22/2024

Batch 227494 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24081798-001CMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00435**	0.0050	0	87.1	0.004532	4.00	08/22/2024

Teklab Inc. Environmental Laboratory

Receiving Check List

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q3

Work Order: 24080169

Report Date: 12-Sep-24

Carrier: Justin Colp

Received By: AMD

Completed by: Amber Dilallo

On: 19-Aug-24

Reviewed by: Ellie Hopkins

On: 21-Aug-24

Pages to follow: Chain of custody 6 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 19.1
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐		
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.				
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑	
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐	
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑	

Any No responses must be detailed below or on the COC.

Samples were received on 8/19/24 at 1525 on ice [19.1C - LTG#5]. Additional Nitric Acid (99172) was needed in MW-05 upon arrival at the laboratory. Additional Sodium Hydroxide (95443) was needed in MW-05 and MW-09 upon arrival at the laboratory. pH strip #89660/96651. - LH/amberdilallo - 8/19/2024 3:39:15 PM

Samples were received on 8/20/24 at 1458 on ice [12.7C - LTG#5]. Additional Nitric Acid (99172) was needed in MW-20S, MW-30, MW-32, and MW-08 Duplicate upon arrival at the laboratory. Additional Sodium Hydroxide (95443) was needed in MW-07 upon arrival at the laboratory. pH strip #89660/96651. - amberdilallo - 8/20/2024 3:47:34 PM

Samples were received on 8/21/24 at 1440 on ice [12.7C - LTG#5]. Field Blank and Equipment Blank were filtered and preserved with Nitric Acid (99172) for the dissolved parameters upon arrival at the laboratory. Additional Nitric Acid (99172) was needed in MW-27, MW-31, MW-31S, and PZ-4A upon arrival at the laboratory. pH strip #96651. - NR/amberdilallo - 8/21/2024 3:26:23 PM

CHAIN-OF-CUSTODY / Analytical Request Document

24080169

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G	8-19-24	1026		4	1		2		1					X	X	X	X		24080169-001
2	MW-02	WT	G	8-19-24	1029		4	1		2		1					X	X	X	X		24080169-002
3	MW-03	WT	G	↓	1132		4	1		2		1					X	X	X	X		24080169-003
4	MW-04	WT	G	↓	1221		3	1		1		1						X				24080169-004
5	MW-05	WT	G	↓	1326		4	1		2		1					X	X	X	X		24080169-005
6	MW-06	WT	G				4	1		2		1					X	X	X	X		24080169-006
7	MW-07	WT	G				4	1		2		1					X	X	X	X		24080169-007
8	MW-07S	WT	G				3	1		2							X		X	X		24080169-008
9	MW-08	WT	G				4	1		2		1					X	X	X	X		24080169-009
10	MW-08S	WT	G				3	1		2							X		X	X		24080169-010
11	MW-09	WT	G	8-19-24	1237		3	1		1		1						X				24080169-011
12	MW-10	WT	G	8-19-24	1143		3	1		1		1						X				24080169-012
13	MW-11	WT	G				4	1		2		1					X	X	X	X		24080169-013
14	MW-12	WT	G				4	1		2		1					X	X	X	X		24080169-014
15	MW-20	WT	G				3	1		2							X		X	X		24080169-015
16	MW-20S	WT	G				3	1		2							X		X	X		24080169-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-24Q3 Rev 0	J. Cobb	8-19	1525	[signature]	8/19/24	1525	

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
19.1	X (Y)		

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cobb

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-19-24

added HNO3(99172) to MW5

pH 96651/89660 LTG5

added NaOH(95443) to MW5 MING

CHAIN-OF-CUSTODY / Analytical Request Document

24080169

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES	**GROUND WATER**	DRINKING WATER
UST	RCRA	OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G				4	1		2		1					X	X	X	X		24080169-001
2	MW-02	WT	G				4	1		2		1					X	X	X	X		24080169-002
3	MW-03	WT	G				4	1		2		1					X	X	X	X		24080169-003
4	MW-04	WT	G				3	1		1		1						X				24080169-004
5	MW-05	WT	G				4	1		2		1					X	X	X	X		24080169-005
6	MW-06	WT	G	8-20-24	1117		4	1		2		1					X	X	X	X		24080169-006
7	MW-07	WT	G	8-20-24	948		4	1		2		1					X	X	X	X		24080169-007
8	MW-07S	WT	G	8-20-24	1011		3	1		2							X		X	X		24080169-008
9	MW-08	WT	G	8/20/24	1019		4	1		2		1					X	X	X	X		24080169-009
10	MW-08S	WT	G	8/20/24	1054		3	1		2							X		X	X		24080169-010
11	MW-09	WT	G				3	1		1		1						X				24080169-011
12	MW-10	WT	G				3	1		1		1						X				24080169-012
13	MW-11	WT	G	8-20-24	1057		4	1		2		1					X	X	X	X		24080169-013
14	MW-12	WT	G	8-20-24	1256		4	1		2		1					X	X	X	X		24080169-014
15	MW-20	WT	G				3	1		2							X		X	X		24080169-015
16	MW-20S	WT	G	8-20-24	1147		3	1		2							X		X	X		24080169-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q3 Rev 0	[signature]	8-20-24	1458	[signature]	8/20/24	1458	2.7 #5	Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cob

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-20-24

Added NaOH(95443) to MW-07.
Added HNO3(99172) to MW-20S, MW-30, MW-32 & MW-8 Dup.
pH ✓ 89666/96651 Um 8/20/24

CHAIN-OF-CUSTODY / Analytical Request Document

24080169

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 3

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Sam Davies: samantha.davies@vistracorp.com	Company Name:	Vistra Corp
	Kincaid, IL 62540		Tim Arnold: Tim.Arnold@vistracorp.com	Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com	Purchase Order No.:		Quote Reference:	
Phone: (217) 753-8911	Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY: NPDES / GROUND WATER / DRINKING WATER / UST / RCRA / OTHER

Site Location STATE: IL

Section D Required Client Information — Valid Matrix Codes: DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-23	WT	G				3	1		2							X		X	X		24080169-017
2	MW-27	WT	G				3	1		2							X		X	X		24080169-018
3	MW-28	WT	G	8-20-24	1702		3	1		2							X		X	X		24080169-019
4	MW-30	WT	G	8-20-24	1009		3	1		2							X		X	X		24080169-020
5	MW-31	WT	G				3	1		2							X		X	X		24080169-021
6	MW-31S	WT	G				3	1		2							X		X	X		24080169-022
7	MW-32	WT	G	8-20-24	1248		3	1		2							X		X	X		24080169-023
8	MW-33S	WT	G				3	1		2										X		24080169-024
9	MW-34S	WT	G	8/20/24	1156		3	1		2										X		24080169-025
10	MW-35S	WT	G				3	1		2										X		24080169-026
11	PZ-4A	WT	G				3	1		2										X		24080169-027
12	PZ-4C	WT	G				3	1		2							X		X	X		24080169-028
13	SG-02	WT	G				0										X		X			24080169-029
14	XSG-01	WT	G				0										X		X			24080169-030
15	Field Blank	WT	G				4	1		2		1					X	X	X	X		24080169-031
16	MW-08 Duplicate	WT	G	8/20/24	1019		4	2		1		1					X	X	X	X		24080169-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q3 Rev 0	[signature]	8-20-24	1458	[signature]	8/20/24	1458		Y	N	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cob

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8-20-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

CHAIN-OF-CUSTODY / Analytical Request Document

24080169

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Sam Davies: samantha.davies@vistracorp.com	Company Name:	Vistra Corp
	Kincaid, IL 62540		Tim Arnold: Tim.Arnold@vistracorp.com	Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com	Purchase Order No.:		Quote Reference:	
Phone: (217) 753-8911	Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY		
NPDES	GROUND WATER	DRINKING WATER
UST	RCRA	OTHER
Site Location STATE:	IL	

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-01	WT	G				4	1		2		1					X	X	X	X		24080169-001
2	MW-02	WT	G				4	1		2		1					X	X	X	X		24080169-002
3	MW-03	WT	G				4	1		2		1					X	X	X	X		24080169-003
4	MW-04	WT	G				3	1		1		1						X				24080169-004
5	MW-05	WT	G				4	1		2		1					X	X	X	X		24080169-005
6	MW-06	WT	G				4	1		2		1					X	X	X	X		24080169-006
7	MW-07	WT	G				4	1		2		1					X	X	X	X		24080169-007
8	MW-07S	WT	G				3	1		2							X		X	X		24080169-008
9	MW-08	WT	G				4	1		2		1					X	X	X	X		24080169-009
10	MW-08S	WT	G				3	1		2							X		X	X		24080169-010
11	MW-09	WT	G				3	1		1		1						X				24080169-011
12	MW-10	WT	G				3	1		1		1						X				24080169-012
13	MW-11	WT	G				4	1		2		1					X	X	X	X		24080169-013
14	MW-12	WT	G				4	1		2		1					X	X	X	X		24080169-014
15	MW-20	WT	G	8-21-24	1118		3	1		2							X		X	X		24080169-015
16	MW-20S	WT	G				3	1		2							X		X	X		24080169-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q3 Rev 0	[signature]	8-21	1440	[signature]	8/21/24	1440	12.7	Y	N	
							#5			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Payton Yoch

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 08/21/24 ~~08/22/24~~ TE

PH ✓ 96651 Added HNO_3 (~~97157~~) to 500 mL MW 27, MW 31, MW 31S 97172 + PZ4A

TE [initials] 8/21/24

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

24080169

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes (MATRIX / CODE): DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-23	WT	G	8-21-24	1019		3	1		2							X		X	X		24080169-017
2	MW-27	WT	G	8/21/24	1025		3	1		2							X		X	X		24080169-018
3	MW-28	WT	G				3	1		2							X		X	X		24080169-019
4	MW-30	WT	G				3	1		2							X		X	X		24080169-020
5	MW-31	WT	G	8-21-24	1217		3	1		2							X		X	X		24080169-021
6	MW-31S	WT	G	8-21-24	1001		3	1		2							X		X	X		24080169-022
7	MW-32	WT	G				3	1		2							X		X	X		24080169-023
8	MW-33S	WT	G	8-21-24	1126		3	1		2										X		24080169-024
9	MW-34S	WT	G				3	1		2										X		24080169-025
10	MW-35S	WT	G	8-21-24	1230		3	1		2										X		24080169-026
11	PZ-4A	WT	G	8-21-24	1123		3	1		2										X		24080169-027
12	PZ-4C	WT	G	8-21-24	1053		3	1		2							X		X	X		24080169-028
13	SG-02	WT	G				0										X		X			24080169-029
14	XSG-01	WT	G				0										X		X			24080169-030
15	Field Blank	WT	G	8-21-24	1240		4	1		2		1					X	X	X	X		24080169-031
16	MW-08 Duplicate	WT	G				4	2		1		1					X	X	X	X		24080169-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q3 Rev 0	[signature]	8-21	1440	[signature]	8/21/24	1440		Y	N	
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Payton Yack

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 08/21/24 ~~08/22/24~~ TE PRT

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES	**GROUND WATER**	DRINKING WATER
UST	RCRA	OTHER

Site Location STATE: IL

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-620-141	KIN-845-141	KIN-NE-141									Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	Equipment Blank	WT	G	8-21-24	1245		4	2		1		1					X	X	X	X										24080169-033
2																														
3																														
4																														
5																														
6																														
7																														
8																														
9																														
10																														
11																														
12																														
13																														
14																														
15																														
16																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q3 Rev 0	[signature]	8-21	1440	[signature]	8/21/24	1440		Y	N	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Paxton tech 08/21/24

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): ~~08/22/24~~ [initials]

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

December 17, 2024

Eric Bauer
Ramboll
234 W. Florida Street
Fifth Floor
Milwaukee, WI 53204
TEL: (414) 837-3607
FAX: (414) 837-3608

Illinois	100226
Illinois	1004652024-2
Kansas	E-10374
Louisiana	05002
Louisiana	05003
Oklahoma	9978

RE: KIN-24Q4 **WorkOrder:** 24110014

Dear Eric Bauer:

TEKLAB, INC received 8 samples for KIN_NE_141 on 11/20/2024 12:00:00 PM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column. Unless otherwise documented within this report,Teklab Inc. analyzes samples utilizing the most current methods in compliance with 40CFR. All tests are performed in the Collinsville, IL laboratory unless otherwise noted in the Case Narrative.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Elizabeth A. Hurley
Director of Customer Service
(618)344-1004 ex 33
ehurley@teklabinc.com

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

This reporting package includes the following:

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

Abbr	Definition
*	Analytes on report marked with an asterisk are not NELAP accredited
CCV	Continuing calibration verification is a check of a standard to determine the state of calibration of an instrument between recalibration.
CRQL	A Client Requested Quantitation Limit is a reporting limit that varies according to customer request. The CRQL may not be less than the MDL.
DF	Dilution factor is the dilution performed during analysis only and does not take into account any dilutions made during sample preparation. The reported result is final and includes all dilution factors.
DNI	Did not ignite
DUP	Laboratory duplicate is a replicate aliquot prepared under the same laboratory conditions and independently analyzed to obtain a measure of precision.
ICV	Initial calibration verification is a check of a standard to determine the state of calibration of an instrument before sample analysis is initiated.
IDPH	IL Dept. of Public Health
LCS	Laboratory control sample is a sample matrix, free from the analytes of interest,spiked with verified known amounts of analytes and analyzed exactly like a sample to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.
LCSD	Laboratory control sample duplicate is a replicate laboratory control sample that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MBLK	Method blank is a sample of a matrix similar to the batch of associated sample (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences should present at concentrations that impact the analytical results for sample analyses.
MDL	"The method detection limit is defined as the minimum measured concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results."
MS	Matrix spike is an aliquot of matrix fortified (spiked) with known quantities of specific analytes that is subjected to the entire analytical procedures in order to determine the effect of the matrix on an approved test method's recovery system. The acceptable recovery range is listed in the QC Package (provided upon request).
MSD	Matrix spike duplicate means a replicate matrix spike that is prepared and analyzed in order to determine the precision of the approved test method. The acceptable recovery range is listed in the QC Package (provided upon request).
MW	Molecular weight
NC	Data is not acceptable for compliance purposes
ND	Not Detected at the Reporting Limit
NELAP	NELAP Accredited
PQL	Practical quantitation limit means the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operation conditions.
RL	The reporting limit the lowest level that the data is displayed in the final report. The reporting limit may vary according to customer request or sample dilution. The reporting limit may not be less than the MDL.
RPD	Relative percent difference is a calculated difference between two recoveries (ie. MS/MSD). The acceptable recovery limit is listed in the QC Package (provided upon request).
SPK	The spike is a known mass of target analyte added to a blank sample or sub-sample; used to determine recovery deficiency or for other quality control purposes.
Surr	Surrogates are compounds which are similar to the analytes of interest in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples.
TIC	Tentatively identified compound: Analytes tentatively identified in the sample by using a library search. Only results not in the calibration standard will be reported as tentatively identified compounds. Results for tentatively identified compounds that are not present in the calibration standard, but are assigned a specific chemical name based upon the library search, are calculated using total peak areas from reconstructed ion chromatograms and a response factor of one. The nearest Internal Standard is used for the calculation. The results of any TICs must be considered estimated, and are flagged with a "T". If the estimated result is above the calibration range it is flagged "ET"
TNTC	Too numerous to count (> 200 CFU)

Qualifiers

- # - Unknown hydrocarbon
- B - Analyte detected in associated Method Blank
- C - RL shown is a Client Requested Quantitation Limit
- E - Value above quantitation range
- H - Holding times exceeded
- I - Associated internal standard was outside method criteria
- J - Analyte detected below quantitation limits
- M - Manual Integration used to determine area response
- ND - Not Detected at the Reporting Limit
- R - RPD outside accepted recovery limits
- S - Spike Recovery outside recovery limits
- T - TIC(Tentatively identified compound)
- X - Value exceeds Maximum Contaminant Level

Case Narrative

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q4

Work Order: 24110014
Report Date: 17-Dec-24

Cooler Receipt Temp: 5.1 °C

An employee of Teklab, Inc. collected the sample(s).

Equipment Blanks were not needed. EAH 11/20/24

Per Eric Bauer's request, only KIN_NE_141 data is included in this report. EAH 12/17/24

Locations

Collinsville

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	jhriley@teklabinc.com

Springfield

Address	3920 Pintail Dr Springfield, IL 62711-9415
Phone	(217) 698-1004
Fax	(217) 698-1005
Email	KKlostermann@teklabinc.com

Kansas City

Address	8421 Nieman Road Lenexa, KS 66214
Phone	(913) 541-1998
Fax	(913) 541-1998
Email	jhriley@teklabinc.com

Collinsville Air

Address	5445 Horseshoe Lake Road Collinsville, IL 62234-7425
Phone	(618) 344-1004
Fax	(618) 344-1005
Email	EHurley@teklabinc.com

Chicago

Address	1319 Butterfield Rd. Downers Grove, IL 60515
Phone	(630) 324-6855
Fax	
Email	arenner@teklabinc.com

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

State	Dept	Cert #	NELAP	Exp Date	Lab
Illinois	IEPA	100226	NELAP	1/31/2025	Collinsville
Illinois	IEPA	1004652024-2	NELAP	4/30/2025	Collinsville
Kansas	KDHE	E-10374	NELAP	4/30/2025	Collinsville
Louisiana	LDEQ	05002	NELAP	6/30/2025	Collinsville
Louisiana	LDEQ	05003	NELAP	6/30/2025	Collinsville
Oklahoma	ODEQ	9978	NELAP	12/31/2024	Collinsville
Arkansas	ADEQ	88-0966		3/14/2025	Collinsville
Illinois	IDPH	17584		5/31/2025	Collinsville
Iowa	IDNR	430		6/1/2026	Collinsville
Kentucky	UST	0073		1/31/2025	Collinsville
Mississippi	MSDH			4/30/2025	Collinsville
Missouri	MDNR	930		1/31/2025	Collinsville
Missouri	MDNR	00930		10/31/2026	Collinsville

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

Lab ID: 24110014-001 | **Client Sample ID:** MW-1

Matrix: GROUNDWATER | **Collection Date:** 11/18/2024 11:17

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**16.04**	ft	1	11/18/2024 11:17	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**300**	NTU	1	11/18/2024 11:17	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**93**	mV	1	11/18/2024 11:17	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**451**	µS/cm	1	11/18/2024 11:17	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**17.2**	°C	1	11/18/2024 11:17	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**2.16**	mg/L	1	11/18/2024 11:17	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.36**		1	11/18/2024 11:17	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**168**	mg/L	1	11/19/2024 9:26	R356417
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/19/2024 9:26	R356417
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**374**	mg/L	1	11/23/2024 11:14	R356657
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50		**ND**	mg/L	10	11/19/2024 9:28	R356354
Chloride	NELAP	1.00	5.00		**13.6**	mg/L	10	11/19/2024 9:28	R356354
Sulfate	NELAP	3.00	10.0		**87.0**	mg/L	10	11/19/2024 9:28	R356354
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**56.6**	mg/L	1	11/20/2024 21:43	231371
Magnesium	NELAP	0.0064	0.0500		**25.6**	mg/L	1	11/22/2024 18:11	231371
Potassium	NELAP	0.0400	0.100		**0.284**	mg/L	1	11/20/2024 21:43	231371
Sodium	NELAP	0.0180	0.0500		**16.4**	mg/L	1	11/20/2024 21:43	231371
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Barium	NELAP	0.0007	0.0010		**0.0553**	mg/L	5	11/20/2024 20:37	231371
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Boron	NELAP	0.0150	0.0250		**0.300**	mg/L	5	12/11/2024 10:39	232040
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	11/20/2024 20:37	231371
Cobalt	NELAP	0.0001	0.0010	J	**0.0001**	mg/L	5	11/20/2024 20:37	231371
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Lithium	*	0.0015	0.0030	J	**0.0019**	mg/L	5	11/20/2024 20:37	231371
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	11/20/2024 20:37	231371
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/20/2024 20:37	231371
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/20/2024 20:37	231371
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/20/2024 11:25	231369

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

Lab ID: 24110014-002 **Client Sample ID:** MW-2

Matrix: GROUNDWATER **Collection Date:** 11/18/2024 10:32

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**5.63**	ft	1	11/18/2024 10:32	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**66**	NTU	1	11/18/2024 10:32	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**-72**	mV	1	11/18/2024 10:32	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**647**	µS/cm	1	11/18/2024 10:32	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.3**	°C	1	11/18/2024 10:32	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**2.36**	mg/L	1	11/18/2024 10:32	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**7.04**		1	11/18/2024 10:32	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**261**	mg/L	1	11/19/2024 9:20	R356417
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/19/2024 9:20	R356417
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	20	25		**560**	mg/L	1.25	11/23/2024 11:14	R356657
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50	J	**0.38**	mg/L	10	11/19/2024 10:03	R356354
Chloride	NELAP	1.00	5.00		**14.2**	mg/L	10	11/19/2024 10:03	R356354
Sulfate	NELAP	3.00	10.0		**136**	mg/L	10	11/19/2024 10:03	R356354
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**97.1**	mg/L	1	11/20/2024 21:48	231371
Magnesium	NELAP	0.0064	0.0500		**33.1**	mg/L	1	11/22/2024 18:15	231371
Potassium	NELAP	0.0400	0.100		**1.37**	mg/L	1	11/20/2024 21:48	231371
Sodium	NELAP	0.0180	0.0500		**23.9**	mg/L	1	11/20/2024 21:48	231371
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/20/2024 19:00	231371
Arsenic	NELAP	0.0004	0.0010		**0.0015**	mg/L	5	11/20/2024 19:00	231371
Barium	NELAP	0.0007	0.0010		**0.117**	mg/L	5	11/20/2024 19:00	231371
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/20/2024 19:00	231371
Boron	NELAP	0.0092	0.0250		**0.0715**	mg/L	5	11/20/2024 19:00	231371
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/20/2024 19:00	231371
Chromium	NELAP	0.0007	0.0015	J	**0.0014**	mg/L	5	11/20/2024 19:00	231371
Cobalt	NELAP	0.0001	0.0010	J	**0.0006**	mg/L	5	11/20/2024 19:00	231371
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/20/2024 19:00	231371
Lithium	*	0.0015	0.0030		**0.0048**	mg/L	5	11/20/2024 19:00	231371
Molybdenum	NELAP	0.0006	0.0015		**0.0043**	mg/L	5	11/20/2024 19:00	231371
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/20/2024 19:00	231371
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/20/2024 19:00	231371
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/20/2024 11:28	231369

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

Lab ID: 24110014-021 **Client Sample ID:** MW-33S

Matrix: GROUNDWATER **Collection Date:** 11/20/2024 9:31

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**6.35**	ft	1	11/20/2024 9:31	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**66**	NTU	1	11/20/2024 9:31	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**18**	mV	1	11/20/2024 9:31	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**977**	µS/cm	1	11/20/2024 9:31	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.3**	°C	1	11/20/2024 9:31	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.92**	mg/L	1	11/20/2024 9:31	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.74**		1	11/20/2024 9:31	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**422**	mg/L	1	11/21/2024 12:07	R356548
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/21/2024 12:07	R356548
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**712**	mg/L	1	11/27/2024 8:21	R356878
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50		**ND**	mg/L	10	11/21/2024 16:27	R356537
Chloride	NELAP	1.00	5.00		**24.6**	mg/L	10	11/21/2024 16:27	R356537
Sulfate	NELAP	3.00	10.0		**169**	mg/L	10	11/21/2024 16:27	R356537
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**141**	mg/L	1	11/25/2024 18:51	231490
Magnesium	NELAP	0.0055	0.0500		**76.9**	mg/L	1	11/25/2024 18:51	231490
Potassium	NELAP	0.0400	0.100		**1.07**	mg/L	1	11/25/2024 18:51	231490
Sodium	NELAP	0.0180	0.0500		**20.9**	mg/L	1	11/25/2024 18:51	231490
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:06	231490
Arsenic	NELAP	0.0004	0.0010		**0.0015**	mg/L	5	11/27/2024 20:26	231490
Barium	NELAP	0.0007	0.0010		**0.0717**	mg/L	5	11/27/2024 20:26	231490
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:06	231490
Boron	NELAP	0.0092	0.0250		**0.200**	mg/L	5	11/27/2024 20:26	231490
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:06	231490
Chromium	NELAP	0.0007	0.0015		**0.0037**	mg/L	5	12/02/2024 11:25	231490
Cobalt	NELAP	0.0001	0.0010	J	**0.0004**	mg/L	5	11/22/2024 21:06	231490
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:06	231490
Lithium	*	0.0015	0.0030		**0.0042**	mg/L	5	11/22/2024 21:06	231490
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	11/22/2024 21:06	231490
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:06	231490
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 21:06	231490
Contamination present in the CCB for Pb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/22/2024 8:34	231510

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

Lab ID: 24110014-022 | **Client Sample ID:** MW-34S

Matrix: GROUNDWATER | **Collection Date:** 11/20/2024 10:23

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**6.38**	ft	1	11/20/2024 10:23	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**120**	NTU	1	11/20/2024 10:23	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**78**	mV	1	11/20/2024 10:23	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1110**	µS/cm	1	11/20/2024 10:23	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.5**	°C	1	11/20/2024 10:23	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**6.48**	mg/L	1	11/20/2024 10:23	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.90**		1	11/20/2024 10:23	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**319**	mg/L	1	11/21/2024 12:21	R356548
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/21/2024 12:21	R356548
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**870**	mg/L	1	11/27/2024 8:19	R356878
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50	J	**0.28**	mg/L	10	11/21/2024 17:02	R356537
Chloride	NELAP	1.00	5.00		**28.1**	mg/L	10	11/21/2024 17:02	R356537
Sulfate	NELAP	3.00	10.0		**248**	mg/L	10	11/21/2024 17:02	R356537
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**155**	mg/L	1	11/25/2024 18:52	231490
Magnesium	NELAP	0.0055	0.0500		**79.5**	mg/L	1	11/25/2024 18:52	231490
Potassium	NELAP	0.0400	0.100		**1.33**	mg/L	1	11/25/2024 18:52	231490
Sodium	NELAP	0.0180	0.0500		**20.5**	mg/L	1	11/25/2024 18:52	231490
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Arsenic	NELAP	0.0004	0.0010		**0.0015**	mg/L	5	11/27/2024 20:32	231490
Barium	NELAP	0.0007	0.0010		**0.0886**	mg/L	5	11/27/2024 20:32	231490
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Boron	NELAP	0.0092	0.0250		**0.258**	mg/L	5	11/27/2024 20:32	231490
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Chromium	NELAP	0.0007	0.0015		**0.0041**	mg/L	5	12/02/2024 11:30	231490
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Lithium	*	0.0015	0.0030	J	**0.0024**	mg/L	5	11/22/2024 21:13	231490
Molybdenum	NELAP	0.0006	0.0015	J	**0.0012**	mg/L	5	11/22/2024 21:13	231490
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:13	231490
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 21:13	231490
Contamination present in the CCB for Pb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/22/2024 8:41	231510

Laboratory Results

Teklab, Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q4
Lab ID: 24110014-023
Matrix: GROUNDWATER

Work Order: 24110014
Report Date: 17-Dec-24
Client Sample ID: MW-35S
Collection Date: 11/20/2024 9:53

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**6.76**	ft	1	11/20/2024 9:53	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**19**	NTU	1	11/20/2024 9:53	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**62**	mV	1	11/20/2024 9:53	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1000**	µS/cm	1	11/20/2024 9:53	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.8**	°C	1	11/20/2024 9:53	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.64**	mg/L	1	11/20/2024 9:53	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.80**		1	11/20/2024 9:53	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**311**	mg/L	1	11/21/2024 11:54	R356548
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/21/2024 11:54	R356548
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**732**	mg/L	1	11/27/2024 8:20	R356878
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50		**ND**	mg/L	10	11/21/2024 17:13	R356537
Chloride	NELAP	1.00	5.00		**38.9**	mg/L	10	11/21/2024 17:13	R356537
Sulfate	NELAP	3.00	10.0		**130**	mg/L	10	11/21/2024 17:13	R356537
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**128**	mg/L	1	11/25/2024 18:52	231490
Magnesium	NELAP	0.0055	0.0500		**70.0**	mg/L	1	11/25/2024 18:52	231490
Potassium	NELAP	0.0400	0.100		**0.935**	mg/L	1	11/25/2024 18:52	231490
Sodium	NELAP	0.0180	0.0500		**18.6**	mg/L	1	11/25/2024 18:52	231490
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:19	231490
Arsenic	NELAP	0.0004	0.0010		**0.0011**	mg/L	5	12/02/2024 11:36	231490
Barium	NELAP	0.0007	0.0010		**0.0688**	mg/L	5	11/27/2024 20:37	231490
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:19	231490
Boron	NELAP	0.0092	0.0250		**0.156**	mg/L	5	11/27/2024 20:37	231490
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:19	231490
Chromium	NELAP	0.0007	0.0015	J	**0.0012**	mg/L	5	11/27/2024 20:37	231490
Cobalt	NELAP	0.0001	0.0010	J	**0.0001**	mg/L	5	11/22/2024 21:19	231490
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:19	231490
Lithium	*	0.0015	0.0030	J	**0.0023**	mg/L	5	11/22/2024 21:19	231490
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	11/22/2024 21:19	231490
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:19	231490
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 21:19	231490
Contamination present in the MBLK. Sample results below the reporting limit are reportable per the TNI Standard.									
Contamination present in the CCB for Pb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/22/2024 9:00	231510

Client: Ramboll | **Work Order:** 24110014
Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24
Lab ID: 24110014-024 | **Client Sample ID:** PZ-4A
Matrix: GROUNDWATER | **Collection Date:** 11/19/2024 10:08

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**6.90**	ft	1	11/19/2024 10:08	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**3.7**	NTU	1	11/19/2024 10:08	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**40**	mV	1	11/19/2024 10:08	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**949**	µS/cm	1	11/19/2024 10:08	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**16.7**	°C	1	11/19/2024 10:08	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**5.52**	mg/L	1	11/19/2024 10:08	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.64**		1	11/19/2024 10:08	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**511**	mg/L	1	11/20/2024 12:14	R356488
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/20/2024 12:14	R356488
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20	H	**742**	mg/L	1	11/26/2024 14:44	R356859
Sample analysis did not meet hold time requirements.									
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50	J	**0.30**	mg/L	10	11/20/2024 10:18	R356433
Chloride	NELAP	1.00	5.00		**16.4**	mg/L	10	11/20/2024 10:18	R356433
Sulfate	NELAP	3.00	10.0		**117**	mg/L	10	11/20/2024 10:18	R356433
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**135**	mg/L	1	11/21/2024 22:01	231433
Magnesium	NELAP	0.0055	0.0500		**75.2**	mg/L	1	11/21/2024 22:01	231433
Potassium	NELAP	0.0400	0.100		**0.192**	mg/L	1	11/21/2024 22:01	231433
Sodium	NELAP	0.0180	0.0500		**18.4**	mg/L	1	11/21/2024 22:01	231433
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Arsenic	NELAP	0.0004	0.0010	J	**0.0005**	mg/L	5	11/27/2024 19:02	231433
Barium	NELAP	0.0007	0.0010		**0.0578**	mg/L	5	11/22/2024 15:39	231433
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Boron	NELAP	0.0092	0.0250		**0.821**	mg/L	5	11/22/2024 15:39	231433
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	11/22/2024 15:39	231433
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	11/22/2024 15:39	231433
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	11/22/2024 15:39	231433
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 15:39	231433
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 15:39	231433
LCS recovered outside upper control limits. Sample results are below the reporting limit. Data is reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/21/2024 12:54	231451

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

Lab ID: 24110014-028 **Client Sample ID:** Field Blank

Matrix: AQUEOUS **Collection Date:** 11/20/2024 10:31

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**1**	mg/L	1	11/21/2024 11:44	R356548
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/21/2024 11:44	R356548
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20	H	**< 20**	mg/L	1	12/02/2024 16:13	R357024
Sample analysis did not meet hold time requirements.									
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50		**ND**	mg/L	10	11/21/2024 17:25	R356537
Chloride	NELAP	1.00	5.00		**ND**	mg/L	10	11/21/2024 17:25	R356537
Sulfate	NELAP	3.00	10.0		**ND**	mg/L	10	11/21/2024 17:25	R356537
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**< 0.100**	mg/L	1	11/25/2024 18:53	231490
Magnesium	NELAP	0.0055	0.050	J	**0.0075**	mg/L	1	11/25/2024 18:53	231490
Potassium	NELAP	0.0400	0.100		**< 0.100**	mg/L	1	11/25/2024 18:53	231490
Sodium	NELAP	0.018	0.050	J	**0.027**	mg/L	1	11/25/2024 18:53	231490
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Arsenic	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/27/2024 20:43	231490
Barium	NELAP	0.0007	0.0010		**< 0.0010**	mg/L	5	11/27/2024 20:43	231490
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Boron	NELAP	0.0092	0.0250		**< 0.0250**	mg/L	5	11/27/2024 20:43	231490
Cadmium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Chromium	NELAP	0.0007	0.0015		**< 0.0015**	mg/L	5	11/27/2024 20:43	231490
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Lithium	*	0.0015	0.0030		**< 0.0030**	mg/L	5	11/22/2024 21:25	231490
Molybdenum	NELAP	0.0006	0.0015		**< 0.0015**	mg/L	5	11/22/2024 21:25	231490
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:25	231490
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 21:25	231490
Contamination present in the MBLK. Sample results below the reporting limit are reportable per the TNI Standard.									
Contamination present in the CCB for Pb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/22/2024 9:03	231510

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

Lab ID: 24110014-031 **Client Sample ID:** MW-35S Duplicate

Matrix: GROUNDWATER **Collection Date:** 11/20/2024 9:53

Analyses	Certification	MDL	RL	Qual	Result	Units	DF	Date Analyzed	Batch
FIELD ELEVATION MEASUREMENTS									
Depth to water from measuring point	*	0	0		**6.76**	ft	1	11/20/2024 9:53	R356899
STANDARD METHODS 2130 B FIELD									
Turbidity	*	1.0	1.0		**19**	NTU	1	11/20/2024 9:53	R356899
STANDARD METHODS 18TH ED. 2580 B FIELD									
Oxidation-Reduction Potential	*	-2000	-2000		**62**	mV	1	11/20/2024 9:53	R356899
STANDARD METHODS 2510 B FIELD									
Spec. Conductance, Field	*	0	0		**1000**	µS/cm	1	11/20/2024 9:53	R356899
STANDARD METHODS 2550 B FIELD									
Temperature	*	0	0		**15.8**	°C	1	11/20/2024 9:53	R356899
STANDARD METHODS 4500-O G FIELD									
Oxygen, Dissolved	*	0	0		**4.64**	mg/L	1	11/20/2024 9:53	R356899
SW-846 9040B FIELD									
pH	*	0	1.00		**6.80**		1	11/20/2024 9:53	R356899
STANDARD METHODS 2320 B (TOTAL) 1997, 2011									
Alkalinity, Bicarbonate (as CaCO3)	NELAP	0	0		**310**	mg/L	1	11/21/2024 11:48	R356548
STANDARD METHODS 2320 B 1997, 2011									
Alkalinity, Carbonate (as CaCO3)	NELAP	0	0		**0**	mg/L	1	11/21/2024 11:48	R356548
STANDARD METHODS 2540 C (TOTAL) 1997, 2011									
Total Dissolved Solids	NELAP	16	20		**658**	mg/L	1	11/27/2024 8:14	R356878
SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY									
Fluoride	NELAP	0.20	0.50	J	**0.21**	mg/L	10	11/21/2024 18:12	R356537
Chloride	NELAP	1.00	5.00		**38.2**	mg/L	10	11/21/2024 18:12	R356537
Sulfate	NELAP	3.00	10.0		**135**	mg/L	10	11/21/2024 18:12	R356537
SW-846 3005A, 6010B, METALS BY ICP (TOTAL)									
Calcium	NELAP	0.0350	0.100		**125**	mg/L	1	11/25/2024 18:58	231490
Magnesium	NELAP	0.0055	0.0500		**68.8**	mg/L	1	11/25/2024 18:58	231490
Potassium	NELAP	0.0400	0.100		**0.902**	mg/L	1	11/25/2024 18:58	231490
Sodium	NELAP	0.0180	0.0500		**17.4**	mg/L	1	11/25/2024 18:58	231490
SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)									
Antimony	NELAP	0.0004	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:31	231490
Arsenic	NELAP	0.0004	0.0010		**0.0011**	mg/L	5	11/27/2024 20:48	231490
Barium	NELAP	0.0007	0.0010		**0.0707**	mg/L	5	11/27/2024 20:48	231490
Beryllium	NELAP	0.0002	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:31	231490
Boron	NELAP	0.0092	0.0250		**0.130**	mg/L	5	11/27/2024 20:48	231490
Cadmium	NELAP	0.0002	0.0010	J	**0.0002**	mg/L	5	11/22/2024 21:31	231490
Chromium	NELAP	0.0007	0.0015		**0.0024**	mg/L	5	12/02/2024 11:41	231490
Cobalt	NELAP	0.0001	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:31	231490
Lead	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:31	231490
Lithium	*	0.0015	0.0030	J	**0.0020**	mg/L	5	11/22/2024 21:31	231490
Molybdenum	NELAP	0.0006	0.0015	J	**0.0006**	mg/L	5	11/22/2024 21:31	231490
Selenium	NELAP	0.0006	0.0010		**< 0.0010**	mg/L	5	11/22/2024 21:31	231490
Thallium	NELAP	0.0010	0.0020		**< 0.0020**	mg/L	5	11/22/2024 21:31	231490
Contamination present in the CCB for Pb. Sample results below the reporting limit are reportable per the TNI Standard.									
SW-846 7470A (TOTAL)									
Mercury	NELAP	0.00006	0.00020		**< 0.00020**	mg/L	1	11/22/2024 9:05	231510

Teklab, Inc. Environmental Laboratory

Sample Summary

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q4

Work Order: 24110014
Report Date: 17-Dec-24

Lab Sample ID	Client Sample ID	Matrix	Fractions	Collection Date
24110014-001	MW-1	Groundwater	2	11/18/2024 11:17
24110014-002	MW-2	Groundwater	2	11/18/2024 10:32
24110014-021	MW-33S	Groundwater	2	11/20/2024 9:31
24110014-022	MW-34S	Groundwater	2	11/20/2024 10:23
24110014-023	MW-35S	Groundwater	2	11/20/2024 9:53
24110014-024	PZ-4A	Groundwater	2	11/19/2024 10:08
24110014-028	Field Blank	Aqueous	2	11/20/2024 10:31
24110014-031	MW-35S Duplicate	Groundwater	2	11/20/2024 9:53

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

STANDARD METHODS 2510 B FIELD

Batch R356899 **SampType:** LCS Units **µS/cm**

SampID: LCS-1-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	100.0	90	110	11/18/2024

Batch R356899 **SampType:** LCS Units **µS/cm**

SampID: LCS-1-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.6	90	110	11/18/2024

Batch R356899 **SampType:** LCS Units **µS/cm**

SampID: LCS-2-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.9	90	110	11/19/2024

Batch R356899 **SampType:** LCS Units **µS/cm**

SampID: LCS-3-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Spec. Conductance, Field	*	0		**1410**	1412	0	99.9	90	110	11/20/2024

SW-846 9040B FIELD

Batch R356899 **SampType:** LCS Units

SampID: LCS-1-BG

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.00**	7.000	0	100.0	98.57	101.4	11/18/2024

Batch R356899 **SampType:** LCS Units

SampID: LCS-1-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**6.98**	7.000	0	99.7	98.57	101.4	11/18/2024

Batch R356899 **SampType:** LCS Units

SampID: LCS-2-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.00**	7.000	0	100.0	98.57	101.4	11/19/2024

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

SW-846 9040B FIELD

Batch R356899 **SampType:** LCS Units
SampID: LCS-3-JC

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
pH	*	1.00		**7.01**	7.000	0	100.1	98.57	101.4	11/20/2024

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R356657 **SampType:** MBLK Units **mg/L**
SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20	J	**16**	16.00	0	100.0	-100	100	11/23/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/23/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/22/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/22/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/22/2024

Batch R356657 **SampType:** LCS Units **mg/L**
SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**924**	1000	0	92.4	90	110	11/22/2024
Total Dissolved Solids		20		**936**	1000	0	93.6	90	110	11/22/2024
Total Dissolved Solids		20		**952**	1000	0	95.2	90	110	11/22/2024
Total Dissolved Solids		20		**988**	1000	0	98.8	90	110	11/23/2024
Total Dissolved Solids		20		**944**	1000	0	94.4	90	110	11/23/2024

Batch R356657 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24111104-019ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**< 20**				0	0.00	11/22/2024

Batch R356657 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24111493-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		25		**572**				585.0	2.16	11/22/2024

Batch R356657 **SampType:** DUP Units **mg/L** RPD Limit **10**
SampID: 24111493-004ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		33		**1650**				1683	1.80	11/23/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R356657 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111622-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		40		**544**				560.0	2.90	11/23/2024

Batch R356657 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111631-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20		**1060**				1038	2.29	11/23/2024

Batch R356859 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/26/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/26/2024

Batch R356859 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**902**	1000	0	90.2	90	110	11/26/2024
Total Dissolved Solids		20		**998**	1000	0	99.8	90	110	11/26/2024

Batch R356859 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111142-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50	H	**410**				450.0	9.30	11/26/2024

Batch R356859 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111493-007ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		100	H	**10700**				10320	3.24	11/26/2024

Batch R356878 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/27/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/27/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	11/27/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R356878 **SampType:** LCS **Units** mg/L

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**1020**	1000	0	102.0	90	110	11/27/2024
Total Dissolved Solids		20		**966**	1000	0	96.6	90	110	11/27/2024
Total Dissolved Solids		20		**1000**	1000	0	100.2	90	110	11/27/2024

Batch R356878 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111809-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		33	H	**1890**				1844	2.68	11/27/2024

Batch R356878 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24111944-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**626**				570.0	9.36	11/27/2024

Batch R356878 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24112164-002ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**1590**				1750	9.58	11/27/2024

Batch R356878 **SampType:** DUP **Units** mg/L **RPD Limit** 10

SampID: 24112248-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		50		**480**				495.0	3.08	11/27/2024

Batch R357024 **SampType:** MBLK **Units** mg/L

SampID: MBLK

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	12/02/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	12/02/2024
Total Dissolved Solids		20		**< 20**	16.00	0	0	-100	100	12/02/2024

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

STANDARD METHODS 2540 C (TOTAL) 1997, 2011

Batch R357024 **SampType:** LCS Units **mg/L**

SampID: LCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Total Dissolved Solids		20		**942**	1000	0	94.2	90	110	12/02/2024
Total Dissolved Solids		20		**980**	1000	0	98.0	90	110	12/02/2024
Total Dissolved Solids		20		**1010**	1000	0	101.2	90	110	12/02/2024

Batch R357024 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24111631-003ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**496**				502.0	1.20	12/02/2024

Batch R357024 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24111811-001ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		20	H	**1200**				1170	2.70	12/02/2024

Batch R357024 **SampType:** DUP Units **mg/L** RPD Limit **10**

SampID: 24111853-005ADUP

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Total Dissolved Solids		33	H	**1290**				1296	0.78	12/02/2024

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356354 **SampType:** MBLK Units **mg/L**

SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						11/19/2024
Chloride		0.50		**ND**						11/19/2024
Sulfate		1.00		**ND**						11/19/2024

Batch R356354 **SampType:** LCS Units **mg/L**

SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**0.96**	1.000	0	96.1	90	110	11/19/2024
Chloride		0.50		**20.2**	20.00	0	101.1	90	110	11/19/2024
Sulfate		1.00		**18.4**	20.00	0	92.1	90	110	11/19/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356354 **SampType:** MS Units **mg/L**

SampID: 24110014-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.86**	10.00	0	98.6	80	120	11/19/2024
Chloride		5.00		**220**	200.0	13.65	103.1	80	120	11/19/2024
Sulfate		10.0		**279**	200.0	87.02	95.8	80	120	11/19/2024

Batch R356354 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.86**	10.00	0	98.6	9.858	0.05	11/19/2024
Chloride		5.00		**219**	200.0	13.65	102.6	219.9	0.43	11/19/2024
Sulfate		10.0		**277**	200.0	87.02	95.1	278.6	0.54	11/19/2024

Batch R356354 **SampType:** MS Units **mg/L**

SampID: 24110014-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.0**	10.00	0.3810	96.3	80	120	11/19/2024
Chloride		5.00		**218**	200.0	14.17	102.0	80	120	11/19/2024
Sulfate		10.0		**329**	200.0	136.2	96.2	80	120	11/19/2024

Batch R356354 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.0**	10.00	0.3810	96.5	10.01	0.19	11/19/2024
Chloride		5.00		**219**	200.0	14.17	102.3	218.2	0.25	11/19/2024
Sulfate		10.0		**329**	200.0	136.2	96.4	328.6	0.11	11/19/2024

Batch R356354 **SampType:** MS Units **mg/L**

SampID: 24111493-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.81**	10.00	0	98.1	80	120	11/19/2024
Chloride		5.00		**260**	200.0	46.84	106.4	80	120	11/19/2024
Sulfate		10.0		**433**	200.0	233.7	99.7	80	120	11/19/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356354 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111493-003AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.84**	10.00	0	98.4	9.811	0.33	11/19/2024
Chloride		5.00		**260**	200.0	46.84	106.4	259.7	0.01	11/19/2024
Sulfate		10.0		**433**	200.0	233.7	99.5	433.2	0.09	11/19/2024

Batch R356354 **SampType:** MS Units **mg/L**

SampID: 24111493-005BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.6**	10.00	0.6910	99.0	80	120	11/19/2024
Chloride		5.00		**240**	200.0	28.55	105.9	80	120	11/19/2024
Sulfate		10.0		**365**	200.0	167.5	99.0	80	120	11/19/2024

Batch R356354 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111493-005BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.6**	10.00	0.6910	99.1	10.59	0.15	11/19/2024
Chloride		5.00		**241**	200.0	28.55	106.1	240.3	0.15	11/19/2024
Sulfate		10.0		**366**	200.0	167.5	99.4	365.5	0.20	11/19/2024

Batch R356433 **SampType:** MBLK Units **mg/L**

SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						11/20/2024
Chloride		0.50		**ND**						11/20/2024
Sulfate		1.00		**ND**						11/20/2024

Batch R356433 **SampType:** LCS Units **mg/L**

SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**0.97**	1.000	0	97.1	90	110	11/20/2024
Chloride		0.50		**20.3**	20.00	0	101.5	90	110	11/20/2024
Sulfate		1.00		**18.5**	20.00	0	92.4	90	110	11/20/2024

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24110014-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.99**	10.00	0	99.9	80	120	11/20/2024
Chloride		5.00		**256**	200.0	42.63	106.5	80	120	11/20/2024
Sulfate		10.0		**197**	200.0	10.04	93.6	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.92**	10.00	0	99.2	9.994	0.72	11/20/2024
Chloride		5.00		**254**	200.0	42.63	105.5	255.6	0.81	11/20/2024
Sulfate		10.0		**196**	200.0	10.04	92.8	197.2	0.82	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24110014-011AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.0**	10.00	0	100.0	80	120	11/20/2024
Chloride		5.00		**239**	200.0	29.50	104.9	80	120	11/20/2024
Sulfate		10.0		**550**	200.0	348.1	101.2	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-011AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.0**	10.00	0	100.2	9.995	0.24	11/20/2024
Chloride		5.00		**239**	200.0	29.50	104.8	239.4	0.14	11/20/2024
Sulfate		10.0		**549**	200.0	348.1	100.4	550.4	0.30	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24111493-008BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Sulfate		100		**7750**	2000	5587	108.0	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111493-008BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Sulfate		100		**7750**	2000	5587	108.2	7747	0.06	11/20/2024

Client: Ramboll | **Work Order:** 24110014

Client Project: KIN-24Q4 | **Report Date:** 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24111622-002AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0.2150	98.4	80	120	11/20/2024
Chloride		5.00		**233**	200.0	25.03	103.9	80	120	11/20/2024
Sulfate		10.0		**225**	200.0	38.04	93.4	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111622-002AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.99**	10.00	0.2150	97.8	10.05	0.61	11/20/2024
Chloride		5.00		**232**	200.0	25.03	103.4	232.8	0.44	11/20/2024
Sulfate		10.0		**224**	200.0	38.04	92.8	224.8	0.53	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24111631-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.95**	10.00	0	99.5	80	120	11/20/2024
Chloride		5.00		**310**	200.0	91.10	109.6	80	120	11/20/2024
Sulfate		10.0		**449**	200.0	249.7	99.7	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111631-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.98**	10.00	0	99.8	9.953	0.31	11/20/2024
Chloride		5.00		**310**	200.0	91.10	109.3	310.4	0.22	11/20/2024
Sulfate		10.0		**448**	200.0	249.7	99.0	449.1	0.31	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**

SampID: 24111631-004BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.4**	10.00	0.5120	99.4	80	120	11/20/2024
Chloride		5.00		**288**	200.0	70.58	108.9	80	120	11/20/2024
Sulfate		10.0		**1190**	200.0	979.2	105.6	80	120	11/20/2024

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24111631-004BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.5**	10.00	0.5120	99.5	10.45	0.15	11/20/2024
Chloride		5.00		**289**	200.0	70.58	109.0	288.4	0.07	11/20/2024
Sulfate		10.0		**1190**	200.0	979.2	105.8	1190	0.04	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**
SampID: 24111660-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.84**	10.00	0	98.4	80	120	11/20/2024
Chloride		5.00		**264**	200.0	49.45	107.1	80	120	11/20/2024
Sulfate		10.0		**209**	200.0	21.28	94.0	80	120	11/20/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24111660-003AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.84**	10.00	0	98.4	9.842	0.02	11/20/2024
Chloride		5.00		**263**	200.0	49.45	106.6	263.6	0.33	11/20/2024
Sulfate		10.0		**209**	200.0	21.28	93.7	209.2	0.29	11/20/2024

Batch R356433 **SampType:** MS Units **mg/L**
SampID: 24111677-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.84**	10.00	0	98.4	80	120	11/21/2024
Chloride		5.00		**222**	200.0	13.18	104.3	80	120	11/21/2024
Sulfate		10.0		**189**	200.0	0	94.7	80	120	11/21/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24111677-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.84**	10.00	0	98.4	9.837	0.02	11/21/2024
Chloride		5.00		**222**	200.0	13.18	104.2	221.7	0.09	11/21/2024
Sulfate		10.0		**189**	200.0	0	94.7	189.5	0.05	11/21/2024

Client: Ramboll
Client Project: KIN-24Q4
Work Order: 24110014
Report Date: 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356433 **SampType:** MS Units **mg/L**
SampID: 24111678-004AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**9.96**	10.00	0	99.6	80	120	11/21/2024
Chloride		5.00		**271**	200.0	57.37	106.7	80	120	11/21/2024
Sulfate		10.0		**259**	200.0	70.09	94.6	80	120	11/21/2024

Batch R356433 **SampType:** MSD Units **mg/L** RPD Limit **15**
SampID: 24111678-004AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**9.98**	10.00	0	99.8	9.961	0.18	11/21/2024
Chloride		5.00		**271**	200.0	57.37	106.8	270.8	0.05	11/21/2024
Sulfate		10.0		**259**	200.0	70.09	94.5	259.3	0.10	11/21/2024

Batch R356537 **SampType:** MBLK Units **mg/L**
SampID: MBLK/ICB

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**ND**						11/21/2024
Chloride		0.50		**ND**						11/21/2024
Sulfate		1.00		**ND**						11/21/2024

Batch R356537 **SampType:** LCS Units **mg/L**
SampID: LCS/ICV/QCS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.05		**0.97**	1.000	0	97.3	90	110	11/21/2024
Chloride		0.50		**20.3**	20.00	0	101.5	90	110	11/21/2024
Sulfate		1.00		**18.5**	20.00	0	92.5	90	110	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**
SampID: 24110014-021AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	100.6	80	120	11/21/2024
Chloride		5.00		**235**	200.0	24.57	105.4	80	120	11/21/2024
Sulfate		10.0		**366**	200.0	169.0	98.4	80	120	11/21/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-021AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	101.0	10.06	0.37	11/21/2024
Chloride		5.00		**236**	200.0	24.57	105.7	235.4	0.21	11/21/2024
Sulfate		10.0		**366**	200.0	169.0	98.2	365.9	0.10	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24110910-005BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.2**	10.00	0.3690	98.6	80	120	11/21/2024
Chloride		5.00		**244**	200.0	31.98	105.8	80	120	11/21/2024
Sulfate		10.0		**1640**	200.0	1446	99.2	80	120	11/21/2024

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110910-005BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.3**	10.00	0.3690	99.4	10.23	0.74	11/21/2024
Chloride		5.00		**245**	200.0	31.98	106.7	243.5	0.79	11/21/2024
Sulfate		10.0		**1660**	200.0	1446	104.9	1644	0.69	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24111734-003AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.4**	10.00	0.5040	99.1	80	120	11/21/2024
Chloride		5.00		**220**	200.0	11.83	103.9	80	120	11/21/2024
Sulfate		10.0		**246**	200.0	55.98	95.1	80	120	11/21/2024

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111734-003AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.4**	10.00	0.5040	99.1	10.41	0.06	11/21/2024
Chloride		5.00		**220**	200.0	11.83	103.9	219.5	0.00	11/21/2024
Sulfate		10.0		**246**	200.0	55.98	95.0	246.2	0.04	11/21/2024

Teklab, Inc. Environmental Laboratory

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q4

Work Order: 24110014

Report Date: 17-Dec-24

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24111734-011AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.3**	10.00	0.4410	98.9	80	120	11/21/2024
Chloride		5.00		**237**	200.0	27.45	104.8	80	120	11/21/2024
Sulfate		10.0		**246**	200.0	55.72	94.9	80	120	11/21/2024

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111734-011AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.4**	10.00	0.4410	99.2	10.33	0.28	11/21/2024
Chloride		5.00		**237**	200.0	27.45	105.0	237.1	0.18	11/21/2024
Sulfate		10.0		**245**	200.0	55.72	94.8	245.6	0.09	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24111735-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	100.8	80	120	11/21/2024
Chloride		5.00		**226**	200.0	17.52	104.2	80	120	11/21/2024
Sulfate		10.0		**349**	200.0	152.7	98.0	80	120	11/21/2024

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111735-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	101.0	10.08	0.19	11/21/2024
Chloride		5.00		**226**	200.0	17.52	104.3	226.0	0.04	11/21/2024
Sulfate		10.0		**348**	200.0	152.7	97.8	348.8	0.15	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24111752-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	100.7	80	120	11/21/2024
Chloride		5.00		**213**	200.0	6.467	103.2	80	120	11/21/2024
Sulfate		10.0		**204**	200.0	16.50	93.9	80	120	11/21/2024

SW846 9056A TOTAL ANIONIC COMPOUNDS BY ION CHROMATOGRAPHY

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111752-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		0.50		**10.1**	10.00	0	100.6	10.07	0.10	11/21/2024
Chloride		5.00		**213**	200.0	6.467	103.2	212.9	0.02	11/21/2024
Sulfate		10.0		**204**	200.0	16.50	93.8	204.3	0.06	11/21/2024

Batch R356537 **SampType:** MS Units **mg/L**

SampID: 24111796-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Fluoride		5.00		**100**	100.0	0	100.4	80	120	11/21/2024
Chloride		50.0		**6680**	2000	4449	111.7	80	120	11/21/2024
Sulfate		100		**2110**	2000	211.0	94.8	80	120	11/21/2024

Batch R356537 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24111796-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Fluoride		5.00		**101**	100.0	0	100.5	100.4	0.11	11/21/2024
Chloride		50.0		**6680**	2000	4449	111.7	6684	0.01	11/21/2024
Sulfate		100		**2110**	2000	211.0	94.8	2107	0.01	11/21/2024

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 231371 **SampType:** MBLK Units **mg/L**

SampID: MBLK-231371

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	11/20/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	11/20/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	11/20/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	11/20/2024

Batch 231371 **SampType:** LCS Units **mg/L**

SampID: LCS-231371

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**5.06**	5.000	0	101.2	85	115	11/20/2024
Magnesium		0.0500		**4.75**	5.000	0	94.9	85	115	11/20/2024
Potassium		0.100		**5.10**	5.000	0	101.9	85	115	11/20/2024
Sodium		0.0500		**5.21**	5.000	0	104.1	85	115	11/20/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 231371 **SampType:** MS Units **mg/L**
SampID: 24110014-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**62.4**	5.000	56.60	116.6	75	125	11/20/2024
Magnesium		0.0500		**30.4**	5.000	25.61	96.0	75	125	11/22/2024
Potassium		0.100		**5.45**	5.000	0.2841	103.3	75	125	11/20/2024
Sodium		0.0500		**20.2**	5.000	16.39	76.8	75	125	11/20/2024

Batch 231371 **SampType:** MSD Units **mg/L** RPD Limit **20**
SampID: 24110014-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**60.9**	5.000	56.60	86.8	62.43	2.42	11/20/2024
Magnesium		0.0500		**30.3**	5.000	25.61	94.7	30.40	0.21	11/22/2024
Potassium		0.100		**5.41**	5.000	0.2841	102.5	5.450	0.74	11/20/2024
Sodium		0.0500		**20.2**	5.000	16.39	75.6	20.23	0.30	11/20/2024

Batch 231431 **SampType:** MBLK Units **mg/L**
SampID: MBLK-231431

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	11/21/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	11/21/2024
Lead		0.0150		**< 0.0150**	0.0040	0	0	-100	100	11/21/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	11/21/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	11/21/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	11/21/2024

Batch 231431 **SampType:** LCS Units **mg/L**
SampID: LCS-231431

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0250		**1.02**	1.000	0	102.5	85	115	11/21/2024
Calcium		0.100		**4.99**	5.000	0	99.8	85	115	11/21/2024
Lead		0.0150		**0.990**	1.000	0	99.0	85	115	11/21/2024
Magnesium		0.0500		**4.66**	5.000	0	93.1	85	115	11/21/2024
Potassium		0.100		**5.07**	5.000	0	101.4	85	115	11/21/2024
Sodium		0.0500		**5.12**	5.000	0	102.3	85	115	11/21/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 231431 **SampType:** MS Units **mg/L**

SampID: 24111631-003DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**61.6**	5.000	57.49	82.0	75	125	11/21/2024
Magnesium		0.0500		**4.54**	5.000	0	90.8	75	125	11/21/2024

Batch 231431 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24111631-003DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100		**63.4**	5.000	57.49	117.4	61.59	2.83	11/21/2024
Magnesium		0.0500		**4.70**	5.000	0	93.9	4.538	3.41	11/21/2024

Batch 231433 **SampType:** MBLK Units **mg/L**

SampID: MBLK-231433

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0250		**< 0.0250**	0.0087	0	0	-100	100	11/21/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	11/21/2024
Lead		0.0150		**< 0.0150**	0.0040	0	0	-100	100	11/21/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	11/21/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	11/21/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	11/21/2024

Batch 231433 **SampType:** LCS Units **mg/L**

SampID: LCS-231433

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0250		**0.975**	1.000	0	97.5	85	115	11/21/2024
Calcium		0.100		**4.89**	5.000	0	97.8	85	115	11/21/2024
Lead		0.0150		**0.956**	1.000	0	95.6	85	115	11/21/2024
Magnesium		0.0500		**4.49**	5.000	0	89.8	85	115	11/21/2024
Potassium		0.100		**4.85**	5.000	0	97.0	85	115	11/21/2024
Sodium		0.0500		**5.01**	5.000	0	100.3	85	115	11/21/2024

Batch 231433 **SampType:** MS Units **mg/L**

SampID: 24110014-017BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**112**	5.000	107.6	83.0	75	125	11/21/2024
Magnesium		0.0500		**57.7**	5.000	53.47	85.0	75	125	11/21/2024
Potassium		0.100		**5.62**	5.000	0.6762	98.9	75	125	11/21/2024
Sodium		0.0500	S	**47.2**	5.000	44.10	61.0	75	125	11/21/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6010B, METALS BY ICP (TOTAL)

Batch 231433 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24110014-017BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Calcium		0.100	S	**116**	5.000	107.6	160.0	111.7	3.39	11/21/2024
Magnesium		0.0500		**59.5**	5.000	53.47	120.4	57.72	3.03	11/21/2024
Potassium		0.100		**5.78**	5.000	0.6762	102.1	5.623	2.73	11/21/2024
Sodium		0.0500		**48.9**	5.000	44.10	95.8	47.15	3.62	11/21/2024

Batch 231490 **SampType:** MBLK Units mg/L

SampID: MBLK-231490

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	11/26/2024
Calcium		0.100		**< 0.100**	0.0350	0	0	-100	100	11/25/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	11/25/2024
Magnesium		0.0500		**< 0.0500**	0.0055	0	0	-100	100	11/26/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	11/26/2024
Potassium		0.100		**< 0.100**	0.0400	0	0	-100	100	11/25/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	11/26/2024
Sodium		0.0500		**< 0.0500**	0.0180	0	0	-100	100	11/25/2024

Batch 231490 **SampType:** LCS Units mg/L

SampID: LCS-231490

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Calcium		0.100		**4.69**	5.000	0	93.9	85	115	11/25/2024
Calcium		0.100		**5.04**	5.000	0	100.8	85	115	11/26/2024
Magnesium		0.0500		**4.69**	5.000	0	93.7	85	115	11/26/2024
Magnesium		0.0500		**4.74**	5.000	0	94.8	85	115	11/25/2024
Potassium		0.100		**5.32**	5.000	0	106.4	85	115	11/25/2024
Potassium		0.100		**5.13**	5.000	0	102.6	85	115	11/26/2024
Sodium		0.0500		**5.26**	5.000	0	105.3	85	115	11/25/2024
Sodium		0.0500		**4.89**	5.000	0	97.9	85	115	11/26/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231371 **SampType:** MBLK Units **mg/L**

SampID: MBLK-231371

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/20/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/20/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	11/20/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	11/20/2024
Boron		0.0250		**< 0.0250**	0.0093	0	0	-100	100	11/20/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/20/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	11/20/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/20/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/20/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	11/20/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	11/20/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/20/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	11/20/2024

Batch 231371 **SampType:** LCS Units **mg/L**

SampID: LCS-231371

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.946**	1.000	0	94.6	80	120	11/20/2024
Arsenic		0.0010		**1.02**	1.000	0	101.7	80	120	11/20/2024
Barium		0.0010		**4.38**	4.000	0	109.6	80	120	11/20/2024
Beryllium		0.0010		**0.0993**	0.1000	0	99.3	80	120	11/20/2024
Boron		0.0250		**0.979**	1.000	0	97.9	80	120	11/20/2024
Cadmium		0.0010		**0.113**	0.1000	0	112.9	80	120	11/20/2024
Chromium		0.0015		**0.410**	0.4000	0	102.6	80	120	11/20/2024
Cobalt		0.0010		**1.00**	1.000	0	100.2	80	120	11/20/2024
Lead		0.0010		**1.01**	1.000	0	101.1	80	120	11/20/2024
Lithium	*	0.0030		**0.999**	1.000	0	99.9	80	120	11/20/2024
Molybdenum		0.0015		**1.04**	1.000	0	103.8	80	120	11/20/2024
Selenium		0.0010		**1.00**	1.000	0	100.4	80	120	11/20/2024
Thallium		0.0020		**0.489**	0.5000	0	97.9	80	120	11/20/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231371 **SampType:** MS Units **mg/L**

SampID: 24110014-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**0.950**	1.000	0	95.0	75	125	11/20/2024
Arsenic		0.0010		**0.989**	1.000	0	98.9	75	125	11/20/2024
Barium		0.0010		**4.39**	4.000	0.05532	108.4	75	125	11/20/2024
Beryllium		0.0010		**0.104**	0.1000	0	103.8	75	125	11/20/2024
Cadmium		0.0010		**0.112**	0.1000	0	111.8	75	125	11/20/2024
Chromium		0.0015		**0.400**	0.4000	0	100.1	75	125	11/20/2024
Cobalt		0.0010		**0.950**	1.000	0.0001179	95.0	75	125	11/20/2024
Lead		0.0010		**1.02**	1.000	0	101.9	75	125	11/20/2024
Lithium	*	0.0030		**1.05**	1.000	0.001870	104.5	75	125	11/20/2024
Molybdenum		0.0015		**1.04**	1.000	0	103.8	75	125	11/20/2024
Selenium		0.0010		**0.990**	1.000	0	99.0	75	125	11/20/2024
Thallium		0.0020		**0.492**	0.5000	0	98.3	75	125	11/20/2024

Batch 231371 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24110014-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**0.937**	1.000	0	93.7	0.9499	1.32	11/20/2024
Arsenic		0.0010		**0.998**	1.000	0	99.8	0.9885	0.95	11/20/2024
Barium		0.0010		**4.33**	4.000	0.05532	106.8	4.393	1.47	11/20/2024
Beryllium		0.0010		**0.0981**	0.1000	0	98.1	0.1038	5.71	11/20/2024
Cadmium		0.0010		**0.111**	0.1000	0	110.9	0.1118	0.85	11/20/2024
Chromium		0.0015		**0.396**	0.4000	0	98.9	0.4004	1.19	11/20/2024
Cobalt		0.0010		**0.945**	1.000	0.0001179	94.5	0.9504	0.56	11/20/2024
Lead		0.0010		**0.994**	1.000	0	99.4	1.019	2.46	11/20/2024
Lithium	*	0.0030		**1.01**	1.000	0.001870	100.4	1.047	4.02	11/20/2024
Molybdenum		0.0015		**1.03**	1.000	0	103.4	1.038	0.31	11/20/2024
Selenium		0.0010		**0.990**	1.000	0	99.0	0.9897	0.06	11/20/2024
Thallium		0.0020		**0.493**	0.5000	0	98.6	0.4915	0.28	11/20/2024

Client: Ramboll

Client Project: KIN-24Q4

Work Order: 24110014

Report Date: 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231431 **SampType:** MBLK Units **mg/L**

SampID: MBLK-231431

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/22/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/22/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	11/22/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	11/22/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	11/22/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/22/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	11/22/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/22/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/22/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	11/22/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	11/22/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/22/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	11/22/2024

Batch 231431 **SampType:** LCS Units **mg/L**

SampID: LCS-231431

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	E	**1.13**	1.000	0	113.3	85	115	11/22/2024
Arsenic		0.0010		**1.06**	1.000	0	106.3	85	115	11/22/2024
Barium		0.0010		**4.30**	4.000	0	107.5	85	115	11/22/2024
Beryllium		0.0010		**0.107**	0.1000	0	107.0	85	115	11/22/2024
Boron	*	0.0250		**1.03**	1.000	0	103.0	85	115	11/22/2024
Cadmium		0.0010		**0.111**	0.1000	0	111.4	85	115	11/22/2024
Chromium		0.0015		**0.416**	0.4000	0	104.1	85	115	11/22/2024
Cobalt		0.0010		**0.985**	1.000	0	98.5	85	115	11/22/2024
Lead		0.0010	E	**1.03**	1.000	0	102.7	85	115	11/22/2024
Lithium	*	0.0030		**1.07**	1.000	0	106.7	85	115	11/22/2024
Molybdenum		0.0015		**1.04**	1.000	0	103.7	85	115	11/22/2024
Selenium		0.0010		**0.994**	1.000	0	99.4	85	115	11/22/2024
Thallium		0.0020		**0.491**	0.5000	0	98.1	85	115	11/22/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231431 **SampType:** MS Units **mg/L**

SampID: 24111631-003DMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Arsenic		0.0010		**0.976**	1.000	0.02101	95.5	70	130	11/22/2024
Barium		0.0010		**4.20**	4.000	0.08572	102.9	70	130	11/22/2024
Beryllium		0.0010		**0.104**	0.1000	0	103.7	70	130	11/22/2024
Boron	*	0.0250		**9.25**	1.000	8.051	119.8	70	130	11/27/2024
Cadmium		0.0010		**0.107**	0.1000	0.0009327	105.7	70	130	11/22/2024
Chromium		0.0015		**0.385**	0.4000	0	96.3	70	130	11/22/2024
Lead		0.0010	E	**1.01**	1.000	0	100.5	70	130	11/22/2024
Selenium		0.0010		**0.944**	1.000	0.03647	90.8	70	130	11/22/2024

Batch 231431 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24111631-003DMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Arsenic		0.0010		**0.976**	1.000	0.02101	95.5	0.9761	0.02	11/22/2024
Barium		0.0010		**4.62**	4.000	0.08572	113.4	4.204	9.48	11/22/2024
Beryllium		0.0010		**0.106**	0.1000	0	105.8	0.1037	2.04	11/22/2024
Boron	*	0.0250		**8.97**	1.000	8.051	92.1	9.249	3.04	11/27/2024
Cadmium		0.0010		**0.118**	0.1000	0.0009327	117.2	0.1066	10.29	11/22/2024
Chromium		0.0015		**0.389**	0.4000	0	97.2	0.3854	0.86	11/22/2024
Lead		0.0010	E	**1.07**	1.000	0	106.5	1.005	5.82	11/22/2024
Selenium		0.0010		**0.927**	1.000	0.03647	89.0	0.9443	1.88	11/22/2024

Quality Control Results

http://www.teklabinc.com/

Client: Ramboll
Client Project: KIN-24Q4

Work Order: 24110014
Report Date: 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231433 **SampType:** MBLK Units **mg/L**
SampID: MBLK-231433

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/22/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/26/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	11/26/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	11/22/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	11/26/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/26/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	11/26/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/22/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/22/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	11/22/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	11/22/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/26/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	11/22/2024

Batch 231433 **SampType:** LCS Units **mg/L**
SampID: LCS-231433

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	SE	**1.17**	1.000	0	117.1	85	115	11/22/2024
Antimony		0.0010		**1.06**	1.000	0	105.9	85	115	11/27/2024
Arsenic		0.0010		**0.957**	1.000	0	95.7	85	115	11/26/2024
Barium		0.0010		**4.45**	4.000	0	111.3	85	115	11/26/2024
Beryllium		0.0010		**0.107**	0.1000	0	107.2	85	115	11/22/2024
Boron	*	0.0250		**0.931**	1.000	0	93.1	85	115	11/26/2024
Cadmium		0.0010		**0.0970**	0.1000	0	97.0	85	115	11/26/2024
Chromium		0.0015		**0.380**	0.4000	0	95.0	85	115	11/26/2024
Cobalt		0.0010		**0.986**	1.000	0	98.6	85	115	11/22/2024
Lead		0.0010	E	**1.10**	1.000	0	110.0	85	115	11/22/2024
Lithium	*	0.0030		**1.08**	1.000	0	108.1	85	115	11/22/2024
Molybdenum		0.0015		**1.02**	1.000	0	102.4	85	115	11/22/2024
Selenium		0.0010		**0.959**	1.000	0	95.9	85	115	11/26/2024
Thallium		0.0020		**0.520**	0.5000	0	104.1	85	115	11/22/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231433 **SampType:** MS Units mg/L

SampID: 24110014-017BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**1.17**	1.000	0	116.6	75	125	11/27/2024
Arsenic		0.0010		**1.11**	1.000	0.02108	108.9	75	125	11/27/2024
Barium		0.0020		**4.40**	4.000	0.1917	105.2	75	125	12/03/2024
Beryllium		0.0010		**0.104**	0.1000	0	104.5	75	125	11/22/2024
Boron		0.0250		**2.13**	1.000	1.139	98.9	75	125	11/22/2024
Cadmium		0.0010		**0.113**	0.1000	0	112.6	75	125	11/27/2024
Chromium		0.0015		**0.402**	0.4000	0	100.5	75	125	11/22/2024
Cobalt		0.0010		**0.931**	1.000	0.002438	92.9	75	125	11/22/2024
Lead		0.0010		**1.04**	1.000	0	103.9	75	125	11/22/2024
Lithium	*	0.0030		**1.02**	1.000	0	102.2	75	125	11/22/2024
Molybdenum		0.0015		**1.18**	1.000	0.001665	118.2	75	125	12/02/2024
Selenium		0.0010		**1.07**	1.000	0	107.3	75	125	11/27/2024
Thallium		0.0020		**0.490**	0.5000	0	98.1	75	125	11/22/2024

Batch 231433 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24110014-017BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Antimony		0.0010		**1.18**	1.000	0	117.9	1.166	1.11	11/27/2024
Arsenic		0.0010		**1.15**	1.000	0.02108	112.7	1.111	3.30	11/27/2024
Barium		0.0020		**4.55**	4.000	0.1917	108.9	4.399	3.35	12/03/2024
Beryllium		0.0010		**0.106**	0.1000	0	105.8	0.1045	1.29	11/22/2024
Boron		0.0250		**2.16**	1.000	1.139	102.0	2.128	1.47	11/22/2024
Cadmium		0.0010		**0.115**	0.1000	0	115.5	0.1126	2.49	11/27/2024
Chromium		0.0015		**0.401**	0.4000	0	100.3	0.4019	0.19	11/22/2024
Cobalt		0.0010		**0.954**	1.000	0.002438	95.2	0.9311	2.45	11/22/2024
Lead		0.0010		**1.04**	1.000	0	103.8	1.039	0.08	11/22/2024
Lithium	*	0.0030		**1.04**	1.000	0	103.9	1.022	1.63	11/22/2024
Molybdenum		0.0015		**1.15**	1.000	0.001665	115.2	1.183	2.56	12/02/2024
Selenium		0.0010		**1.10**	1.000	0	109.9	1.073	2.40	11/27/2024
Thallium		0.0020		**0.508**	0.5000	0	101.6	0.4904	3.56	11/22/2024

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231490 **SampType:** MBLK Units mg/L

SampID: MBLK-231490

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/25/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	11/25/2024
Barium		0.0010		**< 0.0010**	0.0007	0	0	-100	100	11/25/2024
Beryllium		0.0010		**< 0.0010**	0.0002	0	0	-100	100	11/25/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	11/25/2024
Cadmium		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/25/2024
Chromium		0.0015		**< 0.0015**	0.0007	0	0	-100	100	12/02/2024
Chromium		0.0015	S	**0.0025**	0.0007	0	355.7	-100	100	11/27/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	11/25/2024
Lead		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/25/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	11/25/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	11/25/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	11/25/2024
Thallium		0.0020		**< 0.0020**	0.0010	0	0	-100	100	11/25/2024

Batch 231490 **SampType:** LCS Units mg/L

SampID: LCS-231490

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	E	**1.14**	1.000	0	113.6	85	115	11/25/2024
Arsenic		0.0010		**1.12**	1.000	0	111.9	85	115	11/25/2024
Barium		0.0010		**4.41**	4.000	0	110.3	85	115	11/27/2024
Beryllium		0.0010		**0.104**	0.1000	0	103.6	85	115	11/25/2024
Boron	*	0.0250		**1.01**	1.000	0	101.4	85	115	11/25/2024
Cadmium		0.0010		**0.110**	0.1000	0	110.0	85	115	11/25/2024
Chromium		0.0015		**0.386**	0.4000	0	96.4	85	115	11/27/2024
Cobalt		0.0010		**1.09**	1.000	0	108.6	85	115	11/25/2024
Lead		0.0010	E	**0.905**	1.000	0	90.5	85	115	11/25/2024
Lithium	*	0.0030		**1.06**	1.000	0	106.2	85	115	11/25/2024
Molybdenum		0.0015		**1.08**	1.000	0	108.0	85	115	11/25/2024
Selenium		0.0010		**1.10**	1.000	0	109.9	85	115	11/25/2024
Thallium		0.0020		**0.464**	0.5000	0	92.9	85	115	11/25/2024

Batch 231490 **SampType:** MS Units mg/L

SampID: 24111734-023BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Selenium		0.0010		**1.15**	1.000	0	115.2	70	130	11/25/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 231490 **SampType:** MSD Units mg/L RPD Limit 20

SampID: 24111734-023BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Selenium		0.0010		**1.14**	1.000	0	113.6	1.152	1.32	11/25/2024

Batch 232040 **SampType:** MBLK Units mg/L

SampID: MBLK-232040

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010		**< 0.0010**	0.0004	0	0	-100	100	12/11/2024
Arsenic		0.0010		**< 0.0010**	0.0004	0	0	-100	100	12/10/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	12/10/2024
Boron	*	0.0250		**< 0.0250**	0.0093	0	0	-100	100	12/11/2024
Cobalt		0.0010		**< 0.0010**	0.0001	0	0	-100	100	12/10/2024
Lead		0.0010	S	**0.443**	0.0006	0	73810	-100	100	12/11/2024
Lead		0.0010	S	**0.408**	0.0006	0	68040	-100	100	12/10/2024
Lithium	*	0.0030		**< 0.0030**	0.0015	0	0	-100	100	12/10/2024
Molybdenum		0.0015		**< 0.0015**	0.0006	0	0	-100	100	12/10/2024
Selenium		0.0010		**< 0.0010**	0.0006	0	0	-100	100	12/10/2024

Batch 232040 **SampType:** LCS Units mg/L

SampID: LCS-232040

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Antimony		0.0010	S	**1.17**	1.000	0	116.6	85	115	12/11/2024
Arsenic		0.0010		**1.00**	1.000	0	100.5	85	115	12/10/2024
Boron	*	0.0250		**1.01**	1.000	0	100.5	85	115	12/11/2024
Boron	*	0.0250		**0.973**	1.000	0	97.3	85	115	12/10/2024
Cobalt		0.0010		**0.994**	1.000	0	99.4	85	115	12/10/2024
Lead		0.0010	BE	**1.00**	1.000	0	100.5	85	115	12/10/2024
Lead		0.0010	B	**1.12**	1.000	0	111.7	85	115	12/11/2024
Lithium	*	0.0030		**0.927**	1.000	0	92.7	85	115	12/10/2024
Molybdenum		0.0015		**0.997**	1.000	0	99.7	85	115	12/10/2024
Selenium		0.0010		**1.01**	1.000	0	100.6	85	115	12/10/2024

Batch 232040 **SampType:** MS Units mg/L

SampID: 24110014-001BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Boron		0.0250		**1.32**	1.000	0.3003	101.6	75	125	12/11/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 3005A, 6020A, METALS BY ICPMS (TOTAL)

Batch 232040 **SampType:** MSD Units **mg/L** RPD Limit **20**

SampID: 24110014-001BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Boron		0.0250		**1.32**	1.000	0.3003	101.6	1.316	0.04	12/11/2024

SW-846 7470A (TOTAL)

Batch 231369 **SampType:** MBLK Units **mg/L**

SampID: MBLK-231369

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	11/20/2024

Batch 231369 **SampType:** LCS Units **mg/L**

SampID: LCS-231369

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00498**	0.0050	0	99.5	85	115	11/20/2024

Batch 231369 **SampType:** MS Units **mg/L**

SampID: 24110014-003BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00481**	0.0050	0	96.2	75	125	11/20/2024

Batch 231369 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-003BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00478**	0.0050	0	95.6	0.004812	0.65	11/20/2024

Batch 231369 **SampType:** MS Units **mg/L**

SampID: 24110014-018BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00420**	0.0050	0	84.0	75	125	11/20/2024

Batch 231369 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-018BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00405**	0.0050	0	81.0	0.004200	3.65	11/20/2024

SW-846 7470A (TOTAL)

Batch 231451 **SampType:** MBLK Units mg/L

SampID: MBLK-231451

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	11/21/2024

Batch 231451 **SampType:** LCS Units mg/L

SampID: LCS-231451

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00443**	0.0050	0	88.6	85	115	11/21/2024

Batch 231451 **SampType:** MS Units mg/L

SampID: 24110014-011BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00442**	0.0050	0	88.4	75	125	11/21/2024

Batch 231451 **SampType:** MSD Units mg/L RPD Limit **15**

SampID: 24110014-011BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00432**	0.0050	0	86.3	0.004422	2.44	11/21/2024

Batch 231451 **SampType:** MS Units mg/L

SampID: 24111603-001AMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00412**	0.0050	0	82.4	75	125	11/21/2024

Batch 231451 **SampType:** MSD Units mg/L RPD Limit **15**

SampID: 24111603-001AMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00417**	0.0050	0	83.4	0.004120	1.23	11/21/2024

Batch 231510 **SampType:** MBLK Units mg/L

SampID: MBLK-231510

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**< 0.00020**	0.0001	0	0	-100	100	11/22/2024

Batch 231510 **SampType:** LCS Units mg/L

SampID: LCS-231510

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00468**	0.0050	0	93.7	85	115	11/22/2024

Client: Ramboll **Work Order:** 24110014

Client Project: KIN-24Q4 **Report Date:** 17-Dec-24

SW-846 7470A (TOTAL)

Batch 231510 **SampType:** MS Units **mg/L**

SampID: 24110014-021BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00476**	0.0050	0	95.2	75	125	11/22/2024

Batch 231510 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-021BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00459**	0.0050	0	91.8	0.004759	3.65	11/22/2024

Batch 231510 **SampType:** MS Units **mg/L**

SampID: 24110014-022BMS

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	Low Limit	High Limit	Date Analyzed
Mercury		0.00020		**0.00467**	0.0050	0	93.5	75	125	11/22/2024

Batch 231510 **SampType:** MSD Units **mg/L** RPD Limit **15**

SampID: 24110014-022BMSD

Analyses	Cert	RL	Qual	Result	Spike	SPK Ref Val	%REC	RPD Ref Val	%RPD	Date Analyzed
Mercury		0.00020		**0.00471**	0.0050	0	94.3	0.004673	0.90	11/22/2024

Receiving Check List

Teklab Inc. Environmental Laboratory

http://www.teklabinc.com/

Client: Ramboll

Client Project: KIN-24Q4

Work Order: 24110014

Report Date: 17-Dec-24

Carrier: Daniel Crump

Received By: JMD

Completed by: Amber Dilallo
On: 18-Nov-24

Reviewed by: Elizabeth A. Hurley
On: 20-Nov-24

Pages to follow: Chain of custody 6 Extra pages included 0

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 5.1		
Type of thermal preservation?	None ☐	Ice ☑	Blue Ice ☐	Dry Ice ☐		
Chain of custody present?	Yes ☑	No ☐				
Chain of custody signed when relinquished and received?	Yes ☑	No ☐				
Chain of custody agrees with sample labels?	Yes ☑	No ☐				
Samples in proper container/bottle?	Yes ☑	No ☐				
Sample containers intact?	Yes ☑	No ☐				
Sufficient sample volume for indicated test?	Yes ☑	No ☐				
All samples received within holding time?	Yes ☑	No ☐				
Reported field parameters measured:	Field ☑	Lab ☐	NA ☐			
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐				
When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.						
Water – at least one vial per sample has zero headspace?	Yes ☐	No ☐	No VOA vials ☑			
Water - TOX containers have zero headspace?	Yes ☐	No ☐	No TOX containers ☑			
Water - pH acceptable upon receipt?	Yes ☐	No ☑	NA ☐			
NPDES/CWA TCN interferences checked/treated in the field?	Yes ☐	No ☐	NA ☑			

Any No responses must be detailed below or on the COC.

pH strip #96651. - LH/amberdilallo - 11/18/2024 4:28:13 PM

Samples were received on 11/19/24 at 1510 on ice [3.9C/4.3C - LTG#5]. Additional Nitric Acid (100984) was needed in MW-5, MW-12, MW-30, and MW-31S upon arrival at the laboratory. pH strip #96651. - amberdilallo - 11/19/2024 3:47:26 PM

Samples were received on 11/20/24 at 1200 on ice [3.1C - LTG#5]. pH strip #96651. - JD/amberdilallo - 11/20/2024 5:14:53 PM

CHAIN-OF-CUSTODY / Analytical Request Document

24110014

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A Required Client Information:		Section B Required Project Information:	Section C Invoice Information:
Company:	Vistra Corp-Kincaid	Report To: Brian Voelker, Sam Davies	Attention: Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To: Sam Davies: samantha.davies@vistracorp.com	Company Name: Vistra Corp
	Kincaid, IL 62540	Tim Arnold: Tim.Arnold@vistracorp.com	Address: see Section A
Email To:	Brian.Voelker@VistraCorp.com	Purchase Order No.:	Quote Reference:
Phone:	(217) 753-8911 Fax:	Project Name:	Project Manager: Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:	Profile #:

REGULATORY AGENCY

NPDES — **GROUND WATER** — DRINKING WATER
UST — RCRA — OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-1	WT	G	11-18-24	1117		2	1		1							X	X	X		24110014-001
2	MW-2	WT	G	11-18-24	1032		2	1		1							X	X	X		24110014-002
3	MW-3	WT	G	11-18-24	1330		2	1		1							X	X			24110014-003
4	MW-5	WT	G				2	1		1							X	X			24110014-004
5	MW-6	WT	G	11-18-24	1140		2	1		1							X	X			24110014-005
6	MW-7	WT	G	11-18-24	1221		2	1		1							X	X			24110014-006
7	MW-7S	WT	G	11-18-24	1241		2	1		1							X	X			24110014-007
8	MW-8	WT	G	11-18-24	1038		2	1		1							X	X			24110014-008
9	MW-8S	WT	G	11-18-24	Dry		2	1		1							X	X			24110014-009
10	MW-11	WT	G	11-18-24	1155		2	1		1							X	X			24110014-010
11	MW-12	WT	G				2	1		1							X	X			24110014-011
12	MW-20	WT	G	11-18-24	1403		2	1		1							X	X			24110014-012
13	MW-20S	WT	G				2	1		1							X	X			24110014-013
14	MW-23	WT	G	11-18-24	1238		2	1		1							X	X			24110014-014
15	MW-27	WT	G	11-18-24	Dry		2	1		1							X	X			24110014-015
16	MW-28	WT	G				2	1		1							X	X			24110014-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q4 Rev 0	[signature]	11-18	1600	Jackie Davis	11/18/24	16:00	5.1	Y	N	
							IR5			
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cob

SIGNATURE of SAMPLER: Justin Cob [signature] — DATE Signed (MM/DD/YY): 11-18-24

PHV 96051 LH 11/18/24

CHAIN-OF-CUSTODY / Analytical Request Document

24110014

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:	Section C Invoice Information:
Company: Vistra Corp-Kincaid		Report To: Brian Voelker, Sam Davies	Attention: Brian Voelker, Tim Arnold
Address: 199 IL 104		Copy To: Sam Davies: samantha.davies@vistracorp.com	Company Name: Vistra Corp
Kincaid, IL 62540		Tim Arnold: Tim.Arnold@vistracorp.com	Address: see Section A
Email To: Brian.Voelker@VistraCorp.com		Purchase Order No.:	Quote Reference:
Phone: (217) 753-8911	Fax:	Project Name:	Project Manager: Liz Hurley
Requested Due Date/TAT: 10 day		Project Number:	Profile #:

REGULATORY AGENCY		
NPDES	GROUND WATER	DRINKING WATER
UST	RCRA	OTHER
Site Location STATE:	IL	

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-30	WT	G				2	1		1							X	X			24110014-017
2	MW-31	WT	G	11-18-24	1349		2	1		1							X	X			24110014-018
3	MW-31S	WT	G				2	1		1							X	X			24110014-019
4	MW-32	WT	G	11-18-24	1324		2	1		1							X	X			24110014-020
5	MW-33S	WT	G				2	1		1									X		24110014-021
6	MW-34S	WT	G				2	1		1									X		24110014-022
7	MW-35S	WT	G				2	1		1									X		24110014-023
8	PZ-4A	WT	G				2	1		1									X		24110014-024
9	PZ-4C	WT	G				2	1		1							X	X			24110014-025
10	SG-02	WT	G				0										X	X			24110014-026
11	XSG-01	WT	G				0										X	X			24110014-027
12	Field Blank	WT	G				2	1		1							X	X	X		24110014-028
13	MW-8 Duplicate	WT	G	11-18-24	1038		2	1		1							X	X			24110014-029
14	MW-32 Duplicate	WT	G	11-18-24	1224		2	1		1							X	X			24110014-030
15	MW-35S Duplicate	WT	G				2	1		1									X		24110014-031
16	Equipment Blank 1	WT	G				2	1		1							X	X	X		24110014-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q4 Rev 0	[signature]	11-18	1600	Jake Davis	11/18/24	16:00		Y	N	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brett Gillihan

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 11-18-24

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

24110014

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104, Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911
Fax:	
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com; Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER | UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	Equipment Blank 2	WT	G				2	1		1							X	X	X		24110014-033
2	Equipment Blank 3	WT	G				2	1		1							X	X	X		24110014-034
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15																					
16																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q4 Rev 0	[signature]	11-18	1600	Jackie Deeris	11/18/24	16:00		Y	N	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brett Billihan

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-18-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

24110014

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Requested Analysis Filtered (Y/N)

Section D Required Client Information

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-1	WT	G				2	1		1							X	X	X		24110014-001
2	MW-2	WT	G				2	1		1							X	X	X		24110014-002
3	MW-3	WT	G				2	1		1							X	X			24110014-003
4	MW-5	WT	G	11-19-24	1140		2	1		1							X	X			24110014-004
5	MW-6	WT	G				2	1		1							X	X			24110014-005
6	MW-7	WT	G				2	1		1							X	X			24110014-006
7	MW-7S	WT	G				2	1		1							X	X			24110014-007
8	MW-8	WT	G				2	1		1							X	X			24110014-008
9	MW-8S	WT	G				2	1		1							X	X			24110014-009
10	MW-11	WT	G				2	1		1							X	X			24110014-010
11	MW-12	WT	G	11-19-24	1342		2	1		1							X	X			24110014-011
12	MW-20	WT	G				2	1		1							X	X			24110014-012
13	MW-20S	WT	G	11-19-24	1057		2	1		1							X	X			24110014-013
14	MW-23	WT	G				2	1		1							X	X			24110014-014
15	MW-27	WT	G				2	1		1							X	X			24110014-015
16	MW-28	WT	G	11-19-24	1312		2	1		1							X	X			24110014-016

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
KIN-24Q4 Rev 0	[signature]	11-19	1510	[signature]	11/19/24	1510	3.9	Y	N	
							4.3	#5		
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Cole

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-19-24

Added HNO3 (100984) to

CHAIN-OF-CUSTODY / Analytical Request Document

24110014

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 2 of 3

Section A Required Client Information:

Company:	Vistra Corp-Kincaid
Address:	199 IL 104
	Kincaid, IL 62540
Email To:	Brian.Voelker@VistraCorp.com
Phone:	(217) 753-8911 Fax:
Requested Due Date/TAT:	10 day

Section B Required Project Information:

Report To:	Brian Voelker, Sam Davies
Copy To:	Sam Davies: samantha.davies@vistracorp.com
	Tim Arnold: Tim.Arnold@vistracorp.com
Purchase Order No.:	
Project Name:	
Project Number:	

Section C Invoice Information:

Attention:	Brian Voelker, Tim Arnold
Company Name:	Vistra Corp
Address:	see Section A
Quote Reference:	
Project Manager:	Liz Hurley
Profile #:	

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes (MATRIX / CODE): DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-30	WT	G	11-19-24	1230		2	1		1							X	X			24110014-017
2	MW-31	WT	G				2	1		1							X	X			24110014-018
3	MW-31S	WT	G	11-19-24	1204		2	1		1							X	X			24110014-019
4	MW-32	WT	G				2	1		1							X	X			24110014-020
5	MW-33S	WT	G				2	1		1									X		24110014-021
6	MW-34S	WT	G				2	1		1									X		24110014-022
7	MW-35S	WT	G				2	1		1									X		24110014-023
8	PZ-4A	WT	G	11-19-24	1008		2	1		1									X		24110014-024
9	PZ-4C	WT	G	11-19-24	0944		2	1		1							X	X			24110014-025
10	SG-02	WT	G				0										X	X			24110014-026
11	XSG-01	WT	G				0										X	X			24110014-027
12	Field Blank	WT	G				2	1		1							X	X	X		24110014-028
13	MW-8 Duplicate	WT	G				2	1		1							X	X			24110014-029
14	MW-32 Duplicate	WT	G				2	1		1							X	X			24110014-030
15	MW-35S Duplicate	WT	G				2	1		1									X		24110014-031
16	Equipment Blank 1	WT	G				2	1		1							X	X	X		24110014-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-24Q4 Rev 0	[illegible]	11-19	1510	[illegible]	11/19/24	1510	Y N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: [illegible]

SIGNATURE of SAMPLER: [illegible]

DATE Signed (MM/DD/YY): 11-19-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

3.1 R5
IC< PH 96657

CHAIN-OF-CUSTODY / Analytical Request Document

24110014

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Vistra Corp-Kincaid	Report To:	Brian Voelker, Sam Davies	Attention:	Brian Voelker, Tim Arnold
Address:	199 IL 104	Copy To:	Sam Davies: samantha.davies@vistracorp.com	Company Name:	Vistra Corp
	Kincaid, IL 62540		Tim Arnold: Tim.Arnold@vistracorp.com	Address:	see Section A
Email To:	Brian.Voelker@VistraCorp.com	Purchase Order No.:		Quote Reference:	
Phone:	(217) 753-8911 Fax:	Project Name:		Project Manager:	Liz Hurley
Requested Due Date/TAT:	10 day	Project Number:		Profile #:	

REGULATORY AGENCY

NPDES | **GROUND WATER** | DRINKING WATER
UST | RCRA | OTHER

Site Location STATE: IL

Section D Required Client Information

Valid Matrix Codes — MATRIX / CODE: DRINKING WATER DW, WATER WT, WASTE WATER WW, PRODUCT P, SOIL/SOLID SL, OIL OL, WIPE WP, AIR AR, OTHER OT, TISSUE TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED DATE	COLLECTED TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	KIN-257-141	KIN-845-141	KIN-NE-141	Residual Chlorine (Y/N)	Project No./ Lab I.D.
1	MW-30	WT	G				2	1		1							X	X			24110014-017
2	MW-31	WT	G				2	1		1							X	X			24110014-018
3	MW-31S	WT	G				2	1		1							X	X			24110014-019
4	MW-32	WT	G				2	1		1							X	X			24110014-020
5	MW-33S	WT	G	11-20-24	0931		2	1		1									X		24110014-021
6	MW-34S	WT	G	↓	1023		2	1		1									X		24110014-022
7	MW-35S	WT	G		0953		2	1		1									X		24110014-023
8	PZ-4A	WT	G				2	1		1									X		24110014-024
9	PZ-4C	WT	G				2	1		1							X	X			24110014-025
10	SG-02	WT	G				0										X	X			24110014-026
11	XSG-01	WT	G				0										X	X			24110014-027
12	Field Blank	WT	G	11-20-24	1031		2	1		1							X	X	X		24110014-028
13	MW-8 Duplicate	WT	G				2	1		1							X	X			24110014-029
14	MW-32 Duplicate	WT	G				2	1		1							X	X			24110014-030
15	MW-35S Duplicate	WT	G	11-20-24	0953		2	1		1									X		24110014-031
16	Equipment Blank 1	WT	G				2	1		1							X	X	X		24110014-032

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
KIN-24Q4 Rev 0	[signature]	11-20	1200	[signature]	11/20/24	1200	Y N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Justin Colp

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 11-20-24

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

APPENDIX C
KINCAID ASH POND UPDATE TO THE GEOCHEMICAL CONCEPTUAL SITE MODEL (NATURE)

TECHNICAL MEMORANDUM

DATE May 8, 2025 **Reference No.** 23RAM01-1

TO Brian G. Hennings - Ramboll

CC Stu Cravens - Vistra

FROM Shannon Zahuranec, Allie Wyman, and Tom Meuzelaar **EMAIL:** shannon@lifecyclegeo.com

KINCAID ASH POND UPDATE TO THE GEOCHEMICAL CONCEPTUAL SITE MODEL (NATURE)

1.0 INTRODUCTION

Life Cycle Geo, LLC (LCG) has completed this technical memorandum as an addition to the Kincaid Ash Pond (KIN AP) geochemical conceptual site model (GCSM) on behalf of Ramboll Americas Engineering Solutions, Inc. (Ramboll) for Illinois Power Resources Generating, LLC. A report documenting the nature and extent of constituents above the groundwater protection standard (GWPS) that are attributable to the KIN AP was submitted to the Illinois Environmental Protection Agency (IEPA) on May 12, 2024 (Nature and Extent Report [NE Report], Ramboll, 2024). Included in this report is a detailed GCSM (LCG, 2024), describing the current aqueous and solid phase geochemical conditions and the geochemical conditions that contribute to mobilization and attenuation of constituents in the environment. Subsequent to the NE report submittal, additional investigation was conducted to further characterize the site, including the following:

- Monitoring well installation in Upper Semi Confining Unit (USCU): MW-33S, MW-34S, and MW-35S
- Collection of solids samples from screened intervals of MW-33S, MW-34S, and MW-35S
- Groundwater samples of MW-33S, MW-34S, MW-35S collected in August and November 2024
- Groundwater samples of PZ-4A collected quarterly from November 2023 to November 2024

The three additional monitoring wells MW-33S, MW-34S, and MW-35S were installed along the property boundary to the east of exceedance well MW-20S to define the lateral extent of the boron and sulfate migration to the east (Figure 2-1 of the addendum of the NE report to which this is attached). Groundwater samples were additionally collected from PZ-4A to further confirm the extent of migration south of MW-20S. In all cases, no new exceedances are identified with respect to the newly collected groundwater samples. The three monitoring wells and the piezometer are discussed in combination throughout this document as “investigation wells” and samples from these wells are broadly identified as “investigation samples”.

Here we describe the solid and aqueous chemistry of the additional investigation samples and discuss the results in the context of the earlier conclusions in the KIN AP GCSM. This technical memorandum serves as an attachment to the addendum of the NE report.

2.0 UPDATES TO THE GEOCHEMICAL CONCEPTUAL SITE MODEL

The KIN AP GCSM (LCG, 2024) submitted with the NE Report (Ramboll, 2024) fully describes the geochemical conditions at the KIN AP. This addendum will detail the aquifer solids characterization, pH, redox, and constituents of concern (boron, sulfate, and total dissolved solids [TDS]) for the new monitoring locations and provide analysis of consistency with the existing geochemical interpretation for the site.

2.1 SOLIDS CHARACTERIZATION

Table 1 is an update to Table 3-1 in the GCSM (LCG, 2024) and summarizes aquifer solids sample boring identifiers and collection depths, adjacent groundwater monitoring well names (for ease of comparison with groundwater results), and methods of analysis. Analyses of samples collected as part of this investigation included cation exchange capacity (CEC), loss on ignition (LOI), sequential extraction procedure (SEP), and X-ray diffraction (XRD) (method details provided in LCG [2024] Section 3.1). All laboratory reports for additional solid phase characterization are presented in Appendix C of the NE Addendum to which this report is attached.

Table 2 summarizes the CEC, LOI, and SEP analysis results most relevant to the GCSM. Both CEC and LOI of the additional investigation samples collected were higher than previous results in USCU samples. The additional SEP results (analyzed by Eurofins) are compared to the SEP results previously generated by Eurofins for consistency (see Section 3.1 of LCG [2024] for details regarding SEP analytical methods). The aluminum, iron, and manganese solid-phase concentrations from the SEP are similar to previous measurements, with some samples exhibiting higher or lower values.

Table 3 presents the XRD results from the additional investigation samples. Results show samples are dominated by quartz (>70 wt. %) with feldspar as the second most abundant mineral. This is similar to previously collected USCU XRD results, though quartz is more abundant in the additional investigation samples. The results also identified clay minerals and phyllosilicates though these are less abundant than in previous samples. Notably, the XRD results did not detect any carbonate minerals in the additional investigation samples. Carbonate minerals provide pH buffering capacity to groundwater and the absence may indicate this region is more prone to pH fluctuation.

2.2 AQUEOUS CHARACTERIZATION

Additional aqueous characterization includes data for PZ-4A from November 2023 to November 2024 and data from wells installed for additional investigation from August and November 2024. None of the additional investigation samples exceed the GWPS for any constituents. Figure 1 shows the concentrations of boron, sulfate, and TDS (constituents identified elsewhere in exceedance of the GWPS at the KIN AP), along with data for the known exceedance locations for the same sampling dates. Boron and sulfate are present at detectable levels in all additional investigation samples, but values do not exceed the respective GWPS and are lower than observed in USCU exceedance locations. All aqueous data is provided in Appendix C of the NE Addendum to which this report is attached.

The primary controls on mobility of constituents in the subsurface are pH and redox, with the redox condition represented by the field measurement of oxidation reduction potential (ORP) (Figure 2). The pH of the additional investigation samples ranges from 6.57 to 6.74 standard units (S.U.) and is generally consistent with the pH measured elsewhere for the USCU exceedance locations. The redox condition can be assessed through consideration of ORP and redox sensitive species such as dissolved iron and manganese. The ORP of the additional investigation wells is generally oxidizing and ranges from 18 to 272 mV. Dissolved iron and manganese represent reduced forms of these species and are expected to be at higher concentrations for waters that are more chemically reduced (i.e., lower ORP). These species are low in the additional investigation wells, supporting the conclusion of oxidized conditions in these wells. The ORP measurements for USCU exceedance wells oscillate between reducing and oxidizing conditions. Accordingly, concentrations of dissolved iron and manganese also fluctuate in samples collected from the exceedance wells.

729 Main Street, Longmont, CO 80501 720.550.0745 contact@lifecyclegeo.com www.lifecyclegeo.com

Figure 3 shows a Piper diagram with the data from November 2023 to November 2024 for the additional investigation samples and the USCU exceedance locations. The major ions signatures observed are consistent with previous measurements for groundwaters across the KIN AP (Figure 4-3 of LCG 2024). The cation signature is highly similar for the investigation wells, with roughly even proportions of calcium and magnesium for most samples and slightly more sodium and potassium measured for MW-7S. The anion signature shows consistently low chloride proportions for all samples. The USCU exceedance locations and MW-34S have higher proportions of sulfate, while the other additional investigation samples have a higher proportion of alkalinity.

2.3 GCSM CONCLUSIONS

The KIN AP GCSM (LCG, 2024) found that porewater within the coal combustion residual (CCR) impoundment is likely the primary source of boron, sulfate, and TDS to the shallow groundwater. Sulfate concentrations were found to be the primary driver of TDS exceedances. There is evidence of attenuation of boron and sulfate (and thus TDS) onto aquifer solids, particularly onto iron, manganese, and aluminum hydroxides. Changes in redox condition or pH can influence the stability of these mineral phases and thus influence the attenuation of boron and sulfate.

Results assessed from the aquifer solids and groundwater investigation wells at KIN AP are aligned with earlier interpretations. The aqueous chemistry associated with the investigation wells is largely consistent with the ranges and conditions identified by the GCSM (LCG, 2024), particularly with respect to wells with no identified exceedances. The notable difference identified from the solid phase mineralogical analysis is the absence of detectable carbonates in aquifer solid samples collected from the investigation wells. This indicates this area could be more susceptible to changes in pH than other areas assessed. However, neutral groundwater pH prevails broadly at the KIN AP, and no exceedances of regulated constituents were identified for the investigation wells.

3.0 REFERENCES

Life Cycle Geo LLC (LCG). Geochemical Conceptual Site Model: Kincaid Ash Pond. May 2024.

Ramboll. Nature And Extent Report, Kincaid Power Plant, Ash Pond, IEPA ID NO. W0218140002-01, May 2024.

FIGURES

Figure 1: Boron, Sulfate, Total Dissolved Solids for additional investigation samples and USCU exceedance locations

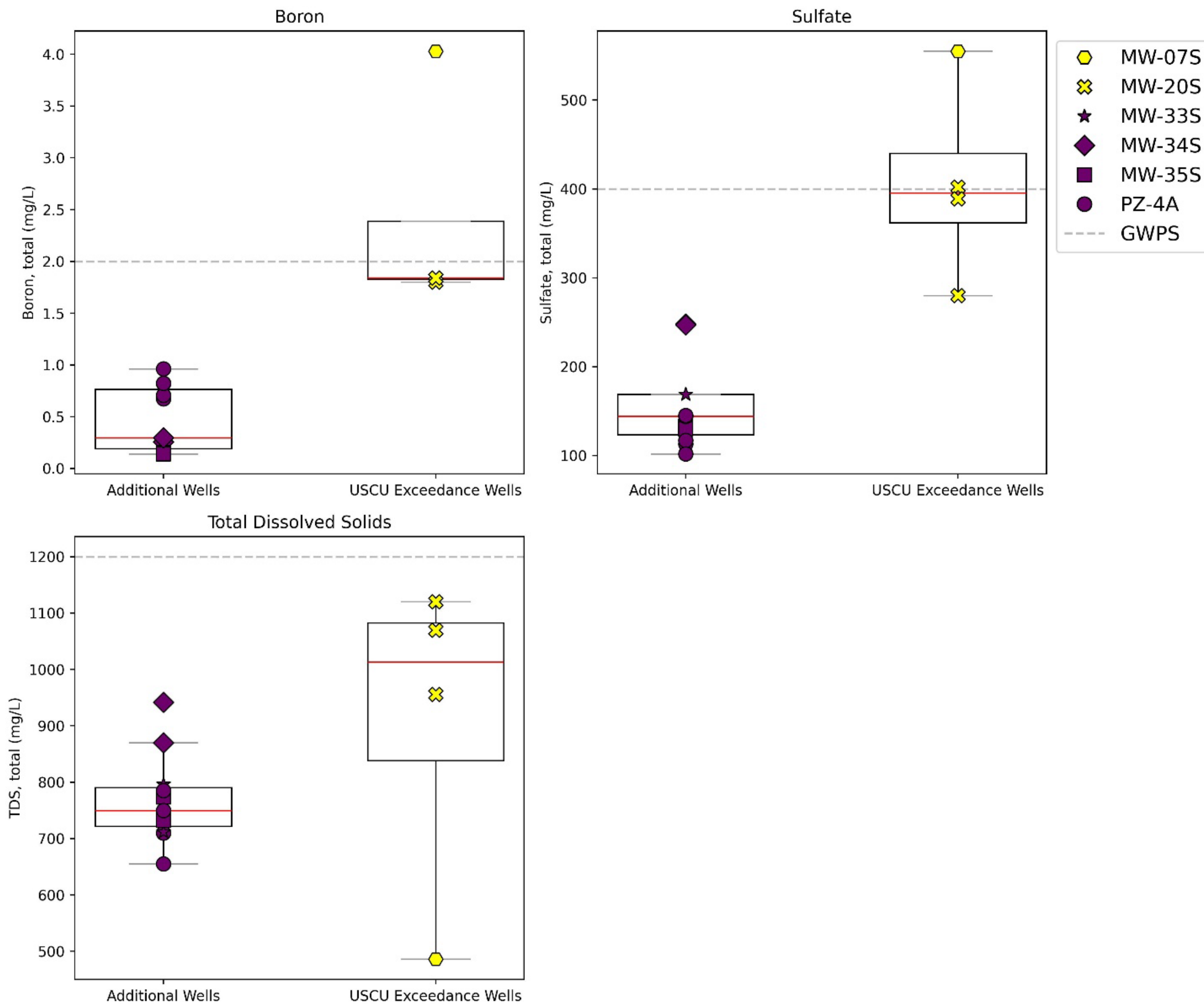


Figure 2: pH, oxidation reduction potential, dissolved iron, and dissolved manganese for additional investigation wells and USCU exceedance locations

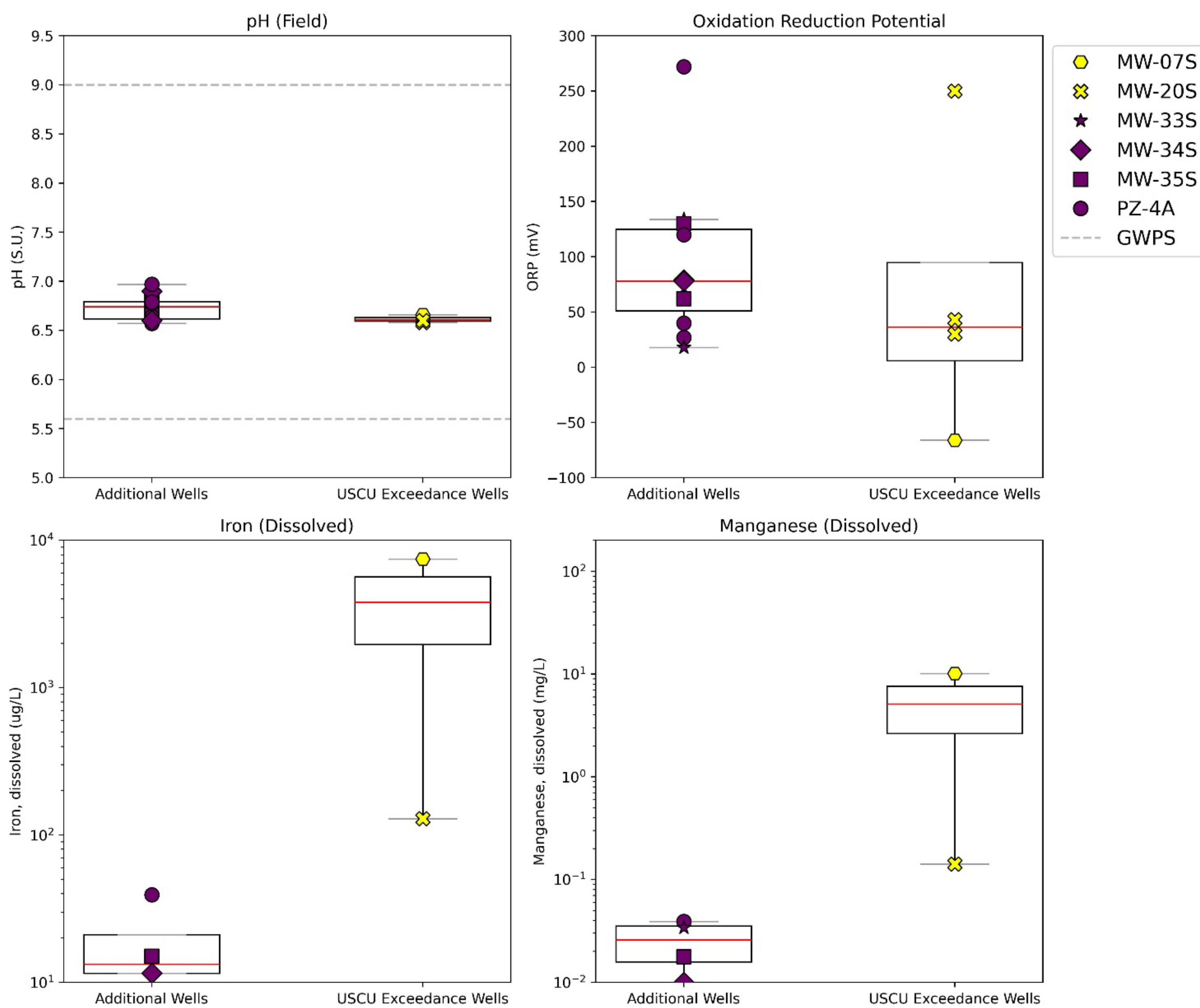
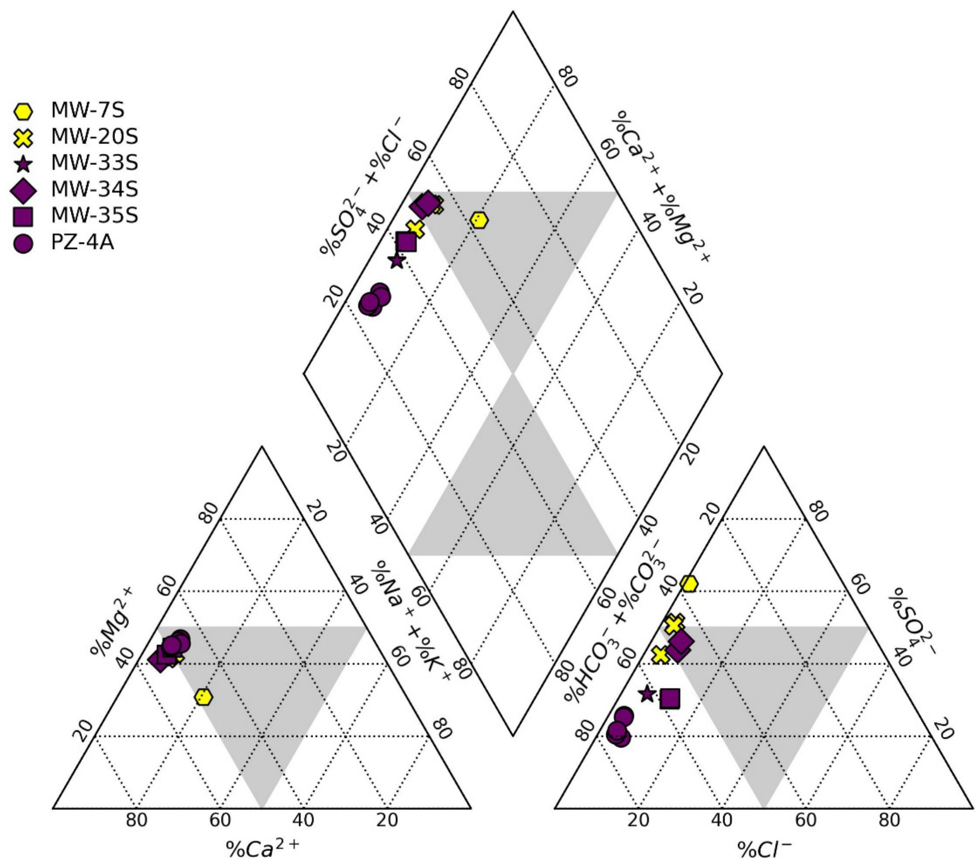


Figure 3: Piper diagram for additional investigation wells and USCU exceedance locations



TABLES

Table 1. Summary of Solid Samples

HSU	Location	Monitoring Well Name	Depth Range (ft bgs)	CEC	LOI	TOC	SEP	XRD	XRF	TIMA	Total Metals
CCR	K-SB-XPW03	XPW03	(10-20)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-12	MW-12	(13-17.3)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-12	MW-12	(17.3-21.0)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-28	MW-28	(18-21.5)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-28	MW-28	(19-25)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	2023 (SGS)	--
USCU	K-SB-07	MW-7S	(7-10)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-32	MW-32	(31-36)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-03	MW-32	(19-20)	2021 (SGS)	2021 (SGS)	2021 (SGS)	2021 (Eurofins)	2021 (SGS)	--	--	2021 (SGS)
UA	K-SB-32	MW-32	(31-36)	--	2023 (SGS)	--	--	2023 (SGS)	2023 (SGS)	--	--
USCU	MW-33S-9-11	MW-33S	(9-11)	2024 (Eurofins)	2024 (Eurofins)	--	2024 (Eurofins)	2024 (Eurofins)	--	--	--
USCU	MW_33S-14-15'	MW-33S	(14-15)	--	2024 (Eurofins)	--	2024 (Eurofins)	2024 (Eurofins)	--	--	--
USCU	MW-34S-9-11	MW-34S	(9-11)	2024 (Eurofins)	2024 (Eurofins)	--	2024 (Eurofins)	2024 (Eurofins)	--	--	--
USCU	MW_35S-9-11'	MW-35S	(9-11)	--	2024 (Eurofins)	--	2024 (Eurofins)	2024 (Eurofins)	--	--	--

Notes:

ft bgs = feet below ground surface

CEC = cation exchange capacity

LOI = loss on ignition

TOC = total organic carbon

SEP = sequential extraction procedure

XRD = X-ray diffraction

XRF = X-ray fluorescence

TIMA = TESCAN integrated mineral analysis

HSU = hydrostratigraphic unit

CCR = coal combustion residual

UA = uppermost aquifer

USCU = upper semi-confining unit

-- = no data

SGS, Eurofins = labs where analyses was performed

Table 2. Solid Samples Data Comparison

Analytical Method	Fraction	Parameter	Upper Semi Confining Unit	
			Previous Results	Additional Investigation Samples
CEC	NA	Cation Exchange Capacity	25.4-26.0	31.1-37
LOI	NA	Loss on Ignition	1.42-6.67	18-23
SEP	Exchangeable	Aluminum	40	<8.1
SEP	Carbonates	Aluminum	66	11-15
SEP	Non-Crystalline Materials	Aluminum	190	260-350
SEP	Metal Hydroxides	Aluminum	2800	2200-3000
SEP	Organics	Aluminum	71	43-110
SEP	Acid/Sulfides	Aluminum	5900	6800-9800
SEP	Residual	Aluminum	17000	26000-28000
SEP	Total	Aluminum	44000	37000-49000
SEP	Sum	Aluminum	26000	38000-40000
SEP	Exchangeable	Iron	48	<14
SEP	Carbonates	Iron	52	<11
SEP	Non-Crystalline Materials	Iron	210	290-590
SEP	Metal Hydroxides	Iron	9200	4100-13000
SEP	Organics	Iron	<53	<55
SEP	Acid/Sulfides	Iron	6900	8300-10000
SEP	Residual	Iron	5100	4000-4200
SEP	Total	Iron	19000	17000-28000
SEP	Sum	Iron	22000	17000-28000
SEP	Exchangeable	Manganese	0.5	<0.15-0.33
SEP	Carbonates	Manganese	4.9	<1.0-1.4
SEP	Non-Crystalline Materials	Manganese	99	98-400
SEP	Metal Hydroxides	Manganese	84	72-380
SEP	Organics	Manganese	<2.2	3.1-18
SEP	Acid/Sulfides	Manganese	40	53-74
SEP	Residual	Manganese	38	37-54
SEP	Total	Manganese	230	260-710
SEP	Sum	Manganese	270	330-930

Notes:

CEC = cation exchange capacity

LOI = loss on ignition

SEP = sequential extraction procedure

* CEC and LOI data is for K-SB-07 (7.0-10.0) and K-SB-08 (4.0-7.0), SEP data is for K-SB-07 (7.0-10.0) only

LIFECYCLEGEO

Table 3 - XRD Data Comparison

		Previous Results			Additional Investigation Samples							
Sample ID		K-SB-07 (7.0-10.0)	K-SB-07 S (7-11)	K-SB-08 (4.0-7.0)	MW-33S-9-11		MW_33S-14-15'		MW-34S-9-11		MW_35S-9-11'	
Sampled Aquifer Unit		USCU	USCU	USCU	USCU		USCU		USCU		USCU	
Mineral/Compound	Mineral Type	Full Mineral, 2021	Full Mineral, 2023	Full Mineral, 2021	Full Mineral	Clay Fraction	Full Mineral	Clay Fraction	Full Mineral	Clay Fraction	Full Mineral	Clay Fraction
Quartz	Silicate	53.7	57.2	53.9	80.1	74.3	83.2	75.3	74.7	71.8	81.9	72.7
Feldspar	Feldspar	--	--	--	12.2	15.2	7.6	9	13.5	15.1	10.4	14.5
K-feldspar	Feldspar	--	--	--	2.6	4	4.1	6	2.6	3.3	2.2	4.5
Illite/Muscovite	Clay	--	--	--	3.1	4	3.8	7.7	6.2	5.2	3.7	4.1
Chlorite/ Vermiculite	Phyllosilicate	--	--	--	1.5	1.5	1.1	0.9	2.2	3.2	1.3	2.8
Kaolinite	Clay	5.1	--	4.2	0.4	0.8	0.2	1.1	0.8	0.7	0.5	0.8
Amphibole	Silicate	--	--	--	0.0	0.2	0.0	0.0	0.1	0.7	0.0	0.5
Orthoclase	Silicate	6.6	7.6	7.4	--	--	--	--	--	--	--	--
Albite	Feldspar	13.2	11.6	14.6	--	--	--	--	--	--	--	--
Calcite	Carbonate	0.4	--	0.5	--	--	--	--	--	--	--	--
Ankerite	Carbonate	0.3	--	1	--	--	--	--	--	--	--	--
Dolomite	Carbonate	0.2	--	0.9	--	--	--	--	--	--	--	--
Rhodochrosite	Carbonate	0.2	--	0.1	--	--	--	--	--	--	--	--
Siderite	Carbonate	0.2	--	0	--	--	--	--	--	--	--	--
Chlorite	Phyllosilicate	6.2	--	4.9	--	--	--	--	--	--	--	--
Nontronite	Phyllosilicate	0	--	0	--	--	--	--	--	--	--	--
Muscovite	Mica	11.6	--	10.8	--	--	--	--	--	--	--	--
Pyrite	Sulfide	0.1	--	0.3	--	--	--	--	--	--	--	--
Magnetite	Oxide	1	0.56	0.3	--	--	--	--	--	--	--	--
Actinolite	Amphibole	0.6	--	0.3	--	--	--	--	--	--	--	--
Diopside	Silicate	0.8	--	0.7	--	--	--	--	--	--	--	--
Hematite	Oxide	--	--	--	--	--	--	--	--	--	--	--
Maghemite	Oxide	--	--	--	--	--	--	--	--	--	--	--
Illite	Phyllosilicates	--	7.6	--	--	--	--	--	--	--	--	--
Montmorillonite	Phyllosilicates	--	15.4	--	--	--	--	--	--	--	--	--
Total		100	100	100	100	100	100	100	100	100	100	100

Notes:

All results presented as weight percent (wt. %)

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

USCU = upper semi-confining unit

APPENDIX D
SOLIDS SAMPLING ANALYTICAL LABORATORY REPORTS

eurofins | Environment Testing

1 2 3 4 5 6 7 8 9 10 11 12 13

ANALYTICAL REPORT

PREPARED FOR

Attn: Michael Davis
Ramboll Americas Engineering Solutions
333 W Wacker Drive
Suite 1050
Chicago, Illinois 60606

Generated 7/26/2024 9:07:58 AM

JOB DESCRIPTION

Kincaid Nature & Extent SEP

JOB NUMBER

140-37376-1

Eurofins Knoxville
5815 Middlebrook Pike
Knoxville TN 37921

See page two for job notes and contact information.

myEOL

Eurofins Knoxville

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

Authorization

Ryan Henry

Generated
7/26/2024 9:07:58 AM

Authorized for release by
Ryan Henry, Project Manager I
WilliamR.Henry@et.eurofinsus.com
(865)291-3006

1
2
3
4
5
6
7
8
9
10
11
12
13

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.
L	A negative instrument reading had an absolute value greater than the reporting limit

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: 140-37376-1 Eurofins Knoxville

Job Narrative
140-37376-1

Receipt
The samples were received on 6/28/2024 at 9:30am and arrived in good condition, and where required, properly preserved and on ice.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

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 ($MgSO_4$), 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-HNO_3-H_2O, 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, HNO_3, HCl and H_3BO_3. 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, HNO_3, HCl and H_3BO_3. 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 = $(C \times V \times V1 \times D) / (W \times S \times V2)$

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 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 solution 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.

The serial diilution is analyzed at an additional 5 fold dilution using the dilution factors applied to the duplicate and the associated original sample. Due to a limitation of the expanded deliverable forms, the dilutions of the duplicate and serial dilution in the expanded deliverable are not expressed on a per analyte basis.

Please refer to the summary section of the report for the duplicate information as it contains the dilution factors at which the sample was analyzed.

Methods 6010B, 6010B SEP: The following samples were diluted due to the presence of Silicon which interferes with Arsenic, Cobalt, Lead, Selenium and Thallium: MW_33S-9-11' (140-37376-1), MW_33S-14-15' (140-37376-2), MW_34S-9-11' (140-37376-3) and MW_35S-9-11' (140-37376-4). Elevated reporting limits (RLs) are provided.

Methods 6010B, 6010B SEP: The following samples were diluted due to the presence of Titanium which interferes with Cobalt, Lead and Thallium: MW_33S-9-11' (140-37376-1), MW_34S-9-11' (140-37376-3) and MW_35S-9-11' (140-37376-4). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the nature of the sample matrix: MW_33S-9-11' (140-37376-1), MW_33S-14-15' (140-37376-2), MW_34S-9-11' (140-37376-3) and MW_35S-9-11' (140-37376-4). Elevated reporting limits (RLs) are provided for Aluminum, Barium and Calcium.

Method 6010B SEP: The method blank for step 4 has Selenium detected above the reporting limit. Selenium is historically known to be high in the leachate solution used during the extraction procedure. Affected samples include:MW_33S-9-11' (140-37376-1), MW_33S-14-15' (140-37376-2), MW_34S-9-11' (140-37376-3), MW_35S-9-11' (140-37376-4) and (MB 140-88588/10-B).

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: MW_33S-9-11' (140-37376-1), MW_33S-14-15' (140-37376-2), MW_34S-9-11' (140-37376-3) and MW_35S-9-11' (140-37376-4). Elevated reporting limits (RLs) are provided for Aluminum.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Loss On Ignition: Loss on Ignition (LOI) is based on ASTM test method D 7348. LOI is analyzed in a manner that is similar to ash content in that the data collection process is the same, although the ignition conditions may be different. The result expresses the sample lost during ignition as a percentage instead of measuring the concentration of sample residue retained under the ignition conditions. LOI applies only to solid samples.

One gram of a solid sample is ignited in an air atmosphere at 750°C (combustion industries or for general information) or 950°C (cement industry). The sample weight lost during the ignition is calculated as a percentage of the original sample weight.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-37376-1	MW_33S-9-11'	Solid	06/03/24 14:00	06/28/24 09:30
140-37376-2	MW_33S-14-15'	Solid	06/03/24 14:10	06/28/24 09:30
140-37376-3	MW_34S-9-11'	Solid	06/06/24 09:30	06/28/24 09:30
140-37376-4	MW_35S-9-11'	Solid	06/03/24 10:00	06/28/24 09:30

Client Sample ID: MW_33S-9-11'
Lab Sample ID: 140-37376-1

Date Collected: 06/03/24 14:00
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 82.4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		49	7.8	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Antimony	ND		15	1.4	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Arsenic	ND		2.4	0.63	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Barium	**1.3**	**J**	12	0.58	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Cadmium	ND		1.2	0.078	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Calcium	**1200**		1200	9.2	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Chromium	ND		2.4	0.34	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Iron	ND		24	14	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Lead	ND		2.4	0.53	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Lithium	ND		12	0.73	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Manganese	ND		3.6	0.15	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Molybdenum	ND		9.7	0.40	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Selenium	ND		2.4	0.83	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4
Thallium	ND		8.5	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 12:57	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**13**	**J**	36	5.8	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Antimony	ND		11	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Arsenic	ND		1.8	0.47	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Barium	**1.8**	**J**	9.1	0.44	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Beryllium	**0.13**	**J B**	0.91	0.058	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Cadmium	ND		0.91	0.040	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Calcium	**680**	**J**	910	8.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Chromium	ND		1.8	0.25	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Cobalt	ND		9.1	0.23	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Iron	ND		18	11	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Lead	ND		1.8	0.40	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Lithium	ND		9.1	0.55	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Manganese	ND		2.7	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Molybdenum	ND		7.3	0.30	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Selenium	ND		1.8	0.62	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3
Thallium	ND		6.4	0.76	mg/Kg	☼	07/09/24 07:00	07/15/24 14:26	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**320**		12	2.5	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Antimony	ND		3.6	0.34	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Arsenic	**0.47**	**J**	0.61	0.16	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Barium	**8.3**		3.0	0.15	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Beryllium	**0.12**	**J**	0.30	0.018	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Calcium	**6.1**	**J**	300	1.8	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Chromium	**0.28**	**J**	0.61	0.085	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Cobalt	**1.3**	**J**	3.0	0.055	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Iron	**290**		6.1	3.5	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Lead	**0.20**	**J**	0.61	0.13	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Lithium	ND		3.0	0.18	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1

Client Sample Results

Client: Ramboll Americas Engineering Solutions — Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Client Sample ID: MW_33S-9-11' — Lab Sample ID: 140-37376-1

Date Collected: 06/03/24 14:00 — **Matrix: Solid**
Date Received: 06/28/24 09:30 — **Percent Solids: 82.4**

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	**150**	**B**	0.91	0.033	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Molybdenum	ND		2.4	0.10	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Selenium	ND		0.61	0.21	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/10/24 07:00	07/15/24 15:37	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2200**		12	1.9	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Antimony	ND		3.6	0.55	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Arsenic	**0.96**		0.61	0.27	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Barium	**30**		3.0	0.15	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Beryllium	**0.19**	**J**	0.30	0.019	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Calcium	**2100**		300	2.7	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Chromium	**4.6**	**B**	0.61	0.085	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Cobalt	**0.89**	**J**	3.0	0.064	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Iron	**4100**		6.1	3.5	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Lead	**3.4**		0.61	0.13	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Lithium	**1.7**	**J**	3.0	0.18	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Manganese	**72**		0.91	0.16	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Molybdenum	ND		2.4	0.10	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Selenium	**0.69**	**B**	0.61	0.57	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1
Thallium	ND		2.1	0.35	mg/Kg	☼	07/16/24 07:00	07/22/24 13:00	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**110**	**J**	180	29	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Antimony	ND		55	5.1	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Arsenic	ND		9.1	2.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Barium	**25**	**J**	46	2.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Beryllium	ND		4.6	0.38	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Cadmium	ND		4.6	0.19	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Calcium	**860**	**J**	4600	13	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Chromium	**4.4**	**J**	9.1	1.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Cobalt	ND		46	0.73	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Iron	ND		91	53	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Lead	ND		9.1	2.0	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Lithium	ND		46	2.7	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Manganese	**3.1**	**J**	14	2.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Molybdenum	ND		36	1.5	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Selenium	ND		9.1	3.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5
Thallium	ND		32	4.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:29	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8500**		12	1.9	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Antimony	ND		3.6	0.34	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Arsenic	**1.8**		0.61	0.18	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Barium	**16**		3.0	0.15	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Beryllium	**0.23**	**J**	0.30	0.015	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1

Client Sample ID: MW_33S-9-11' Lab Sample ID: 140-37376-1

Date Collected: 06/03/24 14:00 Matrix: Solid
Date Received: 06/28/24 09:30 Percent Solids: 82.4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Calcium	**360**		300	2.5	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Chromium	**8.9**		0.61	0.085	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Cobalt	**1.4**	**J**	3.0	0.056	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Iron	**8400**		6.1	3.5	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Lead	**2.7**		0.61	0.13	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Lithium	**5.9**		3.0	0.18	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Manganese	**53**		0.91	0.30	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Selenium	ND		0.61	0.21	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/16/24 11:00	07/22/24 15:39	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**27000**		120	19	mg/Kg	☼	07/17/24 07:00	07/23/24 14:15	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Arsenic	**1.7**		1.2	0.73	mg/Kg	☼	07/17/24 07:00	07/24/24 12:07	2
Barium	**260**		3.0	0.056	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Beryllium	**0.25**	**J**	0.30	0.019	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Calcium	**2100**		300	6.9	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Chromium	**13**		0.61	0.085	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Cobalt	**0.77**	**J**	6.1	0.063	mg/Kg	☼	07/17/24 07:00	07/24/24 12:07	2
Iron	**4000**		6.1	5.0	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Lead	**3.1**		1.2	0.27	mg/Kg	☼	07/17/24 07:00	07/24/24 12:07	2
Lithium	**9.4**		3.0	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Manganese	**51**		0.91	0.38	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Molybdenum	ND		2.4	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 16:09	1
Selenium	ND		1.2	0.41	mg/Kg	☼	07/17/24 07:00	07/24/24 12:07	2
Thallium	**1.2**	**J**	4.2	0.44	mg/Kg	☼	07/17/24 07:00	07/24/24 12:07	2

Method: SW846 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			07/25/24 13:48	1
Antimony	ND		3.0	0.14	mg/Kg			07/25/24 13:48	1
Arsenic	**4.9**		0.50	0.13	mg/Kg			07/25/24 13:48	1
Barium	**340**		2.5	0.12	mg/Kg			07/25/24 13:48	1
Beryllium	**0.91**		0.25	0.0075	mg/Kg			07/25/24 13:48	1
Cadmium	ND		0.25	0.011	mg/Kg			07/25/24 13:48	1
Calcium	**7200**		250	0.74	mg/Kg			07/25/24 13:48	1
Chromium	**31**		0.50	0.070	mg/Kg			07/25/24 13:48	1
Cobalt	**4.4**		2.5	0.023	mg/Kg			07/25/24 13:48	1
Iron	**17000**		5.0	4.1	mg/Kg			07/25/24 13:48	1
Lead	**9.4**		0.50	0.11	mg/Kg			07/25/24 13:48	1
Lithium	**17**		2.5	0.15	mg/Kg			07/25/24 13:48	1
Manganese	**330**		0.75	0.052	mg/Kg			07/25/24 13:48	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/25/24 13:48	1
Selenium	**0.69**		0.50	0.17	mg/Kg			07/25/24 13:48	1
Thallium	**1.2**	**J**	1.8	0.18	mg/Kg			07/25/24 13:48	1

Client Sample Results

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Client Sample ID: MW_33S-9-11'

Date Collected: 06/03/24 14:00
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-1

Matrix: Solid
Percent Solids: 82.4

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	49000		120	19	mg/Kg	☼	07/17/24 07:00	07/23/24 15:13	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Arsenic	5.8		0.61	0.36	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Barium	500		30	0.56	mg/Kg	☼	07/17/24 07:00	07/23/24 15:13	10
Beryllium	0.89		0.30	0.019	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Calcium	7100		3000	69	mg/Kg	☼	07/17/24 07:00	07/23/24 15:13	10
Chromium	32	B	0.61	0.085	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Cobalt	5.5	J	6.1	0.063	mg/Kg	☼	07/17/24 07:00	07/24/24 13:06	2
Iron	18000		6.1	5.0	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Lead	12		1.2	0.27	mg/Kg	☼	07/17/24 07:00	07/24/24 13:06	2
Lithium	17		3.0	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Manganese	400		0.91	0.38	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Molybdenum	0.43	J	2.4	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Selenium	ND		0.61	0.21	mg/Kg	☼	07/17/24 07:00	07/23/24 17:12	1
Thallium	0.89	J	4.2	0.44	mg/Kg	☼	07/17/24 07:00	07/24/24 13:06	2

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition (SPCC Loss On Ignit.)	20		0.34	0.34	%			07/02/24 13:38	1

Client Sample ID: MW_33S-14-15'　　**Lab Sample ID: 140-37376-2**
Date Collected: 06/03/24 14:10　　**Matrix: Solid**
Date Received: 06/28/24 09:30　　**Percent Solids: 84.2**

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47	7.6	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Antimony	ND		14	1.3	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Barium	**1.1**	**J**	12	0.57	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Cadmium	ND		1.2	0.076	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Calcium	**1200**		1200	9.0	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Chromium	ND		2.4	0.33	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Cobalt	ND		12	0.21	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Iron	ND		24	14	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Lead	ND		2.4	0.52	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Lithium	ND		12	0.71	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Manganese	ND		3.6	0.15	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Molybdenum	ND		9.5	0.39	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Selenium	ND		2.4	0.81	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4
Thallium	ND		8.3	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 13:16	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11**	**J**	36	5.7	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Antimony	ND		11	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Barium	**1.5**	**J**	8.9	0.43	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Beryllium	**0.11**	**J B**	0.89	0.057	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Cadmium	ND		0.89	0.039	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Calcium	**330**	**J**	890	7.8	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Chromium	ND		1.8	0.25	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Cobalt	ND		8.9	0.22	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Iron	ND		18	10	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Lead	ND		1.8	0.39	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Lithium	ND		8.9	0.53	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Manganese	**1.4**	**J**	2.7	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Molybdenum	ND		7.1	0.29	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Selenium	ND		1.8	0.61	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3
Thallium	ND		6.2	0.75	mg/Kg	☼	07/09/24 07:00	07/15/24 14:31	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**260**		12	2.5	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Arsenic	**1.1**		0.59	0.15	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Barium	**11**		3.0	0.14	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Beryllium	**0.090**	**J**	0.30	0.018	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Calcium	**7.4**	**J**	300	1.8	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Chromium	**0.41**	**J**	0.59	0.083	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Cobalt	**4.0**		3.0	0.053	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Iron	**360**		5.9	3.4	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Lead	**1.4**		0.59	0.13	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Lithium	ND		3.0	0.18	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1

Client Sample ID: MW_33S-14-15'

Lab Sample ID: 140-37376-2

Date Collected: 06/03/24 14:10

Matrix: Solid

Date Received: 06/28/24 09:30

Percent Solids: 84.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	250	B	0.89	0.032	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Molybdenum	0.24	J	2.4	0.097	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/10/24 07:00	07/15/24 15:42	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2800		12	1.9	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Antimony	ND		3.6	0.53	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Arsenic	3.9		0.59	0.26	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Barium	37		3.0	0.14	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Beryllium	0.31		0.30	0.019	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Calcium	540		300	2.6	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Chromium	6.1	B	0.59	0.083	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Cobalt	4.1		3.0	0.063	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Iron	13000		5.9	3.4	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Lead	7.6		0.59	0.13	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Lithium	3.6		3.0	0.18	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Manganese	170		0.89	0.15	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Molybdenum	0.46	J	2.4	0.097	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Selenium	0.62	B	0.59	0.56	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1
Thallium	ND		2.1	0.34	mg/Kg	☼	07/16/24 07:00	07/22/24 13:19	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	78	J	180	28	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Antimony	ND		53	5.0	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Arsenic	3.6	J	8.9	2.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Barium	13	J	45	2.1	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Beryllium	ND		4.5	0.37	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Cadmium	ND		4.5	0.19	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Calcium	89	J	4500	13	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Chromium	4.2	J	8.9	1.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Cobalt	ND		45	0.71	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Iron	ND		89	52	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Lead	ND		8.9	2.0	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Lithium	ND		45	2.6	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Manganese	13		13	2.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Molybdenum	ND		36	1.5	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Selenium	ND		8.9	3.1	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5
Thallium	ND		31	4.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:34	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6800		12	1.9	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Arsenic	3.9		0.59	0.18	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Barium	12		3.0	0.14	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Beryllium	0.23	J	0.30	0.014	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1

Client Sample ID: MW_33S-14-15'
Lab Sample ID: 140-37376-2

Date Collected: 06/03/24 14:10
Date Received: 06/28/24 09:30
Matrix: Solid
Percent Solids: 84.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Calcium	**170**	**J**	300	2.5	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Chromium	**8.2**		0.59	0.083	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Cobalt	**2.4**	**J**	3.0	0.055	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Iron	**10000**		5.9	3.4	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Lead	**2.1**		0.59	0.13	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Lithium	**7.6**		3.0	0.18	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Manganese	**63**		0.89	0.30	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Molybdenum	**0.15**	**J**	2.4	0.12	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Selenium	ND		0.59	0.20	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/16/24 11:00	07/22/24 15:44	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28000**		120	19	mg/Kg	☼	07/17/24 07:00	07/23/24 14:20	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Arsenic	**1.9**		1.2	0.71	mg/Kg	☼	07/17/24 07:00	07/24/24 12:12	2
Barium	**260**		3.0	0.055	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Beryllium	**0.47**		0.30	0.019	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Calcium	**1300**		300	6.8	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Chromium	**16**		0.59	0.083	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Cobalt	**0.82**	**J**	5.9	0.062	mg/Kg	☼	07/17/24 07:00	07/24/24 12:12	2
Iron	**4200**		5.9	4.9	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Lead	**2.6**		1.2	0.26	mg/Kg	☼	07/17/24 07:00	07/24/24 12:12	2
Lithium	**11**		3.0	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Manganese	**37**		0.89	0.37	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Molybdenum	ND		2.4	0.097	mg/Kg	☼	07/17/24 07:00	07/23/24 16:14	1
Selenium	ND		1.2	0.40	mg/Kg	☼	07/17/24 07:00	07/24/24 12:12	2
Thallium	**1.2**	**J**	4.2	0.43	mg/Kg	☼	07/17/24 07:00	07/24/24 12:12	2

Method: SW846 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			07/25/24 13:48	1
Antimony	ND		3.0	0.14	mg/Kg			07/25/24 13:48	1
Arsenic	**14**		0.50	0.13	mg/Kg			07/25/24 13:48	1
Barium	**330**		2.5	0.12	mg/Kg			07/25/24 13:48	1
Beryllium	**1.2**		0.25	0.0075	mg/Kg			07/25/24 13:48	1
Cadmium	ND		0.25	0.011	mg/Kg			07/25/24 13:48	1
Calcium	**3700**		250	0.74	mg/Kg			07/25/24 13:48	1
Chromium	**35**		0.50	0.070	mg/Kg			07/25/24 13:48	1
Cobalt	**11**		2.5	0.023	mg/Kg			07/25/24 13:48	1
Iron	**28000**		5.0	4.1	mg/Kg			07/25/24 13:48	1
Lead	**14**		0.50	0.11	mg/Kg			07/25/24 13:48	1
Lithium	**22**		2.5	0.15	mg/Kg			07/25/24 13:48	1
Manganese	**540**		0.75	0.052	mg/Kg			07/25/24 13:48	1
Molybdenum	**0.84**	**J**	2.0	0.082	mg/Kg			07/25/24 13:48	1
Selenium	**0.62**		0.50	0.17	mg/Kg			07/25/24 13:48	1
Thallium	**1.2**	**J**	1.8	0.18	mg/Kg			07/25/24 13:48	1

Client Sample Results

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Client Sample ID: MW_33S-14-15'
Date Collected: 06/03/24 14:10
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-2
Matrix: Solid
Percent Solids: 84.2

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		120	19	mg/Kg	☼	07/17/24 07:00	07/23/24 15:18	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Arsenic	14		1.2	0.71	mg/Kg	☼	07/17/24 07:00	07/24/24 13:12	2
Barium	400		30	0.55	mg/Kg	☼	07/17/24 07:00	07/23/24 15:18	10
Beryllium	1.2		0.30	0.019	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Calcium	3600		3000	68	mg/Kg	☼	07/17/24 07:00	07/23/24 15:18	10
Chromium	35	B	0.59	0.083	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Cobalt	12		5.9	0.062	mg/Kg	☼	07/17/24 07:00	07/24/24 13:12	2
Iron	28000		5.9	4.9	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Lead	16		1.2	0.26	mg/Kg	☼	07/17/24 07:00	07/24/24 13:12	2
Lithium	23		3.0	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Manganese	710		0.89	0.37	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Molybdenum	0.99	J	2.4	0.097	mg/Kg	☼	07/17/24 07:00	07/23/24 17:17	1
Selenium	ND		1.2	0.40	mg/Kg	☼	07/17/24 07:00	07/24/24 13:12	2
Thallium	1.1	J	4.2	0.43	mg/Kg	☼	07/17/24 07:00	07/24/24 13:12	2

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition (SPCC Loss On Ignit.)	18		0.25	0.25	%			07/02/24 13:38	1

Client Sample Results

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Client Sample ID: MW_34S-9-11'

Date Collected: 06/06/24 09:30
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-3

Matrix: Solid
Percent Solids: 79.4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	8.1	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Antimony	ND		15	1.4	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Barium	**1.1**	**J**	13	0.60	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Beryllium	ND		1.3	0.39	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Cadmium	ND		1.3	0.081	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Calcium	**1300**		1300	9.6	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Chromium	ND		2.5	0.35	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Cobalt	ND		13	0.23	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Iron	ND		25	15	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Lead	ND		2.5	0.55	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Lithium	ND		13	0.76	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Manganese	ND		3.8	0.16	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Molybdenum	ND		10	0.41	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Selenium	ND		2.5	0.86	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4
Thallium	ND		8.8	1.1	mg/Kg	☼	07/09/24 07:00	07/15/24 13:21	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**15**	**J**	38	6.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Antimony	ND		11	1.1	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Barium	**1.7**	**J**	9.4	0.45	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Beryllium	**0.14**	**J B**	0.94	0.060	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Cadmium	ND		0.94	0.042	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Calcium	**810**	**J**	940	8.3	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Chromium	ND		1.9	0.26	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Cobalt	ND		9.4	0.24	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Iron	ND		19	11	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Lead	ND		1.9	0.42	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Lithium	ND		9.4	0.57	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Manganese	ND		2.8	1.1	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Molybdenum	ND		7.6	0.31	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Selenium	ND		1.9	0.64	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3
Thallium	ND		6.6	0.79	mg/Kg	☼	07/09/24 07:00	07/15/24 14:37	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**350**		13	2.6	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Antimony	ND		3.8	0.35	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Arsenic	**0.58**	**J**	0.63	0.16	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Barium	**9.0**		3.1	0.15	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Beryllium	**0.13**	**J**	0.31	0.019	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Calcium	**7.0**	**J**	310	1.9	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Chromium	**0.40**	**J**	0.63	0.088	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Cobalt	**1.4**	**J**	3.1	0.057	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Iron	**340**		6.3	3.7	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Lead	**0.36**	**J**	0.63	0.14	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Lithium	ND		3.1	0.19	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1

Client Sample ID: MW_34S-9-11'
Date Collected: 06/06/24 09:30
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-3
Matrix: Solid
Percent Solids: 79.4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	98	B	0.94	0.034	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Selenium	ND		0.63	0.21	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/10/24 07:00	07/15/24 15:47	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2700		13	2.0	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Antimony	ND		3.8	0.57	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Arsenic	1.4		0.63	0.28	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Barium	40		3.1	0.15	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Beryllium	0.27	J	0.31	0.020	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Calcium	1600		310	2.8	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Chromium	5.7	B	0.63	0.088	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Cobalt	2.1	J	3.1	0.067	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Iron	5600		6.3	3.7	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Lead	4.9		0.63	0.14	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Lithium	2.5	J	3.1	0.19	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Manganese	180		0.94	0.16	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Molybdenum	0.12	J	2.5	0.10	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Selenium	0.72	B	0.63	0.59	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1
Thallium	ND		2.2	0.37	mg/Kg	☼	07/16/24 07:00	07/22/24 13:24	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	86	J	190	30	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Antimony	ND		57	5.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Arsenic	ND		9.4	2.4	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Barium	31	J	47	2.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Beryllium	ND		4.7	0.40	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Cadmium	ND		4.7	0.20	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Calcium	370	J	4700	14	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Chromium	4.5	J	9.4	1.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Cobalt	ND		47	0.76	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Iron	ND		94	55	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Lead	ND		9.4	2.1	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Lithium	ND		47	2.8	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Manganese	10	J	14	2.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Molybdenum	ND		38	1.6	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Selenium	ND		9.4	3.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5
Thallium	ND		33	4.4	mg/Kg	☼	07/17/24 07:00	07/22/24 14:39	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9400		13	2.0	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Antimony	ND		3.8	0.35	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Arsenic	1.6		0.63	0.19	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Barium	22		3.1	0.15	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Beryllium	0.23	J	0.31	0.015	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1

Client Sample ID: MW_34S-9-11'
Lab Sample ID: 140-37376-3
Date Collected: 06/06/24 09:30
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 79.4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Calcium	280	J	310	2.6	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Chromium	9.5		0.63	0.088	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Cobalt	1.5	J	3.1	0.058	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Iron	8300		6.3	3.7	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Lead	2.6		0.63	0.14	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Lithium	6.1		3.1	0.19	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Manganese	54		0.94	0.31	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Selenium	ND		0.63	0.21	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/16/24 11:00	07/22/24 15:49	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		130	20	mg/Kg	☼	07/17/24 07:00	07/23/24 14:25	10
Antimony	ND		3.8	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Arsenic	1.7		1.3	0.76	mg/Kg	☼	07/17/24 07:00	07/24/24 12:17	2
Barium	250		3.1	0.058	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Beryllium	0.25	J	0.31	0.020	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Calcium	2100		310	7.2	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Chromium	14		0.63	0.088	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Cobalt	0.86	J	6.3	0.065	mg/Kg	☼	07/17/24 07:00	07/24/24 12:17	2
Iron	4000		6.3	5.2	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Lead	2.8		1.3	0.28	mg/Kg	☼	07/17/24 07:00	07/24/24 12:17	2
Lithium	9.5		3.1	0.19	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Manganese	51		0.94	0.39	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 16:19	1
Selenium	ND		1.3	0.43	mg/Kg	☼	07/17/24 07:00	07/24/24 12:17	2
Thallium	1.4	J	4.4	0.45	mg/Kg	☼	07/17/24 07:00	07/24/24 12:17	2

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	40000		10	1.6	mg/Kg			07/25/24 13:48	1
Antimony	ND		3.0	0.14	mg/Kg			07/25/24 13:48	1
Arsenic	5.3		0.50	0.13	mg/Kg			07/25/24 13:48	1
Barium	350		2.5	0.12	mg/Kg			07/25/24 13:48	1
Beryllium	1.0		0.25	0.0075	mg/Kg			07/25/24 13:48	1
Cadmium	ND		0.25	0.011	mg/Kg			07/25/24 13:48	1
Calcium	6400		250	0.74	mg/Kg			07/25/24 13:48	1
Chromium	34		0.50	0.070	mg/Kg			07/25/24 13:48	1
Cobalt	5.9		2.5	0.023	mg/Kg			07/25/24 13:48	1
Iron	18000		5.0	4.1	mg/Kg			07/25/24 13:48	1
Lead	11		0.50	0.11	mg/Kg			07/25/24 13:48	1
Lithium	18		2.5	0.15	mg/Kg			07/25/24 13:48	1
Manganese	390		0.75	0.052	mg/Kg			07/25/24 13:48	1
Molybdenum	0.12	J	2.0	0.082	mg/Kg			07/25/24 13:48	1
Selenium	0.72		0.50	0.17	mg/Kg			07/25/24 13:48	1
Thallium	1.4	J	1.8	0.18	mg/Kg			07/25/24 13:48	1

Client Sample Results

Client: Ramboll Americas Engineering Solutions | Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Client Sample ID: MW_34S-9-11'
Lab Sample ID: 140-37376-3

Date Collected: 06/06/24 09:30
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 79.4

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	46000		130	20	mg/Kg	☼	07/17/24 07:00	07/23/24 15:23	10
Antimony	ND		3.8	0.18	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Arsenic	5.6		0.63	0.38	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Barium	470		31	0.58	mg/Kg	☼	07/17/24 07:00	07/23/24 15:23	10
Beryllium	0.87		0.31	0.020	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Calcium	9400		3100	72	mg/Kg	☼	07/17/24 07:00	07/23/24 15:23	10
Chromium	32	B	0.63	0.088	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Cobalt	5.5	J	6.3	0.065	mg/Kg	☼	07/17/24 07:00	07/24/24 13:17	2
Iron	17000		6.3	5.2	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Lead	12		1.3	0.28	mg/Kg	☼	07/17/24 07:00	07/24/24 13:17	2
Lithium	17		3.1	0.19	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Manganese	260		0.94	0.39	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Molybdenum	0.35	J	2.5	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Selenium	ND	L	0.63	0.21	mg/Kg	☼	07/17/24 07:00	07/23/24 17:23	1
Thallium	1.1	J	4.4	0.45	mg/Kg	☼	07/17/24 07:00	07/24/24 13:17	2

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition (SPCC Loss On Ignit.)	23		0.25	0.25	%			07/02/24 13:38	1

Client Sample ID: MW_35S-9-11'
Lab Sample ID: 140-37376-4
Date Collected: 06/03/24 10:00
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 80.2

Method: SW846 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	☼	07/09/24 07:00	07/15/24 13:26	4
Antimony	ND		15	1.4	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Barium	**0.88**	**J**	12	0.60	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Cadmium	ND		1.2	0.080	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Calcium	**1500**		1200	9.5	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Chromium	ND		2.5	0.35	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Iron	ND		25	14	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Lead	ND		2.5	0.55	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Lithium	ND		12	0.75	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Manganese	**0.33**	**J**	3.7	0.15	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Molybdenum	ND		10	0.41	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Selenium	ND		2.5	0.85	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4
Thallium	ND		8.7	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 13:26	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14**	**J**	37	6.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Antimony	ND		11	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Barium	**1.2**	**J**	9.4	0.45	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Beryllium	**0.13**	**J B**	0.94	0.060	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Cadmium	ND		0.94	0.041	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Calcium	**450**	**J**	940	8.2	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Chromium	ND		1.9	0.26	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Cobalt	ND		9.4	0.24	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Iron	ND		19	11	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Lead	ND		1.9	0.41	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Lithium	ND		9.4	0.56	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Manganese	ND		2.8	1.0	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Molybdenum	ND		7.5	0.31	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Selenium	ND		1.9	0.64	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3
Thallium	ND		6.5	0.79	mg/Kg	☼	07/09/24 07:00	07/15/24 14:42	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**320**		12	2.6	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Arsenic	**0.66**		0.62	0.16	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Barium	**11**		3.1	0.15	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Beryllium	**0.13**	**J**	0.31	0.019	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Cadmium	**0.015**	**J**	0.31	0.014	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Calcium	**10**	**J**	310	1.9	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Chromium	**0.51**	**J**	0.62	0.087	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Cobalt	**3.5**		3.1	0.056	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Iron	**590**		6.2	3.6	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Lead	**1.4**		0.62	0.14	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Lithium	ND		3.1	0.19	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1

Client Sample ID: MW_35S-9-11' — Lab Sample ID: 140-37376-4

Date Collected: 06/03/24 10:00 — Matrix: Solid
Date Received: 06/28/24 09:30 — Percent Solids: 80.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	400	B	0.94	0.034	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Molybdenum	0.18	J	2.5	0.10	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/10/24 07:00	07/15/24 15:52	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3000		12	2.0	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Antimony	ND		3.7	0.56	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Arsenic	1.9		0.62	0.27	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Barium	50		3.1	0.15	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Beryllium	0.34		0.31	0.020	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Calcium	410		310	2.7	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Chromium	6.7	B	0.62	0.087	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Cobalt	3.6		3.1	0.066	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Iron	6900		6.2	3.6	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Lead	5.8		0.62	0.14	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Lithium	2.8	J	3.1	0.19	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Manganese	380		0.94	0.16	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Molybdenum	0.22	J	2.5	0.10	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Selenium	0.76	B	0.62	0.59	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1
Thallium	ND		2.2	0.36	mg/Kg	☼	07/16/24 07:00	07/22/24 13:29	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	43	J	190	29	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Antimony	ND		56	5.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Arsenic	ND		9.4	2.4	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Barium	44	J	47	2.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Beryllium	ND		4.7	0.39	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Cadmium	ND		4.7	0.20	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Calcium	85	J	4700	14	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Chromium	4.8	J	9.4	1.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Cobalt	ND		47	0.75	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Iron	ND		94	55	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Lead	ND		9.4	2.1	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Lithium	ND		47	2.7	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Manganese	18		14	2.3	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Molybdenum	ND		37	1.6	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Selenium	ND		9.4	3.2	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5
Thallium	ND		33	4.4	mg/Kg	☼	07/17/24 07:00	07/22/24 14:45	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9800		12	2.0	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Arsenic	1.6		0.62	0.19	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Barium	25		3.1	0.15	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Beryllium	0.22	J	0.31	0.015	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1

Client Sample ID: MW_35S-9-11' — Lab Sample ID: 140-37376-4

Date Collected: 06/03/24 10:00 — Matrix: Solid
Date Received: 06/28/24 09:30 — Percent Solids: 80.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Calcium	240	J	310	2.6	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Chromium	9.7		0.62	0.087	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Cobalt	1.5	J	3.1	0.057	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Iron	8300		6.2	3.6	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Lead	2.3		0.62	0.14	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Lithium	6.4		3.1	0.19	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Manganese	74		0.94	0.31	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/16/24 11:00	07/22/24 15:54	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26000		120	20	mg/Kg	☼	07/17/24 07:00	07/23/24 14:29	10
Antimony	ND		3.7	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Arsenic	1.6		1.2	0.75	mg/Kg	☼	07/17/24 07:00	07/24/24 12:21	2
Barium	240		3.1	0.057	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Beryllium	0.25	J	0.31	0.020	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Calcium	2100		310	7.1	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Chromium	14		0.62	0.087	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Cobalt	0.73	J	6.2	0.065	mg/Kg	☼	07/17/24 07:00	07/24/24 12:21	2
Iron	4000		6.2	5.1	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Lead	3.0		1.2	0.27	mg/Kg	☼	07/17/24 07:00	07/24/24 12:21	2
Lithium	8.7		3.1	0.19	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Manganese	54		0.94	0.39	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 16:25	1
Selenium	ND		1.2	0.42	mg/Kg	☼	07/17/24 07:00	07/24/24 12:21	2
Thallium	1.1	J	4.4	0.45	mg/Kg	☼	07/17/24 07:00	07/24/24 12:21	2

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	39000		10	1.6	mg/Kg			07/25/24 13:48	1
Antimony	ND		3.0	0.14	mg/Kg			07/25/24 13:48	1
Arsenic	5.8		0.50	0.13	mg/Kg			07/25/24 13:48	1
Barium	380		2.5	0.12	mg/Kg			07/25/24 13:48	1
Beryllium	1.1		0.25	0.0075	mg/Kg			07/25/24 13:48	1
Cadmium	0.015	J	0.25	0.011	mg/Kg			07/25/24 13:48	1
Calcium	4800		250	0.74	mg/Kg			07/25/24 13:48	1
Chromium	35		0.50	0.070	mg/Kg			07/25/24 13:48	1
Cobalt	9.3		2.5	0.023	mg/Kg			07/25/24 13:48	1
Iron	20000		5.0	4.1	mg/Kg			07/25/24 13:48	1
Lead	12		0.50	0.11	mg/Kg			07/25/24 13:48	1
Lithium	18		2.5	0.15	mg/Kg			07/25/24 13:48	1
Manganese	930		0.75	0.052	mg/Kg			07/25/24 13:48	1
Molybdenum	0.40	J	2.0	0.082	mg/Kg			07/25/24 13:48	1
Selenium	0.76		0.50	0.17	mg/Kg			07/25/24 13:48	1
Thallium	1.1	J	1.8	0.18	mg/Kg			07/25/24 13:48	1

Client Sample ID: MW_35S-9-11'
Lab Sample ID: 140-37376-4

Date Collected: 06/03/24 10:00
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 80.2

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	47000		120	20	mg/Kg	☼	07/17/24 07:00	07/23/24 15:28	10
Antimony	ND		3.7	0.17	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Arsenic	5.5		0.62	0.37	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Barium	490		31	0.57	mg/Kg	☼	07/17/24 07:00	07/23/24 15:28	10
Beryllium	0.95		0.31	0.020	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Calcium	5800		3100	71	mg/Kg	☼	07/17/24 07:00	07/23/24 15:28	10
Chromium	36	B	0.62	0.087	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Cobalt	6.5		6.2	0.065	mg/Kg	☼	07/17/24 07:00	07/24/24 13:22	2
Iron	18000		6.2	5.1	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Lead	12		1.2	0.27	mg/Kg	☼	07/17/24 07:00	07/24/24 13:22	2
Lithium	19		3.1	0.19	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Manganese	440		0.94	0.39	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Molybdenum	0.45	J	2.5	0.10	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/17/24 07:00	07/23/24 17:28	1
Thallium	1.3	J	4.4	0.45	mg/Kg	☼	07/17/24 07:00	07/24/24 13:22	2

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition (SPCC Loss On Ignit.)	22		0.25	0.25	%			07/02/24 13:38	1

Default Detection Limits

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Prep: 3010A
SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.077	mg/Kg
Cadmium	0.25	0.016	mg/Kg
Calcium	250	1.9	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A
SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	2.2	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	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
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.015	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	1.5	mg/Kg
Chromium	0.50	0.070	mg/Kg

Default Detection Limits

Client: Ramboll Americas Engineering Solutions
Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Method: 6010B SEP - SEP Metals (ICP) - Step 3 (Continued)

Prep: 3010A
SEP: Non-Crystalline

Analyte	RL	MDL	Units
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
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A
SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	2.2	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.47	mg/Kg
Thallium	1.8	0.29	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
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Barium	7.5	0.36	mg/Kg
Beryllium	0.75	0.063	mg/Kg
Cadmium	0.75	0.032	mg/Kg
Calcium	750	2.2	mg/Kg
Chromium	1.5	0.21	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
Selenium	1.5	0.52	mg/Kg
Thallium	5.3	0.70	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.012	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	2.1	mg/Kg
Chromium	0.50	0.070	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
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.30	mg/Kg
Barium	2.5	0.046	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	5.7	mg/Kg
Chromium	0.50	0.070	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	0.31	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	0.74	mg/Kg
Chromium	0.50	0.070	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

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	RL	MDL	Units
Manganese	0.75	0.052	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.30	mg/Kg
Barium	2.5	0.046	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Calcium	250	5.7	mg/Kg
Chromium	0.50	0.070	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	0.31	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

General Chemistry

Analyte	RL	RL	Units
Loss on Ignition	0.50	0.50	%

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-88304/10-A
Matrix: Solid
Analysis Batch: 89131
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 88304

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Antimony	ND		3.0	0.14	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Arsenic	ND		0.50	0.30	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Barium	ND		2.5	0.046	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Beryllium	ND		0.25	0.016	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Cadmium	ND		0.25	0.011	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Calcium	ND		250	5.7	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Chromium	0.0735	J	0.50	0.070	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Cobalt	ND		2.5	0.026	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Iron	ND		5.0	4.1	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Lead	ND		0.50	0.11	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Lithium	ND		2.5	0.15	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Manganese	ND		0.75	0.31	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Selenium	ND		0.50	0.17	mg/Kg		07/17/24 07:00	07/23/24 13:21	1
Thallium	ND		1.8	0.18	mg/Kg		07/17/24 07:00	07/23/24 13:21	1

Lab Sample ID: LCS 140-88304/11-A
Matrix: Solid
Analysis Batch: 89131
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 88304

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	99.9		mg/Kg		100	80 - 120
Antimony	25.0	25.1		mg/Kg		100	80 - 125
Arsenic	5.00	4.95		mg/Kg		99	80 - 120
Barium	5.00	5.16		mg/Kg		103	80 - 120
Beryllium	2.50	2.53		mg/Kg		101	80 - 120
Cadmium	2.50	2.55		mg/Kg		102	80 - 125
Calcium	2500	2570		mg/Kg		103	80 - 120
Chromium	10.0	10.6		mg/Kg		106	80 - 120
Cobalt	5.00	5.15		mg/Kg		103	80 - 125
Iron	50.0	52.6		mg/Kg		105	80 - 120
Lead	5.00	4.87		mg/Kg		97	80 - 120
Lithium	5.00	5.14		mg/Kg		103	80 - 120
Manganese	5.00	5.21		mg/Kg		104	80 - 120
Molybdenum	25.0	25.7		mg/Kg		103	80 - 125
Selenium	7.50	7.28		mg/Kg		97	80 - 120
Thallium	20.0	20.4		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 140-88304/12-A
Matrix: Solid
Analysis Batch: 89131
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 88304

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	99.6		mg/Kg		100	80 - 120	0	30
Antimony	25.0	25.0		mg/Kg		100	80 - 125	0	30
Arsenic	5.00	5.01		mg/Kg		100	80 - 120	1	30
Barium	5.00	5.14		mg/Kg		103	80 - 120	0	30
Beryllium	2.50	2.54		mg/Kg		101	80 - 120	0	30

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: LCSD 140-88304/12-A
Matrix: Solid
Analysis Batch: 89131

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 88304

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	2.50	2.56		mg/Kg		102	80 - 125	0	30
Calcium	2500	2560		mg/Kg		103	80 - 120	0	30
Chromium	10.0	10.6		mg/Kg		106	80 - 120	0	30
Cobalt	5.00	5.15		mg/Kg		103	80 - 125	0	30
Iron	50.0	52.7		mg/Kg		105	80 - 120	0	30
Lead	5.00	4.88		mg/Kg		98	80 - 120	0	30
Lithium	5.00	5.15		mg/Kg		103	80 - 120	0	30
Manganese	5.00	5.24		mg/Kg		105	80 - 120	0	30
Molybdenum	25.0	25.7		mg/Kg		103	80 - 125	0	30
Selenium	7.50	7.28		mg/Kg		97	80 - 120	0	30
Thallium	20.0	20.5		mg/Kg		103	80 - 120	1	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-88305/10-B ^4
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 88472

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Antimony	ND		12	1.1	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Arsenic	ND		2.0	0.52	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Barium	ND		10	0.48	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Beryllium	ND		1.0	0.31	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Cadmium	ND		1.0	0.064	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Calcium	ND		1000	7.6	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Chromium	ND		2.0	0.28	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Cobalt	ND		10	0.18	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Iron	ND		20	12	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Lead	ND		2.0	0.44	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Lithium	ND		10	0.60	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Manganese	ND		3.0	0.12	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Molybdenum	ND		8.0	0.33	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Selenium	ND		2.0	0.68	mg/Kg		07/09/24 07:00	07/15/24 12:17	4
Thallium	ND		7.0	0.84	mg/Kg		07/09/24 07:00	07/15/24 12:17	4

Lab Sample ID: LCS 140-88305/11-B ^5
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 88472

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	87.4		mg/Kg		87	80 - 120
Antimony	25.0	23.1		mg/Kg		92	80 - 120
Arsenic	5.00	4.35		mg/Kg		87	80 - 120
Barium	5.00	4.66	J	mg/Kg		93	80 - 120
Beryllium	2.50	2.52		mg/Kg		101	80 - 120
Cadmium	2.50	2.32		mg/Kg		93	80 - 120
Calcium	2500	2300		mg/Kg		92	80 - 120
Chromium	10.0	9.49		mg/Kg		95	80 - 120

1 2 3 4 5 6 7 8 9 10 11 12 13

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-88305/11-B ^5
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 88472

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	5.00	4.68	J	mg/Kg		94	80 - 120
Iron	50.0	47.4		mg/Kg		95	80 - 120
Lead	5.00	4.66		mg/Kg		93	80 - 120
Lithium	5.00	4.46	J	mg/Kg		89	80 - 120
Manganese	5.00	4.83		mg/Kg		97	80 - 120
Molybdenum	25.0	23.0		mg/Kg		92	80 - 120
Selenium	7.50	6.60		mg/Kg		88	80 - 120
Thallium	20.0	18.7		mg/Kg		93	80 - 120

Lab Sample ID: LCSD 140-88305/12-B ^5
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 88472

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	86.6		mg/Kg		87	80 - 120	1	30
Antimony	25.0	23.0		mg/Kg		92	80 - 120	0	30
Arsenic	5.00	4.50		mg/Kg		90	80 - 120	4	30
Barium	5.00	4.51	J	mg/Kg		90	80 - 120	3	30
Beryllium	2.50	2.43		mg/Kg		97	80 - 120	4	30
Cadmium	2.50	2.25		mg/Kg		90	80 - 120	3	30
Calcium	2500	2220		mg/Kg		89	80 - 120	4	30
Chromium	10.0	9.24		mg/Kg		92	80 - 120	3	30
Cobalt	5.00	4.51	J	mg/Kg		90	80 - 120	4	30
Iron	50.0	45.5		mg/Kg		91	80 - 120	4	30
Lead	5.00	4.63		mg/Kg		93	80 - 120	1	30
Lithium	5.00	4.41	J	mg/Kg		88	80 - 120	1	30
Manganese	5.00	4.67		mg/Kg		93	80 - 120	3	30
Molybdenum	25.0	22.2		mg/Kg		89	80 - 120	3	30
Selenium	7.50	6.74		mg/Kg		90	80 - 120	2	30
Thallium	20.0	17.9		mg/Kg		90	80 - 120	4	30

Lab Sample ID: MB 140-88451/10-B ^3
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 88476

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Antimony	ND		9.0	0.84	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Arsenic	ND		1.5	0.39	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Barium	ND		7.5	0.36	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Beryllium	0.0780	J	0.75	0.048	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Cadmium	ND		0.75	0.033	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Calcium	ND		750	6.6	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Chromium	ND		1.5	0.21	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Cobalt	ND		7.5	0.19	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Iron	ND		15	8.7	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Lead	ND		1.5	0.33	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Lithium	ND		7.5	0.45	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Manganese	ND		2.3	0.84	mg/Kg		07/09/24 07:00	07/15/24 13:31	3

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-88451/10-B ^3
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 88476

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	ND		6.0	0.25	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Selenium	ND		1.5	0.51	mg/Kg		07/09/24 07:00	07/15/24 13:31	3
Thallium	ND		5.3	0.63	mg/Kg		07/09/24 07:00	07/15/24 13:31	3

Lab Sample ID: LCS 140-88451/11-B ^5
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 88476

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	ND		mg/Kg		-2	
Antimony	25.0	20.4		mg/Kg		82	70 - 120
Arsenic	5.00	3.65		mg/Kg		73	60 - 120
Barium	5.00	2.24	J	mg/Kg		45	30 - 60
Beryllium	2.50	1.46		mg/Kg		58	40 - 70
Cadmium	2.50	2.40		mg/Kg		96	80 - 120
Calcium	2500	699	J	mg/Kg		28	10 - 40
Chromium	10.0	8.31		mg/Kg		83	60 - 120
Cobalt	5.00	4.67	J	mg/Kg		93	80 - 120
Iron	50.0	ND		mg/Kg		3	
Lead	5.00	4.50		mg/Kg		90	70 - 120
Lithium	5.00	4.48	J	mg/Kg		90	80 - 120
Manganese	5.00	4.84		mg/Kg		97	80 - 120
Molybdenum	25.0	20.4		mg/Kg		82	70 - 120
Selenium	7.50	6.45		mg/Kg		86	70 - 120
Thallium	20.0	18.4		mg/Kg		92	80 - 120

Lab Sample ID: LCSD 140-88451/12-B ^5
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 88476

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	ND		mg/Kg		-0.6		90	
Antimony	25.0	19.9		mg/Kg		80	70 - 120	2	30
Arsenic	5.00	3.88		mg/Kg		78	60 - 120	6	30
Barium	5.00	2.20	J	mg/Kg		44	30 - 60	2	30
Beryllium	2.50	1.42		mg/Kg		57	40 - 70	3	30
Cadmium	2.50	2.36		mg/Kg		95	80 - 120	1	30
Calcium	2500	675	J	mg/Kg		27	10 - 40	4	30
Chromium	10.0	8.09		mg/Kg		81	60 - 120	3	30
Cobalt	5.00	4.61	J	mg/Kg		92	80 - 120	1	30
Iron	50.0	ND		mg/Kg		3		11	
Lead	5.00	4.32		mg/Kg		86	70 - 120	4	30
Lithium	5.00	4.43	J	mg/Kg		89	80 - 120	1	30
Manganese	5.00	4.72		mg/Kg		94	80 - 120	3	30
Molybdenum	25.0	20.1		mg/Kg		80	70 - 120	2	30
Selenium	7.50	6.38		mg/Kg		85	70 - 120	1	30
Thallium	20.0	18.3		mg/Kg		92	80 - 120	0	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-88488/10-B | **Client Sample ID: Method Blank**
Matrix: Solid | **Prep Type: Step 3**
Analysis Batch: 88772 | **Prep Batch: 88516**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Antimony	ND		3.0	0.28	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Arsenic	ND		0.50	0.13	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Barium	ND		2.5	0.12	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Beryllium	ND		0.25	0.015	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Cadmium	ND		0.25	0.011	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Calcium	ND		250	1.5	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Chromium	ND		0.50	0.070	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Cobalt	ND		2.5	0.045	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Iron	ND		5.0	2.9	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Lead	ND		0.50	0.11	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Lithium	ND		2.5	0.15	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Manganese	0.0880	J	0.75	0.027	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Selenium	ND		0.50	0.17	mg/Kg		07/10/24 07:00	07/15/24 14:47	1
Thallium	ND		1.8	0.21	mg/Kg		07/10/24 07:00	07/15/24 14:47	1

Lab Sample ID: LCS 140-88488/11-B | **Client Sample ID: Lab Control Sample**
Matrix: Solid | **Prep Type: Step 3**
Analysis Batch: 88772 | **Prep Batch: 88516**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	95.8		mg/Kg		96	80 - 120
Antimony	25.0	24.7		mg/Kg		99	80 - 120
Arsenic	5.00	4.84		mg/Kg		97	80 - 120
Barium	5.00	4.98		mg/Kg		100	70 - 120
Beryllium	2.50	2.60		mg/Kg		104	80 - 120
Cadmium	2.50	1.76		mg/Kg		70	10 - 120
Calcium	2500	46.9	J	mg/Kg		2	
Chromium	10.0	10.2		mg/Kg		102	80 - 120
Cobalt	5.00	5.11		mg/Kg		102	80 - 120
Iron	50.0	50.2		mg/Kg		100	80 - 120
Lead	5.00	ND		mg/Kg		2	
Lithium	5.00	4.86		mg/Kg		97	80 - 120
Manganese	5.00	5.16		mg/Kg		103	80 - 120
Molybdenum	25.0	24.9		mg/Kg		99	80 - 120
Selenium	7.50	7.57		mg/Kg		101	80 - 120
Thallium	20.0	20.3		mg/Kg		102	80 - 120

Lab Sample ID: LCSD 140-88488/12-B | **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid | **Prep Type: Step 3**
Analysis Batch: 88772 | **Prep Batch: 88516**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	93.8		mg/Kg		94	80 - 120	2	30
Antimony	25.0	24.2		mg/Kg		97	80 - 120	2	30
Arsenic	5.00	4.76		mg/Kg		95	80 - 120	2	30
Barium	5.00	4.89		mg/Kg		98	70 - 120	2	30
Beryllium	2.50	2.56		mg/Kg		102	80 - 120	2	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-88488/12-B
Matrix: Solid
Analysis Batch: 88772

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 88516

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	2.50	1.71		mg/Kg		68	10 - 120	3	30
Calcium	2500	46.8	J	mg/Kg		2		0	
Chromium	10.0	10.1		mg/Kg		101	80 - 120	1	30
Cobalt	5.00	5.02		mg/Kg		100	80 - 120	2	30
Iron	50.0	49.4		mg/Kg		99	80 - 120	2	30
Lead	5.00	ND		mg/Kg		2		6	
Lithium	5.00	4.82		mg/Kg		96	80 - 120	1	30
Manganese	5.00	5.12		mg/Kg		102	80 - 120	1	30
Molybdenum	25.0	24.5		mg/Kg		98	80 - 120	2	30
Selenium	7.50	7.40		mg/Kg		99	80 - 120	2	30
Thallium	20.0	20.0		mg/Kg		100	80 - 120	2	30

Lab Sample ID: MB 140-88588/10-B
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 88764

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Antimony	ND		3.0	0.45	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Arsenic	ND		0.50	0.22	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Barium	ND		2.5	0.12	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Beryllium	ND		0.25	0.016	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Cadmium	ND		0.25	0.011	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Calcium	ND		250	2.2	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Chromium	0.0965	J	0.50	0.070	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Cobalt	ND		2.5	0.053	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Iron	ND		5.0	2.9	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Lead	ND		0.50	0.11	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Lithium	ND		2.5	0.15	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Manganese	ND		0.75	0.13	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Selenium	0.754		0.50	0.47	mg/Kg		07/16/24 07:00	07/22/24 12:20	1
Thallium	ND		1.8	0.29	mg/Kg		07/16/24 07:00	07/22/24 12:20	1

Lab Sample ID: LCS 140-88588/11-B
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 88764

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	91.5		mg/Kg		92	80 - 120
Antimony	25.0	23.0		mg/Kg		92	80 - 130
Arsenic	5.00	4.72		mg/Kg		94	80 - 130
Barium	5.00	4.68		mg/Kg		94	80 - 120
Beryllium	2.50	2.48		mg/Kg		99	80 - 120
Cadmium	2.50	2.36		mg/Kg		94	80 - 120
Calcium	2500	2320		mg/Kg		93	80 - 120
Chromium	10.0	9.65		mg/Kg		97	80 - 120
Cobalt	5.00	4.74		mg/Kg		95	80 - 120
Iron	50.0	47.1		mg/Kg		94	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-88588/11-B **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 89073 **Prep Batch: 88764**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	5.00	4.62		mg/Kg		92	80 - 120
Lithium	5.00	4.70		mg/Kg		94	80 - 120
Manganese	5.00	4.81		mg/Kg		96	80 - 120
Molybdenum	25.0	24.0		mg/Kg		96	80 - 120
Selenium	7.50	0.904		mg/Kg		12	
Thallium	20.0	17.6		mg/Kg		88	80 - 120

Lab Sample ID: LCSD 140-88588/12-B **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid **Prep Type: Step 4**
Analysis Batch: 89073 **Prep Batch: 88764**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	95.8		mg/Kg		96	80 - 120	5	30
Antimony	25.0	23.8		mg/Kg		95	80 - 130	4	30
Arsenic	5.00	4.90		mg/Kg		98	80 - 130	4	30
Barium	5.00	4.85		mg/Kg		97	80 - 120	3	30
Beryllium	2.50	2.56		mg/Kg		102	80 - 120	3	30
Cadmium	2.50	2.44		mg/Kg		98	80 - 120	3	30
Calcium	2500	2410		mg/Kg		96	80 - 120	4	30
Chromium	10.0	9.92		mg/Kg		99	80 - 120	3	30
Cobalt	5.00	4.90		mg/Kg		98	80 - 120	3	30
Iron	50.0	49.1		mg/Kg		98	80 - 120	4	30
Lead	5.00	4.75		mg/Kg		95	80 - 120	3	30
Lithium	5.00	4.84		mg/Kg		97	80 - 120	3	30
Manganese	5.00	4.95		mg/Kg		99	80 - 120	3	30
Molybdenum	25.0	24.8		mg/Kg		99	80 - 120	3	30
Selenium	7.50	0.832		mg/Kg		11		8	
Thallium	20.0	18.2		mg/Kg		91	80 - 120	3	30

Lab Sample ID: MB 140-88679/10-B ^5 **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 5**
Analysis Batch: 89073 **Prep Batch: 88823**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Antimony	ND		45	4.2	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Arsenic	ND		7.5	1.9	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Barium	ND		38	1.8	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Beryllium	ND		3.8	0.32	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Cadmium	ND		3.8	0.16	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Calcium	ND		3800	11	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Chromium	ND		7.5	1.1	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Cobalt	ND		38	0.60	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Iron	ND		75	44	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Lead	ND		7.5	1.7	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Lithium	ND		38	2.2	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Manganese	ND		11	1.9	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Molybdenum	ND		30	1.3	mg/Kg		07/17/24 07:00	07/22/24 13:34	5
Selenium	3.20	J	7.5	2.6	mg/Kg		07/17/24 07:00	07/22/24 13:34	5

QC Sample Results

Client: Ramboll Americas Engineering Solutions

Job ID: 140-37376-1

Project/Site: Kincaid Nature & Extent SEP

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-88679/10-B ^5
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 88823

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	ND		26	3.5	mg/Kg		07/17/24 07:00	07/22/24 13:34	5

Lab Sample ID: LCS 140-88679/11-B ^5
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 88823

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	300	ND		mg/Kg		7	
Antimony	75.0	69.1		mg/Kg		92	80 - 120
Arsenic	15.0	10.9		mg/Kg		73	60 - 100
Barium	15.0	8.06	J	mg/Kg		54	40 - 70
Beryllium	7.50	3.29	J	mg/Kg		44	40 - 70
Cadmium	7.50	7.35		mg/Kg		98	80 - 130
Calcium	7500	2070	J	mg/Kg		28	20 - 50
Chromium	30.0	30.0		mg/Kg		100	80 - 130
Cobalt	15.0	3.41	J	mg/Kg		23	1 - 60
Iron	150	ND		mg/Kg		2	
Lead	15.0	10.3		mg/Kg		69	40 - 80
Lithium	15.0	16.4	J	mg/Kg		109	80 - 150
Manganese	15.0	3.12	J	mg/Kg		21	1 - 60
Molybdenum	75.0	53.4		mg/Kg		71	60 - 100
Selenium	22.5	25.0		mg/Kg		111	80 - 140
Thallium	60.0	11.5	J	mg/Kg		19	

Lab Sample ID: LCSD 140-88679/12-B ^5
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 88823

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	300	ND		mg/Kg		7		2	
Antimony	75.0	70.5		mg/Kg		94	80 - 120	2	30
Arsenic	15.0	11.0		mg/Kg		73	60 - 100	1	30
Barium	15.0	7.97	J	mg/Kg		53	40 - 70	1	30
Beryllium	7.50	3.53	J	mg/Kg		47	40 - 70	7	30
Cadmium	7.50	7.58		mg/Kg		101	80 - 130	3	30
Calcium	7500	2080	J	mg/Kg		28	20 - 50	1	30
Chromium	30.0	30.3		mg/Kg		101	80 - 130	1	30
Cobalt	15.0	3.57	J	mg/Kg		24	1 - 60	5	30
Iron	150	ND		mg/Kg		0.5		125	
Lead	15.0	10.1		mg/Kg		67	40 - 80	2	30
Lithium	15.0	16.2	J	mg/Kg		108	80 - 150	1	30
Manganese	15.0	2.75	J	mg/Kg		18	1 - 60	13	30
Molybdenum	75.0	56.2		mg/Kg		75	60 - 100	5	30
Selenium	22.5	23.5		mg/Kg		104	80 - 140	6	30
Thallium	60.0	4.72	J	mg/Kg		8		84	

Client: Ramboll Americas Engineering Solutions	Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-88807/10-A
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 88807

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Antimony	ND		3.0	0.28	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Arsenic	ND		0.50	0.15	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Barium	ND		2.5	0.12	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Beryllium	ND		0.25	0.012	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Cadmium	ND		0.25	0.011	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Calcium	ND		250	2.1	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Chromium	ND		0.50	0.070	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Cobalt	ND		2.5	0.046	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Iron	ND		5.0	2.9	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Lead	ND		0.50	0.11	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Lithium	ND		2.5	0.15	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Manganese	ND		0.75	0.25	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Molybdenum	ND		2.0	0.099	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Selenium	ND		0.50	0.17	mg/Kg		07/16/24 11:00	07/22/24 14:50	1
Thallium	ND		1.8	0.21	mg/Kg		07/16/24 11:00	07/22/24 14:50	1

Lab Sample ID: LCS 140-88807/11-A
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 88807

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	98.9		mg/Kg		99	80 - 120
Antimony	25.0	25.5		mg/Kg		102	80 - 120
Arsenic	5.00	5.13		mg/Kg		103	80 - 120
Barium	5.00	4.98		mg/Kg		100	80 - 120
Beryllium	2.50	2.65		mg/Kg		106	80 - 120
Cadmium	2.50	2.57		mg/Kg		103	80 - 120
Calcium	2500	2490		mg/Kg		100	80 - 120
Chromium	10.0	10.2		mg/Kg		102	80 - 120
Cobalt	5.00	5.11		mg/Kg		102	80 - 120
Iron	50.0	50.4		mg/Kg		101	80 - 120
Lead	5.00	5.03		mg/Kg		101	80 - 120
Lithium	5.00	5.04		mg/Kg		101	80 - 120
Manganese	5.00	5.11		mg/Kg		102	80 - 120
Molybdenum	25.0	25.5		mg/Kg		102	80 - 120
Selenium	7.50	7.85		mg/Kg		105	80 - 120
Thallium	20.0	21.0		mg/Kg		105	80 - 120

Lab Sample ID: LCSD 140-88807/12-A
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 88807

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	99.1		mg/Kg		99	80 - 120	0	30
Antimony	25.0	25.2		mg/Kg		101	80 - 120	1	30
Arsenic	5.00	5.07		mg/Kg		101	80 - 120	1	30
Barium	5.00	4.98		mg/Kg		100	80 - 120	0	30
Beryllium	2.50	2.62		mg/Kg		105	80 - 120	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-88807/12-A
Matrix: Solid
Analysis Batch: 89073

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 88807

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	2.50	2.55		mg/Kg		102	80 - 120	1	30
Calcium	2500	2480		mg/Kg		99	80 - 120	0	30
Chromium	10.0	10.2		mg/Kg		102	80 - 120	1	30
Cobalt	5.00	5.07		mg/Kg		101	80 - 120	1	30
Iron	50.0	50.4		mg/Kg		101	80 - 120	0	30
Lead	5.00	5.04		mg/Kg		101	80 - 120	0	30
Lithium	5.00	4.97		mg/Kg		99	80 - 120	1	30
Manganese	5.00	5.07		mg/Kg		101	80 - 120	1	30
Molybdenum	25.0	25.2		mg/Kg		101	80 - 120	1	30
Selenium	7.50	7.81		mg/Kg		104	80 - 120	1	30
Thallium	20.0	20.9		mg/Kg		104	80 - 120	1	30

Lab Sample ID: MB 140-88837/10-A
Matrix: Solid
Analysis Batch: 89131

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 88837

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Antimony	ND		3.0	0.14	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Arsenic	ND		0.50	0.30	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Barium	ND		2.5	0.046	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Beryllium	ND		0.25	0.016	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Cadmium	ND		0.25	0.011	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Calcium	ND		250	5.7	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Chromium	ND		0.50	0.070	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Cobalt	ND		2.5	0.026	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Iron	ND		5.0	4.1	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Lead	ND		0.50	0.11	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Lithium	ND		2.5	0.15	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Manganese	ND		0.75	0.31	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Selenium	ND		0.50	0.17	mg/Kg		07/17/24 07:00	07/23/24 13:06	1
Thallium	ND		1.8	0.18	mg/Kg		07/17/24 07:00	07/23/24 13:06	1

Lab Sample ID: LCS 140-88837/11-A
Matrix: Solid
Analysis Batch: 89131

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 88837

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	101		mg/Kg		101	80 - 120
Antimony	25.0	25.2		mg/Kg		101	80 - 125
Arsenic	5.00	5.06		mg/Kg		101	80 - 120
Barium	5.00	5.20		mg/Kg		104	80 - 120
Beryllium	2.50	2.56		mg/Kg		102	80 - 120
Cadmium	2.50	2.56		mg/Kg		103	80 - 125
Calcium	2500	2580		mg/Kg		103	80 - 120
Chromium	10.0	10.6		mg/Kg		106	80 - 120
Cobalt	5.00	5.19		mg/Kg		104	80 - 125
Iron	50.0	53.1		mg/Kg		106	80 - 120

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-88837/11-A
Matrix: Solid
Analysis Batch: 89131

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 88837

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	5.00	5.00		mg/Kg		100	80 - 120
Lithium	5.00	5.26		mg/Kg		105	80 - 120
Manganese	5.00	5.27		mg/Kg		105	80 - 120
Molybdenum	25.0	25.8		mg/Kg		103	80 - 125
Selenium	7.50	7.30		mg/Kg		97	80 - 120
Thallium	20.0	20.6		mg/Kg		103	80 - 120

Lab Sample ID: LCSD 140-88837/12-A
Matrix: Solid
Analysis Batch: 89131

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 88837

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	99.6		mg/Kg		100	80 - 120	1	30
Antimony	25.0	24.9		mg/Kg		100	80 - 125	1	30
Arsenic	5.00	4.98		mg/Kg		100	80 - 120	2	30
Barium	5.00	5.14		mg/Kg		103	80 - 120	1	30
Beryllium	2.50	2.52		mg/Kg		101	80 - 120	2	30
Cadmium	2.50	2.55		mg/Kg		102	80 - 125	1	30
Calcium	2500	2560		mg/Kg		102	80 - 120	1	30
Chromium	10.0	10.5		mg/Kg		105	80 - 120	1	30
Cobalt	5.00	5.15		mg/Kg		103	80 - 125	1	30
Iron	50.0	52.4		mg/Kg		105	80 - 120	1	30
Lead	5.00	4.91		mg/Kg		98	80 - 120	2	30
Lithium	5.00	5.12		mg/Kg		102	80 - 120	3	30
Manganese	5.00	5.21		mg/Kg		104	80 - 120	1	30
Molybdenum	25.0	25.6		mg/Kg		102	80 - 125	1	30
Selenium	7.50	7.37		mg/Kg		98	80 - 120	1	30
Thallium	20.0	20.4		mg/Kg		102	80 - 120	1	30

Method: Loss On Ignit. - Loss On Ignition

Lab Sample ID: MB 140-88351/1
Matrix: Solid
Analysis Batch: 88351

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Loss on Ignition	ND		0.49	0.49	%			07/02/24 13:38	1

Lab Sample ID: 140-37376-1 DU
Matrix: Solid
Analysis Batch: 88351

Client Sample ID: MW_33S-9-11'
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Loss on Ignition	20		20.1		%		1	10

Metals

Prep Batch: 88304

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Total/NA	Solid	Total	
140-37376-2	MW_33S-14-15'	Total/NA	Solid	Total	
140-37376-3	MW_34S-9-11'	Total/NA	Solid	Total	
140-37376-4	MW_35S-9-11'	Total/NA	Solid	Total	
MB 140-88304/10-A	Method Blank	Total/NA	Solid	Total	
LCS 140-88304/11-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-88304/12-A	Lab Control Sample Dup	Total/NA	Solid	Total	

SEP Batch: 88305

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 1	Solid	Exchangeable	
140-37376-2	MW_33S-14-15'	Step 1	Solid	Exchangeable	
140-37376-3	MW_34S-9-11'	Step 1	Solid	Exchangeable	
140-37376-4	MW_35S-9-11'	Step 1	Solid	Exchangeable	
MB 140-88305/10-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-88305/11-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-88305/12-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	

SEP Batch: 88451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 2	Solid	Carbonate	
140-37376-2	MW_33S-14-15'	Step 2	Solid	Carbonate	
140-37376-3	MW_34S-9-11'	Step 2	Solid	Carbonate	
140-37376-4	MW_35S-9-11'	Step 2	Solid	Carbonate	
MB 140-88451/10-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-88451/11-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-88451/12-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Prep Batch: 88472

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 1	Solid	3010A	88305
140-37376-2	MW_33S-14-15'	Step 1	Solid	3010A	88305
140-37376-3	MW_34S-9-11'	Step 1	Solid	3010A	88305
140-37376-4	MW_35S-9-11'	Step 1	Solid	3010A	88305
MB 140-88305/10-B ^4	Method Blank	Step 1	Solid	3010A	88305
LCS 140-88305/11-B ^5	Lab Control Sample	Step 1	Solid	3010A	88305
LCSD 140-88305/12-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	88305

Prep Batch: 88476

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 2	Solid	3010A	88451
140-37376-2	MW_33S-14-15'	Step 2	Solid	3010A	88451
140-37376-3	MW_34S-9-11'	Step 2	Solid	3010A	88451
140-37376-4	MW_35S-9-11'	Step 2	Solid	3010A	88451
MB 140-88451/10-B ^3	Method Blank	Step 2	Solid	3010A	88451
LCS 140-88451/11-B ^5	Lab Control Sample	Step 2	Solid	3010A	88451
LCSD 140-88451/12-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	88451

SEP Batch: 88488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 3	Solid	Non-Crystalline	

Metals (Continued)

SEP Batch: 88488 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-2	MW_33S-14-15'	Step 3	Solid	Non-Crystalline	
140-37376-3	MW_34S-9-11'	Step 3	Solid	Non-Crystalline	
140-37376-4	MW_35S-9-11'	Step 3	Solid	Non-Crystalline	
MB 140-88488/10-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-88488/11-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-88488/12-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	

Prep Batch: 88516

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 3	Solid	3010A	88488
140-37376-2	MW_33S-14-15'	Step 3	Solid	3010A	88488
140-37376-3	MW_34S-9-11'	Step 3	Solid	3010A	88488
140-37376-4	MW_35S-9-11'	Step 3	Solid	3010A	88488
MB 140-88488/10-B	Method Blank	Step 3	Solid	3010A	88488
LCS 140-88488/11-B	Lab Control Sample	Step 3	Solid	3010A	88488
LCSD 140-88488/12-B	Lab Control Sample Dup	Step 3	Solid	3010A	88488

SEP Batch: 88588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 4	Solid	Metal Hydroxide	
140-37376-2	MW_33S-14-15'	Step 4	Solid	Metal Hydroxide	
140-37376-3	MW_34S-9-11'	Step 4	Solid	Metal Hydroxide	
140-37376-4	MW_35S-9-11'	Step 4	Solid	Metal Hydroxide	
MB 140-88588/10-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-88588/11-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-88588/12-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	

SEP Batch: 88679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 5	Solid	Organic-Bound	
140-37376-2	MW_33S-14-15'	Step 5	Solid	Organic-Bound	
140-37376-3	MW_34S-9-11'	Step 5	Solid	Organic-Bound	
140-37376-4	MW_35S-9-11'	Step 5	Solid	Organic-Bound	
MB 140-88679/10-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-88679/11-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-88679/12-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	

Prep Batch: 88764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 4	Solid	3010A	88588
140-37376-2	MW_33S-14-15'	Step 4	Solid	3010A	88588
140-37376-3	MW_34S-9-11'	Step 4	Solid	3010A	88588
140-37376-4	MW_35S-9-11'	Step 4	Solid	3010A	88588
MB 140-88588/10-B	Method Blank	Step 4	Solid	3010A	88588
LCS 140-88588/11-B	Lab Control Sample	Step 4	Solid	3010A	88588
LCSD 140-88588/12-B	Lab Control Sample Dup	Step 4	Solid	3010A	88588

Analysis Batch: 88772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 1	Solid	6010B SEP	88472
140-37376-1	MW_33S-9-11'	Step 2	Solid	6010B SEP	88476

Metals (Continued)

Analysis Batch: 88772 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 3	Solid	6010B SEP	88516
140-37376-2	MW_33S-14-15'	Step 1	Solid	6010B SEP	88472
140-37376-2	MW_33S-14-15'	Step 2	Solid	6010B SEP	88476
140-37376-2	MW_33S-14-15'	Step 3	Solid	6010B SEP	88516
140-37376-3	MW_34S-9-11'	Step 1	Solid	6010B SEP	88472
140-37376-3	MW_34S-9-11'	Step 2	Solid	6010B SEP	88476
140-37376-3	MW_34S-9-11'	Step 3	Solid	6010B SEP	88516
140-37376-4	MW_35S-9-11'	Step 1	Solid	6010B SEP	88472
140-37376-4	MW_35S-9-11'	Step 2	Solid	6010B SEP	88476
140-37376-4	MW_35S-9-11'	Step 3	Solid	6010B SEP	88516
MB 140-88305/10-B ^4	Method Blank	Step 1	Solid	6010B SEP	88472
MB 140-88451/10-B ^3	Method Blank	Step 2	Solid	6010B SEP	88476
MB 140-88488/10-B	Method Blank	Step 3	Solid	6010B SEP	88516
LCS 140-88305/11-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	88472
LCS 140-88451/11-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	88476
LCS 140-88488/11-B	Lab Control Sample	Step 3	Solid	6010B SEP	88516
LCSD 140-88305/12-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	88472
LCSD 140-88451/12-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	88476
LCSD 140-88488/12-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	88516

SEP Batch: 88807

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 6	Solid	Acid/Sulfide	
140-37376-2	MW_33S-14-15'	Step 6	Solid	Acid/Sulfide	
140-37376-3	MW_34S-9-11'	Step 6	Solid	Acid/Sulfide	
140-37376-4	MW_35S-9-11'	Step 6	Solid	Acid/Sulfide	
MB 140-88807/10-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-88807/11-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-88807/12-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	

Prep Batch: 88823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 5	Solid	3010A	88679
140-37376-2	MW_33S-14-15'	Step 5	Solid	3010A	88679
140-37376-3	MW_34S-9-11'	Step 5	Solid	3010A	88679
140-37376-4	MW_35S-9-11'	Step 5	Solid	3010A	88679
MB 140-88679/10-B ^5	Method Blank	Step 5	Solid	3010A	88679
LCS 140-88679/11-B ^5	Lab Control Sample	Step 5	Solid	3010A	88679
LCSD 140-88679/12-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	88679

Prep Batch: 88837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 7	Solid	Residual	
140-37376-2	MW_33S-14-15'	Step 7	Solid	Residual	
140-37376-3	MW_34S-9-11'	Step 7	Solid	Residual	
140-37376-4	MW_35S-9-11'	Step 7	Solid	Residual	
MB 140-88837/10-A	Method Blank	Step 7	Solid	Residual	
LCS 140-88837/11-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-88837/12-A	Lab Control Sample Dup	Step 7	Solid	Residual	

1 2 3 4 5 6 7 8 9 10 11 12 13

QC Association Summary

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Metals

Analysis Batch: 89073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 4	Solid	6010B SEP	88764
140-37376-1	MW_33S-9-11'	Step 5	Solid	6010B SEP	88823
140-37376-1	MW_33S-9-11'	Step 6	Solid	6010B SEP	88807
140-37376-2	MW_33S-14-15'	Step 4	Solid	6010B SEP	88764
140-37376-2	MW_33S-14-15'	Step 5	Solid	6010B SEP	88823
140-37376-2	MW_33S-14-15'	Step 6	Solid	6010B SEP	88807
140-37376-3	MW_34S-9-11'	Step 4	Solid	6010B SEP	88764
140-37376-3	MW_34S-9-11'	Step 5	Solid	6010B SEP	88823
140-37376-3	MW_34S-9-11'	Step 6	Solid	6010B SEP	88807
140-37376-4	MW_35S-9-11'	Step 4	Solid	6010B SEP	88764
140-37376-4	MW_35S-9-11'	Step 5	Solid	6010B SEP	88823
140-37376-4	MW_35S-9-11'	Step 6	Solid	6010B SEP	88807
MB 140-88588/10-B	Method Blank	Step 4	Solid	6010B SEP	88764
MB 140-88679/10-B ^5	Method Blank	Step 5	Solid	6010B SEP	88823
MB 140-88807/10-A	Method Blank	Step 6	Solid	6010B SEP	88807
LCS 140-88588/11-B	Lab Control Sample	Step 4	Solid	6010B SEP	88764
LCS 140-88679/11-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	88823
LCS 140-88807/11-A	Lab Control Sample	Step 6	Solid	6010B SEP	88807
LCSD 140-88588/12-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	88764
LCSD 140-88679/12-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	88823
LCSD 140-88807/12-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	88807

Analysis Batch: 89131

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-1	MW_33S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-1	MW_33S-9-11'	Total/NA	Solid	6010B	88304
140-37376-1	MW_33S-9-11'	Total/NA	Solid	6010B	88304
140-37376-2	MW_33S-14-15'	Step 7	Solid	6010B SEP	88837
140-37376-2	MW_33S-14-15'	Step 7	Solid	6010B SEP	88837
140-37376-2	MW_33S-14-15'	Total/NA	Solid	6010B	88304
140-37376-2	MW_33S-14-15'	Total/NA	Solid	6010B	88304
140-37376-3	MW_34S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-3	MW_34S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-3	MW_34S-9-11'	Total/NA	Solid	6010B	88304
140-37376-3	MW_34S-9-11'	Total/NA	Solid	6010B	88304
140-37376-4	MW_35S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-4	MW_35S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-4	MW_35S-9-11'	Total/NA	Solid	6010B	88304
140-37376-4	MW_35S-9-11'	Total/NA	Solid	6010B	88304
MB 140-88304/10-A	Method Blank	Total/NA	Solid	6010B	88304
MB 140-88837/10-A	Method Blank	Step 7	Solid	6010B SEP	88837
LCS 140-88304/11-A	Lab Control Sample	Total/NA	Solid	6010B	88304
LCS 140-88837/11-A	Lab Control Sample	Step 7	Solid	6010B SEP	88837
LCSD 140-88304/12-A	Lab Control Sample Dup	Total/NA	Solid	6010B	88304
LCSD 140-88837/12-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	88837

Analysis Batch: 89170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-1	MW_33S-9-11'	Total/NA	Solid	6010B	88304

Metals (Continued)

Analysis Batch: 89170 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-2	MW_33S-14-15'	Step 7	Solid	6010B SEP	88837
140-37376-2	MW_33S-14-15'	Total/NA	Solid	6010B	88304
140-37376-3	MW_34S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-3	MW_34S-9-11'	Total/NA	Solid	6010B	88304
140-37376-4	MW_35S-9-11'	Step 7	Solid	6010B SEP	88837
140-37376-4	MW_35S-9-11'	Total/NA	Solid	6010B	88304

Analysis Batch: 89227

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Sum of Steps 1-7	Solid	6010B SEP	
140-37376-2	MW_33S-14-15'	Sum of Steps 1-7	Solid	6010B SEP	
140-37376-3	MW_34S-9-11'	Sum of Steps 1-7	Solid	6010B SEP	
140-37376-4	MW_35S-9-11'	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 88351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Total/NA	Solid	Loss On Ignit.	
140-37376-2	MW_33S-14-15'	Total/NA	Solid	Loss On Ignit.	
140-37376-3	MW_34S-9-11'	Total/NA	Solid	Loss On Ignit.	
140-37376-4	MW_35S-9-11'	Total/NA	Solid	Loss On Ignit.	
MB 140-88351/1	Method Blank	Total/NA	Solid	Loss On Ignit.	
LCS 140-88351/2	Lab Control Sample	Total/NA	Solid	Loss On Ignit.	
LCSD 140-88351/3	Lab Control Sample Dup	Total/NA	Solid	Loss On Ignit.	
140-37376-1 DU	MW_33S-9-11'	Total/NA	Solid	Loss On Ignit.	

Analysis Batch: 88450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-37376-1	MW_33S-9-11'	Total/NA	Solid	Moisture	
140-37376-2	MW_33S-14-15'	Total/NA	Solid	Moisture	
140-37376-3	MW_34S-9-11'	Total/NA	Solid	Moisture	
140-37376-4	MW_35S-9-11'	Total/NA	Solid	Moisture	
140-37376-1 DU	MW_33S-9-11'	Total/NA	Solid	Moisture	

Client Sample ID: MW_33S-9-11'
Lab Sample ID: 140-37376-1
Date Collected: 06/03/24 14:00
Matrix: Solid
Date Received: 06/28/24 09:30

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			89227	07/25/24 13:48	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Loss On Ignit.		1	1.4543 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			88450	07/08/24 08:59	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: MW_33S-9-11'
Lab Sample ID: 140-37376-1
Date Collected: 06/03/24 14:00
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 82.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			89131	07/23/24 15:13	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 17:12	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			89170	07/24/24 13:06	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			88772	07/15/24 12:57	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			88772	07/15/24 14:26	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 15:37	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 13:00	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 14:29	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 15:39	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_33S-9-11'

Lab Sample ID: 140-37376-1

Date Collected: 06/03/24 14:00
Date Received: 06/28/24 09:30

Matrix: Solid
Percent Solids: 82.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			89131	07/23/24 14:15	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 16:09	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			89170	07/24/24 12:07	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_33S-14-15'

Lab Sample ID: 140-37376-2

Date Collected: 06/03/24 14:10
Date Received: 06/28/24 09:30

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			89227	07/25/24 13:48	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Loss On Ignit.		1	2.0050 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			88450	07/08/24 08:59	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: MW_33S-14-15'

Lab Sample ID: 140-37376-2

Date Collected: 06/03/24 14:10
Date Received: 06/28/24 09:30

Matrix: Solid
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	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			89131	07/23/24 15:18	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 17:17	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			89170	07/24/24 13:12	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			88772	07/15/24 13:16	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			88772	07/15/24 14:31	KNC	EET KNX
	Instrument ID: DUO									

1 2 3 4 5 6 7 8 9 10 11 12 13

Client Sample ID: MW_33S-14-15'
Lab Sample ID: 140-37376-2
Date Collected: 06/03/24 14:10
Matrix: Solid
Date Received: 06/28/24 09:30
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 3	SEP	Non-Crystalline			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 15:42	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 13:19	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 14:34	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 15:44	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			89131	07/23/24 14:20	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 16:14	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			89170	07/24/24 12:12	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_34S-9-11'
Lab Sample ID: 140-37376-3
Date Collected: 06/06/24 09:30
Matrix: Solid
Date Received: 06/28/24 09:30

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			89227	07/25/24 13:48	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Loss On Ignit.		1	2.0344 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			88450	07/08/24 08:59	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: MW_34S-9-11'
Lab Sample ID: 140-37376-3
Date Collected: 06/06/24 09:30
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 79.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			89131	07/23/24 15:23	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_34S-9-11'
Lab Sample ID: 140-37376-3

Date Collected: 06/06/24 09:30
Matrix: Solid

Date Received: 06/28/24 09:30
Percent Solids: 79.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 17:23	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			89170	07/24/24 13:17	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			88772	07/15/24 13:21	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			88772	07/15/24 14:37	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 15:47	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 13:24	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 14:39	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 15:49	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			89131	07/23/24 14:25	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 16:19	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			89170	07/24/24 12:17	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_35S-9-11'
Lab Sample ID: 140-37376-4

Date Collected: 06/03/24 10:00
Matrix: Solid

Date Received: 06/28/24 09:30

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			89227	07/25/24 13:48	KNC	EET KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent SEP

Job ID: 140-37376-1

Client Sample ID: MW_35S-9-11'
Date Collected: 06/03/24 10:00
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Loss On Ignit.		1	1.9727 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
Total/NA	Analysis	Moisture		1			88450	07/08/24 08:59	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: MW_35S-9-11'
Date Collected: 06/03/24 10:00
Date Received: 06/28/24 09:30

Lab Sample ID: 140-37376-4
Matrix: Solid
Percent Solids: 80.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			89131	07/23/24 15:28	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 17:28	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			89170	07/24/24 13:22	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			88772	07/15/24 13:26	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			88772	07/15/24 14:42	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 15:52	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 13:29	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 14:45	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 15:54	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			89131	07/23/24 14:29	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_35S-9-11'
Lab Sample ID: 140-37376-4
Date Collected: 06/03/24 10:00
Matrix: Solid
Date Received: 06/28/24 09:30
Percent Solids: 80.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 16:25	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			89170	07/24/24 12:21	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-88304/10-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			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 13:21	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-88305/10-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			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			88772	07/15/24 12:17	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-88351/1
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	Analysis	Loss On Ignit.		1	1.0123 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-88451/10-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			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			88772	07/15/24 13:31	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-88488/10-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			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 14:47	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-88588/10-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			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 12:20	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-88679/10-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			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 13:34	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-88807/10-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			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 14:50	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-88837/10-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			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 13:06	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-88304/11-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			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 13:26	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-88305/11-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			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		5			88772	07/15/24 12:22	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-88351/2
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	Analysis	Loss On Ignit.		1	1.0543 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-88451/11-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			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		5			88772	07/15/24 13:36	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-88488/11-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			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 14:52	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-88588/11-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			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 12:25	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-88679/11-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			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 13:39	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-88807/11-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			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 14:55	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-88837/11-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			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 13:11	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-88304/12-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			1.000 g	50 mL	88304	07/17/24 07:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			89131	07/23/24 13:31	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88305/12-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			5.000 g	25 mL	88305	07/08/24 07:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	88472	07/09/24 07:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		5			88772	07/15/24 12:27	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88351/3

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
Total/NA	Analysis	Loss On Ignit.		1	1.3115 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88451/12-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			5.000 g	25 mL	88451	07/08/24 10:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	88476	07/09/24 07:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		5			88772	07/15/24 13:41	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88488/12-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			5.000 g	25 mL	88488	07/09/24 07:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	88516	07/10/24 07:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			88772	07/15/24 14:56	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88588/12-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			5.000 g	25 mL	88588	07/11/24 07:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	88764	07/16/24 07:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			89073	07/22/24 12:30	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Ramboll Americas Engineering Solutions | Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88679/12-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			5.000 g	75 mL	88679	07/15/24 07:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	88823	07/17/24 07:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			89073	07/22/24 13:44	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88807/12-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			5.000 g	250 mL	88807	07/16/24 11:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			89073	07/22/24 14:59	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-88837/12-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			1.000 g	50 mL	88837	07/17/24 07:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			89131	07/23/24 13:16	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: MW_33S-9-11' — Lab Sample ID: 140-37376-1 DU

Date Collected: 06/03/24 14:00 — **Matrix: Solid**
Date Received: 06/28/24 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Loss On Ignit.		1	1.0474 g	1 g	88351	07/02/24 13:38	SJF	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			88450	07/08/24 08:59	SJF	EET KNX
	Instrument ID: NOEQUIP									

Laboratory References:

EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Ramboll Americas Engineering Solutions Job ID: 140-37376-1
Project/Site: Kincaid Nature & Extent SEP

Laboratory: Eurofins 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	02-13-25
ANAB	Dept. of Energy	L2311.01	02-13-25
ANAB	ISO/IEC 17025	L2311	02-13-25
Arkansas DEQ	State	88-0688	06-17-25
Colorado	State	TN00009	02-28-25
Connecticut	State	PH-0223	10-01-26
Florida	NELAP	E87177	06-30-25
Georgia (DW)	State	906	07-27-25
Hawaii	State	NA	07-27-24
Kansas	NELAP	E-10349	10-31-24
Kentucky (DW)	State	90101	12-31-24
Louisiana (All)	NELAP	83979	06-30-25
Louisiana (DW)	State	LA019	12-31-24
Maryland	State	277	03-31-25
Michigan	State	9933	07-27-25
Nevada	State	TN00009	07-31-24
New Hampshire	NELAP	2999	01-17-25
New Jersey	NELAP	TN001	06-30-25
New York	NELAP	10781	03-31-25
North Carolina (DW)	State	21705	07-31-25
North Carolina (WW/SW)	State	64	12-31-24
Oklahoma	State	9415	08-31-24
Oregon	NELAP	TNI0189	01-01-25
Pennsylvania	NELAP	68-00576	12-31-24
Tennessee	State	02014	07-27-25
Texas	NELAP	T104704380-23-18	08-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	525-22-279-18762	10-06-25
Utah	NELAP	TN00009	07-31-24
Virginia	NELAP	460176	09-14-24
Washington	State	C593	01-19-25
West Virginia (DW)	State	9955C	12-31-24
West Virginia DEP	State	345	04-30-25
Wisconsin	State	998044300	08-31-24

Method Summary

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	EET KNX
6010B SEP	SEP Metals (ICP)	SW846	EET KNX
Loss On Ignit.	Loss On Ignition	SPCC	EET KNX
Moisture	Percent Moisture	EPA	EET KNX
3010A	Preparation, Total Metals	SW846	EET KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	EET KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	EET KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	EET KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	EET KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	EET KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	EET KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	EET KNX
Total	Preparation, Total Material	TAL-KNOX	EET KNX

Protocol References:

EPA = US Environmental Protection Agency

SPCC = Society for Protective Coatings

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:

EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Eurofins Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone: 865-291-3000 Fax: 865-584-4315

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM: Henry, Ryan	Carrier Tracking No(s):	COC No: 140-14132-3683.2
Client Contact: Michael Davis	Phone:	E-Mail: WilliamR.Henry@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: Ramboll Americas Engineering Solutions	PWSID:			Job #:
Address: 333 W Wacker Drive Suite 1050	Due Date Requested:			Preservation Codes: N - None
City: Chicago	TAT Requested (days):			
State, Zip: IL, 60606	Compliance Project: Δ Yes Δ No			
Phone:	PO #: 1940108210			
Email: mdavis@ramboll.com	WO #:			
Project Name: Kincaid Nature & Extent SEP	Project #: ~~14007449~~ 1940108210			
Site: Kincaid Power Plant	SSOW#:			Other:

Analysis Requested

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)	LossOnIgnition - Loss on Ignition	6010B_SEP - 7-Step SEP	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
MW-33S_9-11'	6/3/24	1400	G	S			X	X	1	
MW-33S_14-13'	6/3/24	1410	↓	↓			X	X	1	Limited volume. DO LOI only if enough
MW-34S-9-11'	6/6/24	0930	↓	↓			X	X	1	
MW-35S-9-11'	6/3/24	1000	↓	↓			X	X	1	

140-37376 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 1 Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:		Date:	Time:		Method of Shipment:	
Relinquished by: [signature]	Date/Time: 6/25/24 1400	Company: Ramboll	Received by: [signature]	Date/Time: 6-28-24 09:31	Company: ETA KN2	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company	
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			

14007449

Ver: 04/02/2024

Loc: 140
37376

EUROFINS KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST   Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
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 : ______ Correction factor: ______			✓	☐ 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
10. Was the sampler identified on the COC?		✓		☑ Sampler Not Listed on COC
11. Is the client and project name/# identified?	✓			☐ COC Incorrect/Incomplete
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

Comments/Actions Taken

CUSTODY SEALS INTACT
RECEIVED AMBIENT RT 20.0/CT 20.1°C
AKD 6·28·24
COOLER FED XH 7771 0050 1426 SD

ID

Labeling Verified by: ______ **Date:** ______

pH test strip lot number: ______

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 14007449   PM Instructions: ______

Sample Receiving Associate: [signature]   Date: 6·28·24

QA026R33.doc, 11/10/23

eurofins | Environment Testing

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

ANALYTICAL REPORT

PREPARED FOR

Attn: Michael Davis
Ramboll Americas Engineering Solutions
333 W Wacker Drive
Suite 1050
Chicago, Illinois 60606

Generated 7/25/2024 9:43:46 AM

JOB DESCRIPTION

Kincaid Nature & Extent CEC Analysis

JOB NUMBER

860-77314-1

Eurofins Houston

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization

Generated
7/25/2024 9:43:46 AM

Authorized for release by
Sachin Kudchadkar, Senior Project Manager
Sachin.Kudchadkar@et.eurofinsus.com
(281)748-9025

Eurofins Houston is a laboratory within Eurofins Environment Testing South Central, LLC, a company within Eurofins Environment Testing Group of Companies

Table of Contents

Definitions/Glossary

Client: Ramboll Americas Engineering Solutions
Job ID: 860-77314-1
Project/Site: Kincaid Nature & Extent CEC Analysis

Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

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

Appendix A

Laboratory Data Package Cover Page - Page 1 of 4

This data package is for Job No. 860-77314-1 and consists of:

This signature page, the laboratory review checklist, and the following reportable data:

☑ R1- Field chain-of-custody documentation;

☑ R2 - Sample identification cross-reference;

☑ R3 - Test reports (analytical data sheets) for each environmental sample that includes:
  a. Items consistent with NELAC Chapter 5,
  b. dilution factors,
  c. preparation methods,
  d. cleanup methods, and
  e. if required for the project, tentatively identified coumpounds (TICs).

☐ R4 - Surrogate recovery data including:
  a. Calculated recovery (%R), and
  b. The laboratory's surrogate QC limits.

☑ R5 - Test reports/summary forms for blank samples;

☑ R6 - Test reports/summary forms for laboratory control samples (LCSs) including:
  a. LCS spiking amounts,
  b. Calculated %R for each analyte, and
  c. The laboratory's LCS QC limits.

☑ R7 - Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a. Samples associated with the MS/MSD clearly identified,
  b. MS/MSD spiking amounts,
  c. Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d. Calculated %Rs and relative percent differences (RPDs), and
  e. The laboratory's MS/MSD QC limits

☑ R8 - Laboratory analytical duplicate (if applicable) recovery and precision:
  a. The amount of analyte measured in the duplicate,
  b. The calculated RPD, and
  c. The laboratory's QC limits for analytical duplicates.

☑ R9 - List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;

☑ R10 - Other problems or anomalies.

☐ Exception Report for every "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program .

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods , analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld .

Check, if applicable: ☐ This laboratory meets an exception under 30 TAC §25.6 and was last inspected by ☐ TCEQ or ☐ ______ on __/__/__. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true .

Name (Printed)	Signature	Official Title (Printed)	Date

Laboratory Data Package Cover Page - Page 2 of 4

Laboratory Name:	Eurofins Houston	LRC Date:	07/25/2024
Project Name:	Kincaid Nature & Extent CEC Analysis	Laboratory Job Number:	860-77314-1
Reviewer Name:			

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
R1	OI	**Chain-of-custody (C-O-C)**					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	✓				
		Were all departures from standard conditions described in an exception report?	✓				
R2	OI	**Sample and quality control (QC) identification**					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	✓				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	✓				
R3	OI	**Test reports**					
		Were all samples prepared and analyzed within holding times?	✓				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	✓				
		Were calculations checked by a peer or supervisor?	✓				
		Were all analyte identifications checked by a peer or supervisor?	✓				
		Were sample detection limits reported for all analytes not detected?	✓				
		Were all results for soil and sediment samples reported on a dry weight basis?	✓				
		Were % moisture (or solids) reported for all soil and sediment samples?	✓				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			✓		
		If required for the project, are TICs reported?			✓		
R4	O	**Surrogate recovery data**					
		Were surrogates added prior to extraction?			✓		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?			✓		
R5	OI	**Test reports/summary forms for blank samples**					
		Were appropriate type(s) of blanks analyzed?	✓				
		Were blanks analyzed at the appropriate frequency?	✓				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	✓				
		Were blank concentrations < MQL?	✓				
R6	OI	**Laboratory control samples (LCS):**					
		Were all COCs included in the LCS?	✓				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	✓				
		Were LCSs analyzed at the required frequency?	✓				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	✓				
		Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	✓				
		Was the LCSD RPD within QC limits?	✓				
R7	OI	**Matrix spike (MS) and matrix spike duplicate (MSD) data**					
		Were the project/method specified analytes included in the MS and MSD?	✓				
		Were MS/MSD analyzed at the appropriate frequency?	✓				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		✓			1
		Were MS/MSD RPDs within laboratory QC limits?	✓				
R8	OI	**Analytical duplicate data**					
		Were appropriate analytical duplicates analyzed for each matrix?	✓				
		Were analytical duplicates analyzed at the appropriate frequency?	✓				
		Were RPDs or relative standard deviations within the laboratory QC limits?	✓				
R9	OI	**Method quantitation limits (MQLs):**					
		Are the MQLs for each method analyte included in the laboratory data package?	✓				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	✓				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	✓				
R10	OI	**Other problems/anomalies**					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	✓				
		Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	✓				
		Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	✓				

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Laboratory Name: Eurofins Houston	LRC Date: 07/25/2024
Project Name: Kincaid Nature & Extent CEC Analysis	Laboratory Job Number: 860-77314-1
Reviewer Name:	

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial calibration (ICAL)**					
		Were response factors and/or relative response factors for each analyte within QC limits?	✓				
		Were percent RSDs or correlation coefficient criteria met?	✓				
		Was the number of standards recommended in the method used for all analytes?	✓				
		Were all points generated between the lowest and highest standard used to calculate the curve?	✓				
		Are ICAL data available for all instruments used?	✓				
		Has the initial calibration curve been verified using an appropriate second source standard?	✓				
S2	OI	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**					
		Was the CCV analyzed at the method-required frequency?	✓				
		Were percent differences for each analyte within the method-required QC limits?	✓				
		Was the ICAL curve verified for each analyte?	✓				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	✓				
S3	O	**Mass spectral tuning**					
		Was the appropriate compound for the method used for tuning?			✓		
		Were ion abundance data within the method-required QC limits?			✓		
S4	O	**Internal standards (IS)**					
		Were IS area counts and retention times within the method-required QC limits?			✓		
S5	OI	**Raw data (NELAC Section 5.5.10)**					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	✓				
		Were data associated with manual integrations flagged on the raw data?	✓				
S6	O	**Dual column confirmation**					
		Did dual column confirmation results meet the method-required QC?			✓		
S7	O	**Tentatively identified compounds (TICs)**					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			✓		
S8	I	**Interference Check Sample (ICS) results**					
		Were percent recoveries within method QC limits?	✓				
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	✓				
S10	OI	**Method detection limit (MDL) studies**					
		Was a MDL study performed for each reported analyte?	✓				
		Is the MDL either adjusted or supported by the analysis of DCSs?	✓				
S11	OI	**Proficiency test reports**					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	✓				
S12	OI	**Standards documentation**					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	✓				
S13	OI	**Compound/analyte identification procedures**					
		Are the procedures for compound/analyte identification documented?	✓				
S14	OI	**Demonstration of analyst competency (DOC)**					
		Was DOC conducted consistent with NELAC Chapter 5?	✓				
		Is documentation of the analyst’s competency up-to-date and on file?	✓				
S15	OI	**Verification/validation documentation for methods (NELAC Chapter 5)**					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	✓				
S16	OI	**Laboratory standard operating procedures (SOPs)**					
		Are laboratory SOPs current and on file for each method performed?	✓				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP -required report(s).
   Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;
2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

Laboratory Data Package Cover Page - Page 4 of 4

Laboratory Name: Eurofins Houston	LRC Date: 07/25/2024
Project Name: Kincaid Nature & Extent CEC Analysis	Laboratory Job Number: 860-77314-1
Reviewer Name:	

ER#[1]	Description
1	Method 6010D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 860-169399 and analytical batch 860-169698 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. Method 6010D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 860-169667 and analytical batch 860-169979 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

1. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Job ID: 860-77314-1 Eurofins Houston

Job Narrative
860-77314-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 6/28/2024 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 28.0°C.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: Ramboll Americas Engineering Solutions

Job ID: 860-77314-1

Project/Site: Kincaid Nature & Extent CEC Analysis

Client Sample ID: MW-33S-9-11'

Lab Sample ID: 860-77314-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	66.5		52.8	13.0	mg/Kg	1	☼	6010D	Total/NA
Cation Exchange Capacity	31.1		0.623	0.623	meq/100gm	1	☼	9081	Total/NA

Client Sample ID: MW-34S-9-11'

Lab Sample ID: 860-77314-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	135		57.2	14.1	mg/Kg	1	☼	6010D	Total/NA
Cation Exchange Capacity	37.0		0.652	0.652	meq/100gm	1	☼	9081	Total/NA

Client Sample ID: MW-34S-9-11'

Lab Sample ID: 860-77314-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	56.8		54.8	13.5	mg/Kg	1	☼	6010D	Total/NA
Cation Exchange Capacity	31.2		0.624	0.624	meq/100gm	1	☼	9081	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-33S-9-11'
Lab Sample ID: 860-77314-1
Date Collected: 06/03/24 14:00
Matrix: Solid
Date Received: 06/28/24 09:25
Percent Solids: 80.2

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	66.5		52.8	13.0	mg/Kg	☼	07/03/24 10:10	07/05/24 11:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cation Exchange Capacity (SW846 9081)	31.1		0.623	0.623	meq/100gm	☼	07/19/24 18:45	07/25/24 09:28	1

Client Sample ID: MW-34S-9-11'
Lab Sample ID: 860-77314-2
Date Collected: 06/06/24 09:30
Matrix: Solid
Date Received: 06/28/24 09:25
Percent Solids: 76.7

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	135		57.2	14.1	mg/Kg	☼	07/03/24 10:10	07/05/24 11:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cation Exchange Capacity (SW846 9081)	37.0		0.652	0.652	meq/100gm	☼	07/19/24 18:45	07/25/24 09:28	1

Client Sample ID: MW-34S-9-11'
Lab Sample ID: 860-77314-3
Date Collected: 06/04/24 10:00
Matrix: Solid
Date Received: 06/28/24 09:25
Percent Solids: 80.1

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	56.8		54.8	13.5	mg/Kg	☼	07/05/24 09:18	07/05/24 16:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cation Exchange Capacity (SW846 9081)	31.2		0.624	0.624	meq/100gm	☼	07/19/24 18:45	07/25/24 09:28	1

QC Sample Results

Client: Ramboll Americas Engineering Solutions
Job ID: 860-77314-1
Project/Site: Kincaid Nature & Extent CEC Analysis

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 860-169399/1-A
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169698
Prep Batch: 169399

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	12.3	U	50.0	12.3	mg/Kg		07/03/24 10:09	07/05/24 10:17	1

Lab Sample ID: LCS 860-169399/2-A
Client Sample ID: Lab Control Sample
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169698
Prep Batch: 169399

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sodium	2500	2300		mg/Kg		92	80 - 120

Lab Sample ID: LCSD 860-169399/3-A
Client Sample ID: Lab Control Sample Dup
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169698
Prep Batch: 169399

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sodium	2500	2300		mg/Kg		92	80 - 120	0	20

Lab Sample ID: MB 860-169667/1-A
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169979
Prep Batch: 169667

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	12.3	U	50.0	12.3	mg/Kg		07/05/24 09:18	07/05/24 15:59	1

Lab Sample ID: LCS 860-169667/2-A
Client Sample ID: Lab Control Sample
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169979
Prep Batch: 169667

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sodium	2500	2340		mg/Kg		94	80 - 120

Lab Sample ID: LCSD 860-169667/3-A
Client Sample ID: Lab Control Sample Dup
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 169979
Prep Batch: 169667

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sodium	2500	2330		mg/Kg		93	80 - 120	0	20

Method: 9081 - Cation Exchange Capacity (CEC)

Lab Sample ID: MB 860-171441/1-A
Client Sample ID: Method Blank
Matrix: Solid
Prep Type: Total/NA
Analysis Batch: 177527
Prep Batch: 171441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cation Exchange Capacity	0.500	U	0.500	0.500	meq/100gm		07/19/24 18:45	07/25/24 09:28	1

Metals

Prep Batch: 169399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-1	MW-33S-9-11'	Total/NA	Solid	3051A	
860-77314-2	MW-34S-9-11'	Total/NA	Solid	3051A	
MB 860-169399/1-A	Method Blank	Total/NA	Solid	3051A	
LCS 860-169399/2-A	Lab Control Sample	Total/NA	Solid	3051A	
LCSD 860-169399/3-A	Lab Control Sample Dup	Total/NA	Solid	3051A	

Prep Batch: 169667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-3	MW-34S-9-11'	Total/NA	Solid	3051A	
MB 860-169667/1-A	Method Blank	Total/NA	Solid	3051A	
LCS 860-169667/2-A	Lab Control Sample	Total/NA	Solid	3051A	
LCSD 860-169667/3-A	Lab Control Sample Dup	Total/NA	Solid	3051A	

Analysis Batch: 169698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-1	MW-33S-9-11'	Total/NA	Solid	6010D	169399
860-77314-2	MW-34S-9-11'	Total/NA	Solid	6010D	169399
MB 860-169399/1-A	Method Blank	Total/NA	Solid	6010D	169399
LCS 860-169399/2-A	Lab Control Sample	Total/NA	Solid	6010D	169399
LCSD 860-169399/3-A	Lab Control Sample Dup	Total/NA	Solid	6010D	169399

Analysis Batch: 169979

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-3	MW-34S-9-11'	Total/NA	Solid	6010D	169667
MB 860-169667/1-A	Method Blank	Total/NA	Solid	6010D	169667
LCS 860-169667/2-A	Lab Control Sample	Total/NA	Solid	6010D	169667
LCSD 860-169667/3-A	Lab Control Sample Dup	Total/NA	Solid	6010D	169667

General Chemistry

Analysis Batch: 169205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-1	MW-33S-9-11'	Total/NA	Solid	Moisture	
860-77314-2	MW-34S-9-11'	Total/NA	Solid	Moisture	
860-77314-3	MW-34S-9-11'	Total/NA	Solid	Moisture	
MB 860-169205/1	Method Blank	Total/NA	Solid	Moisture	

Prep Batch: 171441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-1	MW-33S-9-11'	Total/NA	Solid	9081	
860-77314-2	MW-34S-9-11'	Total/NA	Solid	9081	
860-77314-3	MW-34S-9-11'	Total/NA	Solid	9081	
MB 860-171441/1-A	Method Blank	Total/NA	Solid	9081	

Analysis Batch: 177527

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
860-77314-1	MW-33S-9-11'	Total/NA	Solid	9081	171441
860-77314-2	MW-34S-9-11'	Total/NA	Solid	9081	171441
860-77314-3	MW-34S-9-11'	Total/NA	Solid	9081	171441
MB 860-171441/1-A	Method Blank	Total/NA	Solid	9081	171441

Client Sample ID: MW-33S-9-11' | **Lab Sample ID: 860-77314-1**
Date Collected: 06/03/24 14:00 | **Matrix: Solid**
Date Received: 06/28/24 09:25

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			169205	07/02/24 09:53	JC	EET HOU

Client Sample ID: MW-33S-9-11' | **Lab Sample ID: 860-77314-1**
Date Collected: 06/03/24 14:00 | **Matrix: Solid**
Date Received: 06/28/24 09:25 | **Percent Solids: 80.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			.59 g	50 mL	169399	07/03/24 10:10	PB	EET HOU
Total/NA	Analysis	6010D		1			169698	07/05/24 11:00	JDM	EET HOU
Total/NA	Prep	9081			2.51 g	50 mL	171441	07/19/24 18:45	PB	EET HOU
Total/NA	Analysis	9081		1			177527	07/25/24 09:28	JDM	EET HOU

Client Sample ID: MW-34S-9-11' | **Lab Sample ID: 860-77314-2**
Date Collected: 06/06/24 09:30 | **Matrix: Solid**
Date Received: 06/28/24 09:25

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			169205	07/02/24 09:53	JC	EET HOU

Client Sample ID: MW-34S-9-11' | **Lab Sample ID: 860-77314-2**
Date Collected: 06/06/24 09:30 | **Matrix: Solid**
Date Received: 06/28/24 09:25 | **Percent Solids: 76.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			.57 g	50 mL	169399	07/03/24 10:10	PB	EET HOU
Total/NA	Analysis	6010D		1			169698	07/05/24 11:02	JDM	EET HOU
Total/NA	Prep	9081			2.56 g	50 mL	171441	07/19/24 18:45	PB	EET HOU
Total/NA	Analysis	9081		1			177527	07/25/24 09:28	JDM	EET HOU

Client Sample ID: MW-34S-9-11' | **Lab Sample ID: 860-77314-3**
Date Collected: 06/04/24 10:00 | **Matrix: Solid**
Date Received: 06/28/24 09:25

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			169205	07/02/24 09:53	JC	EET HOU

Client Sample ID: MW-34S-9-11' | **Lab Sample ID: 860-77314-3**
Date Collected: 06/04/24 10:00 | **Matrix: Solid**
Date Received: 06/28/24 09:25 | **Percent Solids: 80.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3051A			.57 g	50 mL	169667	07/05/24 09:18	PB	EET HOU
Total/NA	Analysis	6010D		1			169979	07/05/24 16:28	JDM	EET HOU
Total/NA	Prep	9081			2.53 g	50 mL	171441	07/19/24 18:45	PB	EET HOU
Total/NA	Analysis	9081		1			177527	07/25/24 09:28	JDM	EET HOU

Lab Chronicle

Client: Ramboll Americas Engineering Solutions
Job ID: 860-77314-1
Project/Site: Kincaid Nature & Extent CEC Analysis

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

Accreditation/Certification Summary

Client: Ramboll Americas Engineering Solutions   Job ID: 860-77314-1
Project/Site: Kincaid Nature & Extent CEC Analysis

Laboratory: Eurofins Houston

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	88-00759	08-03-24
Florida	NELAP	E871002	06-30-25
Louisiana (All)	NELAP	03054	06-30-25
Oklahoma	NELAP	1306	08-31-24
Oklahoma	State	2023-139	08-31-24
Texas	NELAP	T104704215	06-30-25
Texas	TCEQ Water Supply	T104704215	12-28-25
USDA	US Federal Programs	525-23-79-79507	03-20-26

Method Summary

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET HOU
9081	Cation Exchange Capacity (CEC)	SW846	EET HOU
Moisture	Percent Moisture	EPA	EET HOU
3051A	Preparation, Metals, Microwave Assisted	SW846	EET HOU
9081	Cation Exchange Capacity (CEC)	SW846	EET HOU

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

Sample Summary

Client: Ramboll Americas Engineering Solutions
Project/Site: Kincaid Nature & Extent CEC Analysis

Job ID: 860-77314-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
860-77314-1	MW-33S-9-11'	Solid	06/03/24 14:00	06/28/24 09:25
860-77314-2	MW-34S-9-11'	Solid	06/06/24 09:30	06/28/24 09:25
860-77314-3	MW-34S-9-11'	Solid	06/04/24 10:00	06/28/24 09:25

Eurofins Houston
4145 Greenbriar Dr
Stafford, TX 77477
Phone (281) 240-4200

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Michael Davis	Lab PM: Sachin Kudchadkar	Carrier Tracking No(s):
Client Contact: Michael Davis	Phone: 708-415-7367	E-Mail: mdavis@ramboll.com	State of Origin: IL
Company: Ramboll Americas Engineering Solutions	PWSID:		COC No: 860-9401-3272.1
Address: 333 W Wacker Dr Suite 1050	Due Date Requested:		Page: Page
City: Chicago	TAT Requested (days): Standard		Job #:
State, Zip: IL 60606	Compliance Project: Δ Yes Δ No		
Phone: 708-415-7367	PO #:		
Email: mdavis@ramboll.com	WO #:		
Project Name: KINCAID Nature + Extent	Project #: 19401082 10		
Site: Kincaid power plant	SSOW#:		

Analysis Requested

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)	[redacted]	9081 Cation Exchange Capacity	moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	N	X	
MW-33s_9-11'	6/3/24	1400	G	S			X	X	1	
~~MW-33s_14-15'~~	~~6/3/24~~	~~1410~~								
MW-34s_9-11'	6/6/24	0930	↓	↓			X	X	1	
MW-34s_9-11'	6/4/24	1000	↓	↓			X	X	1	

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 (circled); O AsNaO2; P Na2O4S; Q Na2SO3; R Na2S2O3; S H2SO4; T TSP Dodecahydrate; U Acetone; V MCAA; W pH 4-5; Z other (specify)
Other:

860-77314 Chain of Custody

Temp 27 IR ID:HOU-368
C/F +0.2
Corrected Temp: 28

Water

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I II III IV Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☒ Archive For 1 Months

Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:	
Relinquished by: [signature]	Date/Time: 6/25/24 1400	Company: Ramboll	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 6/28/24 923	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.		Cooler Temperature(s) °C and Other Remarks:	

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Ramboll Americas Engineering Solutions

Job Number: 860-77314-1

Login Number: 77314

List Source: Eurofins Houston

List Number: 1

Creator: Jimenez, Nicanor

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: Ramboll Americas Engineering Solutions | Job Number: 860-77314-1

Login Number: 77314 | **List Source: Eurofins Houston**

List Number: 2

Creator: Jimenez, Nicanor

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.		
The cooler's custody seal, if present, is intact.		
Sample custody seals, if present, are intact.		
The cooler or samples do not appear to have been compromised or tampered with.		
Samples were received on ice.		
Cooler Temperature is acceptable.		
Cooler Temperature is recorded.		
COC is present.		
COC is filled out in ink and legible.		
COC is filled out with all pertinent information.		
Is the Field Sampler's name present on COC?		
There are no discrepancies between the containers received and the COC.		
Samples are received within Holding Time (excluding tests with immediate HTs)		
Sample containers have legible labels.		
Containers are not broken or leaking.		
Sample collection date/times are provided.		
Appropriate sample containers are used.		
Sample bottles are completely filled.		
Sample Preservation Verified.		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").		
Multiphasic samples are not present.		
Samples do not require splitting or compositing.		
Residual Chlorine Checked.		

Report for:

Michael Davis
Ramboll Americas Engineering Solutions, Inc
333 W. Wacker Drive, Suite 2700
Chicago, IL 60606

Regarding: Eurofins J3 Resources, Inc.
Project: 1940108210; 1940009336
EML ID: 3695124

Approved by:

Business Unit Manager
Scott Ward

Dates of Analysis:
Misc. sub-contracted analysis: 08-26-2024

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested.

eurofins

Built Environment Testing

For:
Michael Davis
Ramboll Americas Engineering Solutions, Inc.
333 W. Wacker Dr., Suite 1050
Chicago, IL 60606

RE:
Eurofins Built Environment Testing – Pasadena, Texas
XRD Mineral Characterization of Drill Core by Full and Clay Mineral Scans
Project ID: Kincaid Nature & Extent
Project #: 1940108210
PO #: 1940009336
EMLab ID: 3695124

Approved By:

Scott M. Ward, Ph.D.

Analyst: Carlos Duane Salinas

Eurofins Built Environment Testing (EBET) is an analytical laboratory accredited for the analysis of asbestos in air and bulk samples by X-Ray Powder Diffraction (XRD), Analytical Transmission Electron Microscopy (ATEM), and Polarized Light Microscopy (PLM) by the National Voluntary Laboratory Accreditation Program (NVLAP) {Lab Code 200525 (Houston) and Lab Code 600120 (Pasadena)}, and the American Industrial Hygiene Association Lab Code 157714 (Pasadena)}.

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. The results relate only to the samples as received and tested. The results include an inherent uncertainty of measurement associated with estimating percentages by the analytical method utilized.

Eurofins Built Environement Testing located in Pasadena, TX, a member of the Eurofins Built Environment Testing group of companies, shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor

Built Environment Testing

Report: 3695124

Mineralogy of Drill Core Samples
XRD (Full and Clay Mineral) Analysis
Project Name: Kincaid Nature & Extent
Project #: 1940108210

For:

Michael Davis
Ramboll Americas Engineering Solutions, Inc.
333 W. Wacker Dr., Suite 1050
Chicago, IL 60606

By:

Carlos Duane Salinas
Technical Expert
Eurofins Built Environmental Testing
3113 Red Bluff Road
Pasadena, Texas 77503

August 23, 2024

eurofins | Built Environment Testing

August 23, 2024

Michael Davis
Ramboll Americas Engineering Solutions, Inc.
333 W/ Wacker Dr., Suite 1050
Chicago, IL 60606

Dear Michael,

Eurofins Built Environmental Testing (EBET) is an analytical laboratory accredited for the analysis of asbestos in air and bulk samples by X-Ray Powder Diffraction (XRD), Analytical Transmission Electron Microscopy (ATEM), and Polarized Light Microscopy (PLM) by the National Voluntary Laboratory Accreditation Program (NVLAP) {Lab Code 200525 (Houston) and Lab Code 600120 (Pasadena)}, and the American Industrial Hygiene Association Laboratory Accreditation Program (AIHA-LAP,LLC) {Lab Code 157714 (Pasadena)}.

EBET received four (4) samples on June 28, 2024, to determine their mineralogy by X-Ray Powder Diffraction (XRD). The samples were orange-tan soils consisting mostly of clay, silt, sand and pebbles. The samples were contained in eight individually labeled 8 oz wide mouth glass jars. The chain of custody matched the labeled sample ID's as follows:

Client Sample Number	EMLab ID Number
MW-33s_9-11'	3695124-1
MW-33s_14-15'	3695124-2
MW-34s_9-11'	3695124-3
MW-35s_9-11'	3695124-4

EBET prepped and analyzed the samples using X-Ray Powder Diffraction.

3695124 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. EBET will not discuss any part of this study with personnel other than those authorized by the client. The results described in this report only apply to the samples analyzed. This report shall not be reproduced except in full, without written approval from EBET. The samples will be kept in our secure storage facility for a minimum of three (3) months from the report date.

eurofins | Built Environment Testing

Full Mineral Scan Sample Preparation

A representative grab sample of the soil was dried overnight at 110 degrees Celsius in our drying oven. The dried sample was then crushed using a large mortar and pestle. The crushed sample was coned and quartered to acquire a representative sample to be further prepared. This sample was ground and homogenized by hand using a mortar and pestle, and then passed through a No. 35 Tyler Mesh (500 um) sieve. The sieved sample was then milled in a McCrone XRD Micro Mill for 15 minutes, utilizing agate grinding elements to produce a powder that was prepped and scanned in our Cubix3/Panalytical XRD using a mineral scan program.

Clay Mineral Scan Sample Preparation

A representative grab sample of the soil was collected and placed into a 100 ml plastic screw-cap container, filled with DI water and then shaken and wet sieved through a No. 400 Tyler Mesh (38 um) sieve. The <38 um material was collected in a 150 ml Pyrex beaker and placed into our drying oven overnight at a temperature of 110 degrees Celsius. The dried sample was then crushed by hand using a ceramic mortar and pestle to produce a powder that was prepped and scanned in our Cubix3/Panalytical XRD using a mineral scan program.

The results of this study can be found in the attached document. If you should have any questions about this report, please feel free to call us at 713-290-0223.

Sincerely,

Carlos Duane Salinas
Technical Expert
EBET – Pasadena, Texas

Mineralogy Report – August 2024.

This report was prepared at the request of Carlos Salinas, Technical Expert at Eurofins Built Environment Testing

I. Quantitative XRD analysis of powder samples

Table 1 - Scans of the following samples were evaluated.

Sample ID	
5124C-1~1	Drill Core Sample
5124C-2~1	Drill Core Sample
5124C-3~1	Drill Core Sample
5124C-4~1	Drill Core Sample
5124-1FM~1	Drill Core Sample
5124-2FM~1	Drill Core Sample
5124-3FM~1	Drill Core Sample
5124-4FM~1	Drill Core Sample

For QXRD analysis the software High score plus version 2.0.1 available from Malvern Panalytical was used.

II. Instrument and measurement conditions

Cubix3/PANalytical

Instrument settings:
Tube: Ceramic Cu long fine focus
Radiation: Copper (Cu)
Diffractometer radius: 200mm
Sample stage: Sample spinner stage

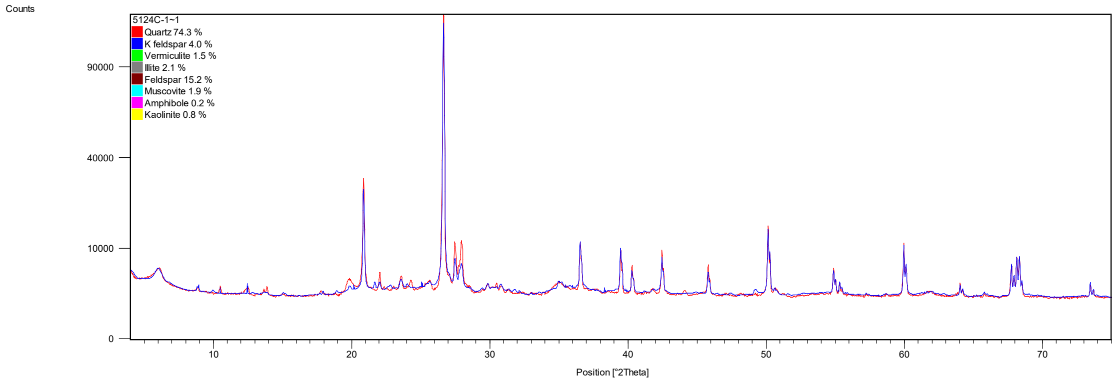
Incident optics:
BBHD
Divergence slit: Fixed 1/2 °
Soller slit: 0.04 radians
Mask: 10mm
Anti scatter slit: Fixed 2°

Diffracted optics:
Soller slit: 0.04 radians
Filter: Not present
Anti scatter slit: Fixed 5.5°
Detector: X'Celerator

Measurement conditions:
Applied power: 45KV, 40mA
Scan range: 4-75º 2Theta
Step size 0,016 º 2Theta
Time per step: 4.82sec
Scan type: continuous

III. QXRD analysis of Drill core samples:

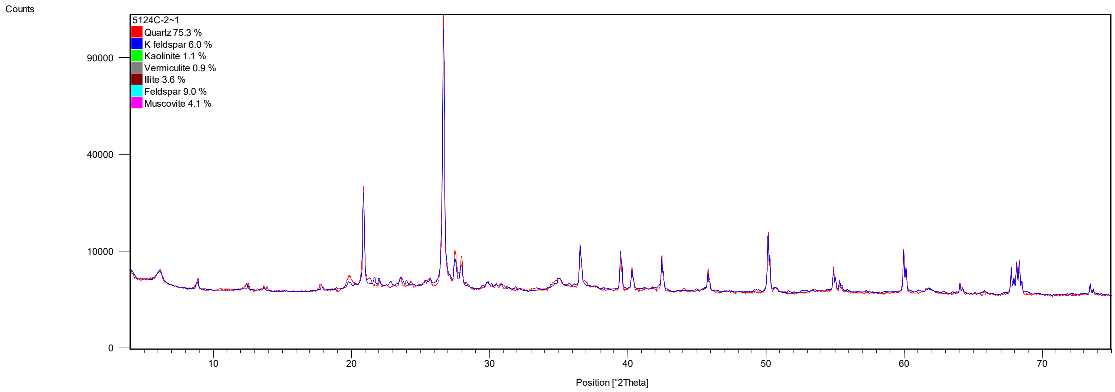
1) Sample 5124C-1~1



Phase	Formula	%
Quartz	SiO_2	74.3
Feldspar	(Na,Ca)(Si,Al)4O8	15.2
K-feldspar	KAlSi3O8	4
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	4
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	1.5
Kaolinite	Al2Si2O5(OH)4	0.8
Amphibole	Ca2(Mg,Fe++)5Si8O22(OH)2	0.2

Figure 1 – Results of X-ray diffraction - 5124-1C~1

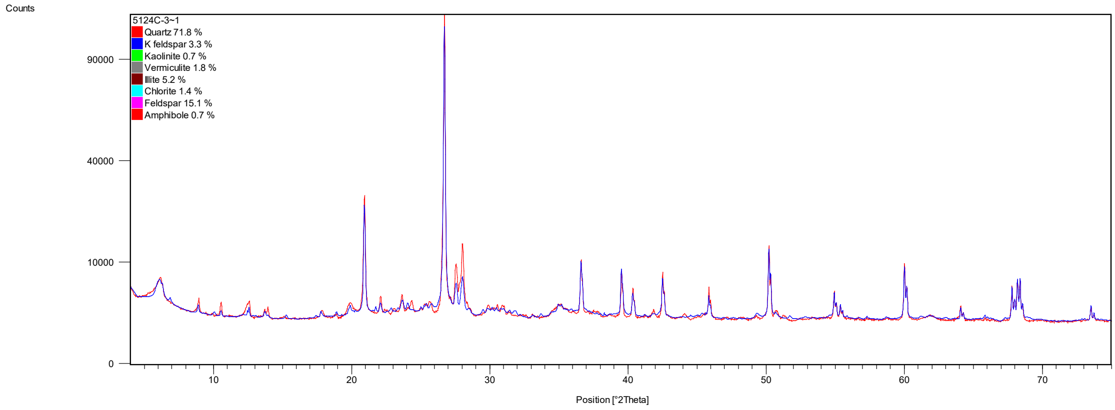
2) Sample 5124C-2~1



Phase	Formula	%
Quartz	SiO2	75.3
Feldspar	(Na,Ca)(Si,Al)4O8	9
K-feldspar	KAlSi3O8	6
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	7.7
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	0.9
Kaolinite	Al2Si2O5(OH)4	1.1

Figure 2 – Results of X-ray diffraction - 5124C-2~1

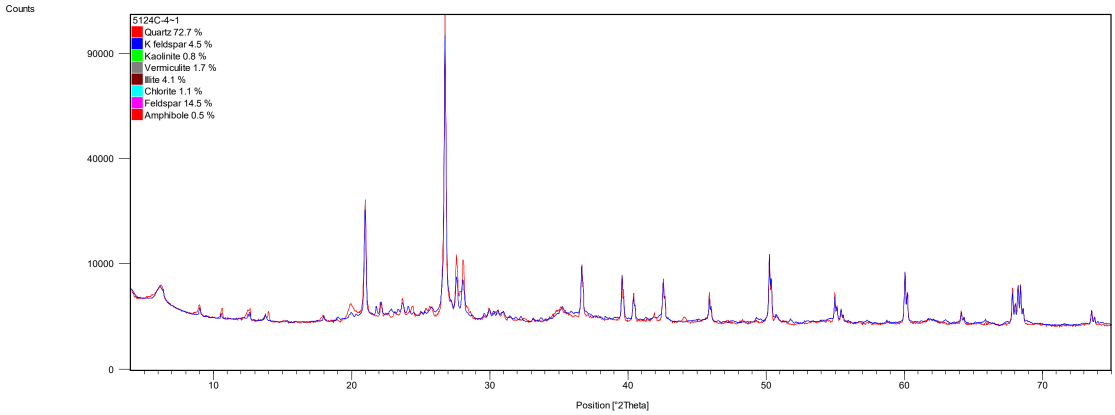
3) Sample 5124C-3~1



Phase	Formula	%
Quartz	SiO2	71.8
Feldspar	(Na,Ca)(Si,Al)4O8	15.1
K-feldspar	KAlSi3O8	3.3
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	5.2
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	3.2
Kaolinite	Al2Si2O5(OH)4	0.7
Amphibole	Ca2(Mg,Fe++)5Si8O22(OH)2	0.7

Figure 3 – Results of X-ray diffraction - 5124C-3~1

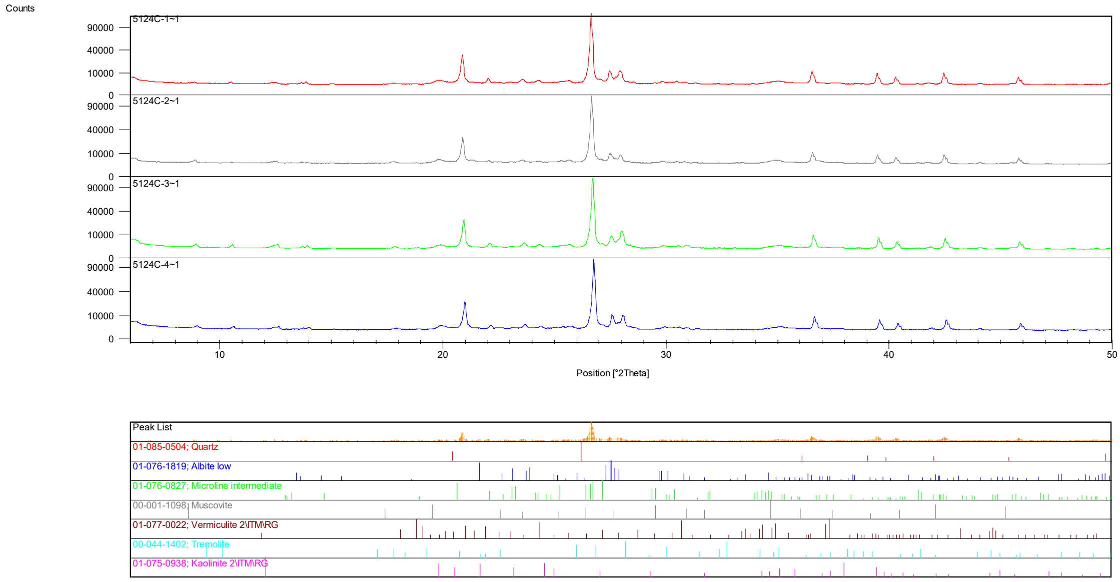
4) Sample 5124C-4~1



Phase	Formula	%
Quartz	SiO2	72.7
Feldspar	(Na,Ca)(Si,Al)4O8	14.5
K-feldspar	KAlSi3O8	4.5
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	4.1
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	2.8
Kaolinite	Al2Si2O5(OH)4	0.8
Amphibole	Ca2(Mg,Fe++)5Si8O22(OH)2	0.5

Figure 4 – Results of X-ray diffraction - 5124C-4~1

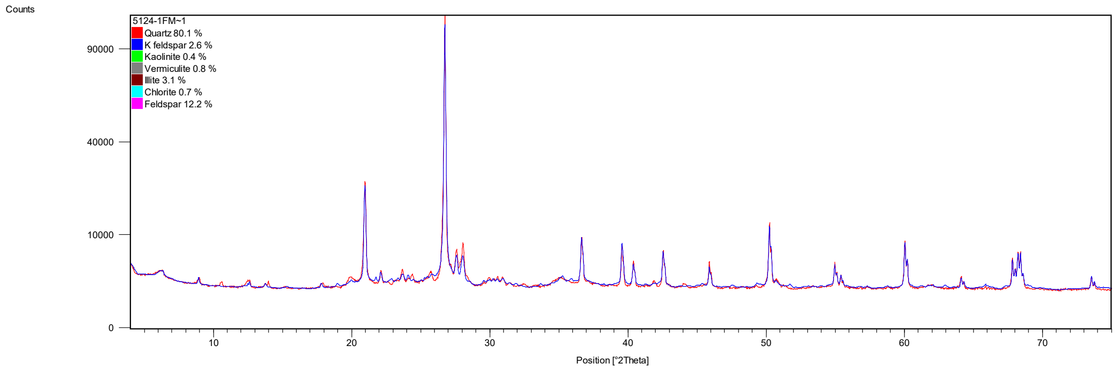
5) CM samples comparison



	Quartz	Feldspar	K-feldspar	Illite/Muscovite	Chlorite/ Vermiculite	Kaolinite	Amphibole
5124C-1~1	74.3	15.2	4	4	1.5	0.8	0.2
5124C-2~1	75.3	9	6	7.7	0.9	1.1	-
5124C-3~1	71.8	15.1	3.3	5.2	3.2	0.7	0.7
5124C-4~1	72.7	14.5	4.5	4.1	2.8	0.8	0.5

Figure 5 - The comparison of the x-ray diffraction (XRD) results

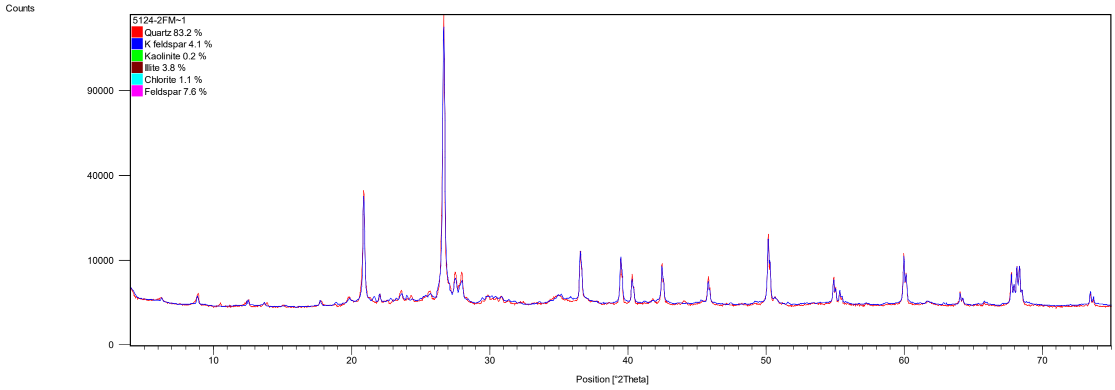
6) Sample 5124-1FM~1



Phase	Formula	%
Quartz	SiO2	80.1
Feldspar	(Na,Ca)(Si,Al)4O8	12.2
K-feldspar	KAlSi3O8	2.6
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	3.1
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	1.5
Kaolinite	Al2Si2O5(OH)4	0.4

Figure 1 – Results of X-ray diffraction - 5124-1FM~1

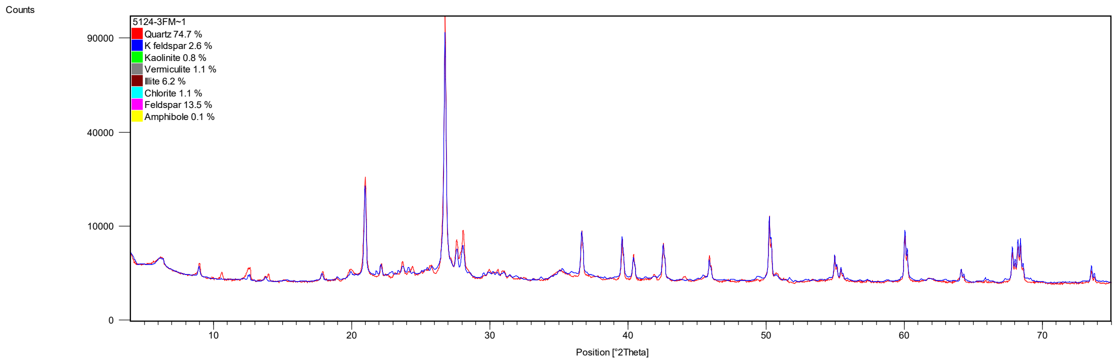
7) Sample 5124-2FM~1



Phase	Formula	%
Quartz	SiO2	83.2
Feldspar	(Na,Ca)(Si,Al)4O8	7.6
K-feldspar	KAlSi3O8	4.1
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	3.8
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	1.1
Kaolinite	Al2Si2O5(OH)4	0.2

Figure 2 – Results of X-ray diffraction - 5124-2FM~1

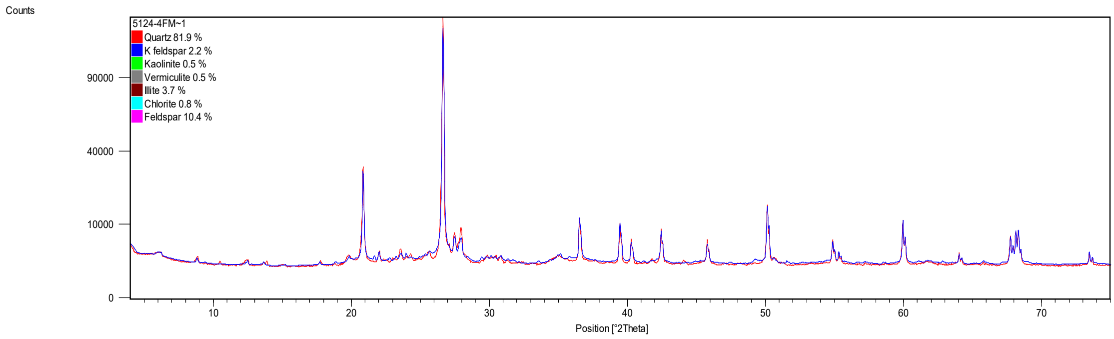
8) Sample 5124-3FM~1



Phase	Formula	%
Quartz	SiO_2	74.7
Feldspar	$(Na,Ca)(Si,Al)_4O_8$	13.5
K-feldspar	$KAlSi_3O_8$	2.6
Illite/Muscovite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)$	6.2
Chlorite/Vermiculite	$(Mg,Fe)_5Al(Si_3Al)O_{10}(OH)_8$	2.2
Kaolinite	$Al_2Si_2O_5(OH)_4$	0.8
Amphibole	$Ca_2(Mg,Fe^{++})_5Si_8O_{22}(OH)_2$	0.1

Figure 3 – Results of X-ray diffraction - 5124-3FM~1

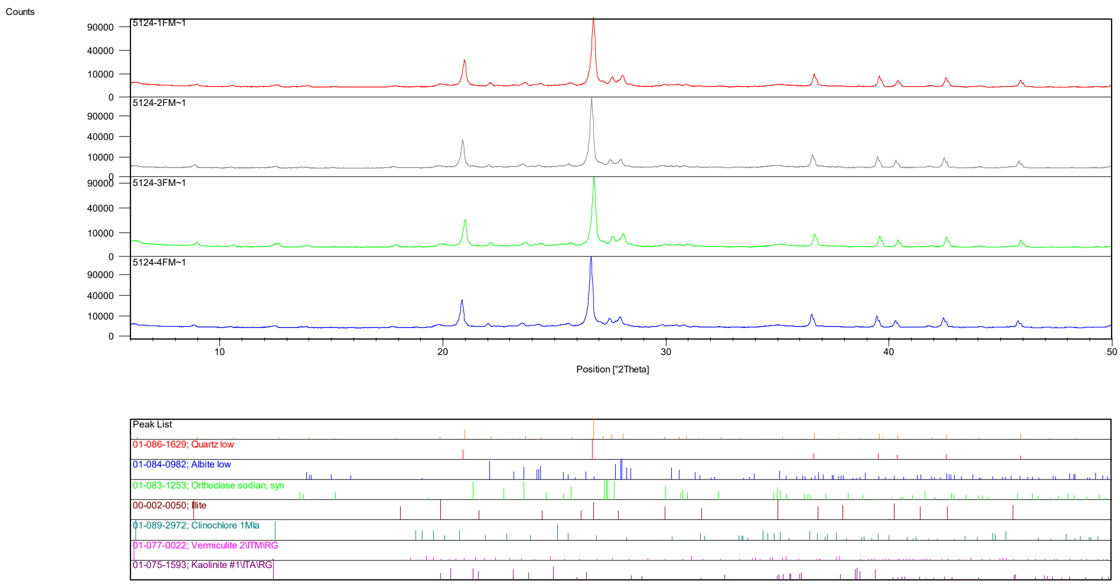
9) Sample 5124-4FM~1



Phase	Formula	%
Quartz	SiO2	81.9
Feldspar	(Na,Ca)(Si,Al)4O8	10.4
K-feldspar	KAlSi3O8	2.2
Illite/Muscovite	(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,(H2O)	3.7
Chlorite/Vermiculite	(Mg,Fe)5Al(Si3Al)O10(OH)8	1.3
Kaolinite	Al2Si2O5(OH)4	0.5

Figure 4 – Results of X-ray diffraction - 5124-4FM~1

10) FM samples comparison



	Quartz	Feldspar	K-feldspar	Illite/Muscovite	Chlorite/ Vermiculite	Kaolinite	Amphibole
5124-1FM~1	80.1	12.2	2.6	3.1	1.5	0.4	-
5124-2FM~1	83.2	7.6	4.1	3.8	1.1	0.2	-
5124-3FM~1	74.7	13.5	2.6	6.2	2.2	0.8	0.1
5124-4FM~1	81.9	10.4	2.2	3.7	1.3	0.5	-

Figure 5 - The comparison of the x-ray diffraction (XRD) results

IV. Comments

The samples have similar mineralogy, with differences in their proportions, composed mainly of quartz, feldspar, illite, muscovite, vermiculite, chlorite, kaolinite and amphibole.
It is necessary to validate the quantification by XRD with other techniques, preferably chemical analysis. The orientation of clay mineral particles affects the XRD intensities of powdered samples. Clay mineral particles exhibit platy characteristics, and some preparation methods can often produce preferred orientation of clay minerals.

Elaborated by:
Angela Nair Avelar
PhD, Geologist - Applied Mineralogy and Development Process

Márcia Mika Saito
MSC, Geologist – Geometallurgical and Applied Mineralogy

Appendix E

Groundwater Polishing Evaluation Report

GROUNDWATER POLISHING EVALUATION REPORT

KINCAID ASH POND

May 08, 2025

Submitted to:

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

Submitted by:

Life Cycle Geo, LLC
729 Main Street
Longmont, Colorado 80501

23RAM01-1

EXECUTIVE SUMMARY

This document has been prepared as an attachment to the Corrective Actions Alternative Analysis (CAAA) prepared by Gradient for Kincaid Power Plant, Kincaid Ash Pond (KIN AP). The constituents of concern (COCs) addressed in this document are boron, sulfate, and total dissolved solids (TDS), which have been identified as having exceedances[1] of the site-specific groundwater protection standards (GWPS) at the time of this analysis. Natural geochemical processes may be appropriate as a “polishing step” for residual plume management after effective source control implementation, if there are no risks to receptors and/or the contaminant plume is not expanding (United States Environmental Protection Agency [USEPA] 1999; USEPA 2015). Source control is a major component of every corrective action considered in the CAAA, and there are no risks to human health or the environment at KIN AP.

Natural groundwater polishing processes, which include both physical and chemical mechanisms, reduce the concentrations of COCs in groundwater. After source control is implemented, a geochemical trailing gradient may form in the subsurface as conditions undergo a return to background water quality which could affect chemical groundwater polishing mechanisms (Savannah River National Laboratory, 2011). This report supports groundwater polishing as a component of the proposed corrective action by evaluating the contribution of chemical mechanisms to groundwater polishing under current conditions and after source control implementation. The groundwater flow and transport model estimated the time to reach the GWPS based on hydraulic properties of the aquifer. The results of this groundwater polishing evaluation contextualizes these estimates by evaluating the potential for attenuation of COCs and for previously attenuated COCs to be remobilized to groundwater as groundwater quality returns to background conditions.

Groundwater polishing mechanisms were assessed using speciation and reaction geochemical models: speciation models assess the distribution of chemical constituents between solid and aqueous phases, and reaction models evaluate how that distribution may change in response to changing site conditions (USEPA 2015). Inputs to the model include geochemically reactive solid mineral phases, compliance well groundwater composition, and background groundwater composition based on site-specific data.

[1] Throughout this document, “exceedance” or “exceedances” is intended to refer only to potential exceedances of proposed applicable background statistics or groundwater protection standards (GWPSs) as described in the proposed groundwater monitoring program which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC’s operating permit application for the Ash Pond. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and therefore Kincaid Generation, LLC has not identified any actual exceedances.

TABLE OF CONTENTS

TABLES

FIGURES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

BCU	Bedrock Confining Unit
CAAA	Corrective Actions Alternative Analysis
CCR	Coal combustion residuals
COCs	Constituents of concern
GCSM	Geochemical conceptual site model
GWPS	Groundwater protection standards
I.A.C.	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
KIN AP	Kincaid Ash Pond
LCU	Lower Confining Unit
PMP	Potential migration pathways
Redox	Oxidation and reduction
SEP	Sequential extraction
S.U.	Standard units
TDS	Total dissolved solids
UA	Uppermost Aquifer
USCU	Upper Semi-Confining Aquifer
USEPA	United States Environmental Agency

1 INTRODUCTION

This document has been prepared as an attachment to the Corrective Actions Alternatives Analysis (CAAA) prepared by Gradient for Kincaid Power Plant, Kincaid Ash Pond Unit 141. The purpose of the CAAA is to holistically evaluate potentially viable corrective actions to remediate groundwater and achieve compliance with GWPS for all monitored parameters under Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600. The constituents of concern (COCs) addressed in this document are boron, sulfate, and total dissolved solids (TDS)[2], which have been identified as having exceedances of the site-specific groundwater protection standards (GWPS) at the time of this analysis. In the CAAA, all corrective actions considered consist of source control and residual plume management. Natural geochemical processes may be appropriate as a "polishing step" for residual plume management after effective source control implementation, if there are no risks to receptors and/or the contaminant plume is not expanding (United States Environmental Protection Agency [USEPA] 1999; USEPA 2015). Source control is a major component of every corrective action considered in the CAAA, and there are no risks to human health or the environment at the KIN AP[3].

Groundwater polishing processes include both physical and chemical mechanisms within the subsurface which reduce the concentrations of COCs in the groundwater. Physical components of groundwater polishing, including advection, dilution, and dispersion, are assessed by groundwater flow and transport modeling (Groundwater Modeling Technical Memorandum[4]). Chemical mechanisms of groundwater polishing include sorption and mineral precipitation. After source control is implemented, a geochemical trailing gradient may form in the subsurface as conditions undergo a return to background water quality which could affect chemical groundwater polishing mechanisms (Savannah River National Laboratory [SRNL], 2011). The chemical components of groundwater polishing at the KIN AP are evaluated herein using a geochemical modeling-based approach informed by site-specific data. This report uses geochemical modeling to evaluate the contribution of chemical mechanisms on groundwater polishing under current conditions and after source control implementation.

The groundwater flow and transport model (Groundwater Modeling Technical Memorandum[5]) estimated the time for boron (as a conservative tracer) to reach the GWPS under different potential corrective actions based on physical components of groundwater polishing and did not incorporate any potential chemical controls on long-term parameter distribution. This geochemical modeling effort supports the assessment of groundwater polishing as a component of the proposed corrective action by evaluating the potential for chemical attenuation of COCs before and after source control as a means of contextualizing the times estimated in the flow and transport model. This analysis also provides an initial foundation for understanding groundwater chemistry to inform adaptive site management as a key component of the Corrective Action Groundwater Monitoring Plan[6].

---

[2] TDS measurements represent the total mass of dissolved constituents in a sample rather than a single chemical behavior. Because sulfate is the dominant contributor to TDS, results for sulfate in this analysis also apply to TDS.
[3] The Human Health and Ecological Risk Assessment serves as Appendix A of the CAAA to which this report is attached.
[4] The Groundwater Modeling Technical Memorandum serves as Appendix A of the Corrective Action Supporting Information Report; the Corrective Action Supporting Information Report serves as Appendix B of the CAAA to which this report is attached.
[5] Ibid.
[6] The Corrective Action Groundwater Monitoring Program serves as Appendix B to the Corrective Action Plan.

Results from the speciation modeling show that a substantial proportion of boron and sulfate are retained on the solid phase under current conditions. Reaction modeling results indicate that substantial remobilization of COCs back to the groundwater phase is unlikely as conditions return to background. Simulations show a minor increase in adsorbent mineral masses is possible and solid sorbing phases are anticipated to be stable. Notably the precipitation of barite is also simulated, which provides a further sink for sulfate. These results suggest that the changing geochemical conditions that come with the “return to background”, such as a more oxidized redox condition, are overall unlikely to cause the estimated time to reach the GWPS to increase. These results will inform corrective action groundwater monitoring and adaptive site management, critical components of every corrective action considered in the CAAA.

2 SITE BACKGROUND

2.1 SITE OVERVIEW

A thorough overview of general site characteristics is presented in Section 1 of the CAAA to which this document is attached and is briefly summarized here. The KIN AP is a 172-acre unlined surface impoundment that was constructed in 1964 and 1965 for the management of both CCR and non-CCR waste streams and has been in continuous operation since 1967 (Ramboll, 2021). The KIN AP is located within the Sangchris Lake Watershed (Hydrologic Unit Code 071300070402) and directly borders a portion of Sangchris Lake to the northwest.

A groundwater monitoring network was proposed in the Operating Permit Application (Burns and McDonnell, 2021) in accordance with 35 I.A.C. § 845.630 to monitor groundwater quality which passes the waste boundary as part of the Operating Permit Application to the Illinois Environmental Protection Agency (IEPA) for the KIN AP. The proposed groundwater monitoring network is shown in **Attachment A**. The monitoring network consists of 19 compliance monitoring wells (MW-3, MW-5, MW-6, MW-7, MW-7S, MW-8. MW-8S, MW-11 MW-12, MW-20, MW-20S, MW-23, MW-27, MW-28, MW-30, MW-31, MW-31S, MW-32) and two background wells (MW-1 and MW-2).

The geology underlying the Site in the vicinity of the AP consists of four distinct hydrostratigraphic units (Ramboll, 2021):

- **Upper Semi-confining Unit (USCU):** The USCU consists of low-permeability clay, with some silt and minor sand, silt layers, and some discontinuous lenses of sand. The higher-permeability sand lenses located within this unit have been identified as potential migration pathways (PMPs). The USCU includes the lithologic layers identified as the Cahokia Formation.
- **Uppermost Aquifer (UA):** The UA is a thin (generally less than 4 feet thick) unit comprised of moderately permeable sand, silty sand, and clayey sand and gravel. The UA includes the clays and silts of the Upper Cahokia Formation and the sands and gravels of the Lower Cahokia Formation. Groundwater flow through the UA is the primary pathway for contaminant migration at the Site.
- **Lower Confining Unit (LCU):** The LCU, which underlies the UA, is comprised of low-permeability silt and clay with minor sand, silt layers, and occasional discontinuous lenses of sand. The LCU includes the lithologic layers identified as the Vandalia Till.
- **Bedrock Confining Unit (BCU):** The BCU, which is comprised of interbedded shale and limestone of the Pennsylvanian Age Bond Formation, underlies the entire AP and acts as an aquitard due to its low hydraulic conductivity.

Groundwater within the UA migrates northwest toward Sangchris Lake. In the vicinity of the AP, groundwater within the USCU similarly appears to flow predominantly north/northwest towards the western lobe of Sangchris Lake. However, there is also a component of groundwater flow to the south and east towards the discharge flume that runs along the southern boundary of the AP, which flows into the eastern lobe of Sangchris Lake (Ramboll, 2021).

A map showing representative groundwater flow direction at the site is shown in **Attachment A**.

2.2 IDENTIFIED EXCEEDANCES OF GWPS

The following GWPS exceedances at compliance groundwater monitoring wells likely attributable to the KIN AP were observed from 2023 Q2 through 2023 Q4 (Ramboll, 2024):

- Boron – Observed at monitoring wells MW-7S, MW-12, and MW-28
- Sulfate – Observed at monitoring wells MW-7S, MW-20, MW-28, and MW-32
- TDS - Observed at monitoring well MW-28

The data set for geochemical modeling was finalized after the 2023 Q4 sampling event. Groundwater at these compliance wells is representative of groundwater conditions downgradient of the unit, and samples may be referred to as downgradient groundwater.

The distribution of exceedances is described in detail in the Nature and Extent Report (Ramboll, 2024) and summarized here. Boron and sulfate are identified above the GWPS in both the UA and the PMP. Boron exceedances are found only to the west of the unit, whereas sulfate is distributed to the west, north, and east of the unit. TDS is present only in the UA to the west of the unit.

Modeling parameters with observed exceedances is appropriate to the scope of the CAAA. Modeling these parameters is conservative because these represent the most wide-spread and persistent exceedances at KIN AP. Additionally, the selected remedy will meet the performance standards of 35 I.A.C. § 845.670(d) and the Corrective Action Plan will be submitted to the Agency on or before May 12, 2025. Once implemented and completed, the selected remedy will attain the GWPSs.

2.3 GEOCHEMICAL CONCEPTUAL SITE MODEL

A Geochemical Conceptual Site Model (GCSM)[7] was developed for KIN AP to describe the geochemical processes that contribute to mobilization and attenuation of constituents in the environment under current conditions, including evaluating whether chemical interactions of COCs with aquifer solids contribute to attenuation of aqueous concentrations at compliance monitoring wells. This discussion relies on lab reports and raw data previously presented in the Nature and Extent Report submitted to IEPA on May 12, 2024 (Ramboll 2024) in accordance with 35 I.A.C. § 845.650(d)(1) and provided again in full with relevant updates presenting ongoing work as Appendix D of the CAAA to which this report is attached.

[7] The GCSM is a component of the Nature and Extent Report previously submitted to IEPA (Ramboll 2024) and provided with relevant updates as Appendix D of the CAAA to which this report is attached.

The main findings of the GCSM are summarized as follows:

- Boron and sulfate are assessed as indicators of influence from the CCR materials. Where observed in shallow groundwater at concentrations above the GWPS, concentrations of boron and sulfate are indicative of impacts by CCR porewater. The uneven distribution of sulfate in the shallow UA/PMP groundwater is attributed to the observed chemical heterogeneity in the AP porewater and physical or chemical heterogeneity along the groundwater flow path.
- Groundwater pH exerts a major control on constituent mobility and reflects a neutral and generally stable condition in the range of 6 to 7.5 S.U. independent of location, lithology, or exceedance status. The stability of pH in groundwater is an indication that groundwater is well buffered, likely due to the widespread presence of carbonate minerals in the aquifer solids which buffer pH within this range.
- Porewater oxidation and reduction potential (ORP) is generally reducing, while background groundwater ORP is more oxidized. Exceedance wells oscillate between reducing and oxidizing conditions. It appears that the groundwater measured at the exceedance wells is under some influence of the reducing condition from the CCR porewater, which may in turn have implications for the stability of attenuating mineral phases under the current (pre-closure) condition.
- The key finding from the aquifer solids assessment is that adsorptive minerals such as iron and aluminum hydroxides are present in the aquifer solids and have currently bound both boron and sulfate within the reactive fraction of the solid matrix.

The geochemical characterization data demonstrate that some degree of attenuation of the exceedance constituents by the aquifer solids has occurred in the past, most notably through adsorption to both iron and aluminum hydroxide minerals. The oxidized nature of the upgradient groundwater and the carbonate-buffered neutral pH condition of the groundwater favor the continued stability of the attenuating mineral phases.

The following section describes the application of a geochemical modeling assessment conducted to evaluate the stability of the attenuation mechanism(s) under a return to background groundwater quality conditions following source control.

3 GROUNDWATER POLISHING REMEDY EVALUATION

This groundwater polishing evaluation uses geochemical modeling to evaluate chemical attenuation of COCs under current conditions and to predict changes in attenuation at exceedance locations following source control to further assess if chemical mechanisms of groundwater polishing will contribute to the remedy achieving the GWPS in a reasonable amount of time. Speciation and reaction models are geochemical models that can be used to evaluate the potential for chemical attenuation in groundwater. Speciation models assess the distribution of constituents between groundwater and aquifer solids, and reaction models evaluate how that distribution may change with changing site conditions (USEPA 2015). The results of geochemical modeling provide insight into groundwater polishing mechanisms and additional context for the time estimated to reach the GWPS determined by the groundwater flow and transport model[8], which is based on hydraulic properties of the aquifer and does not take into account chemical interactions of boron within the hydrologic unit.

3.1 METHODS

Geochemical modeling was done in PHREEQC Version 3 (USGS 2021) using a modified MINTEQ v4 thermodynamic database (as described in relevant sections below). The geochemical modeling of groundwater polishing under current conditions and after source control is completed includes speciation and reaction modeling (USEPA 2015), as follows:

1. Speciation: To understand groundwater polishing mechanisms under current conditions, a solid phase representative of site conditions is equilibrated with current downgradient groundwater. The results of speciation modeling represent the association of COCs with the solid phase under current conditions through mechanisms such as sorption or precipitation.
2. Reaction: In the reaction modeling, the solid phase generated during the speciation modeling phase is reacted iteratively with background groundwater. These results represent the geochemical conditions expected after the source is controlled during which a trailing geochemical gradient may be created (SRNL 2011). The reactions with background groundwater assess the potential for a trailing geochemical gradient to drive changes in groundwater chemistry. Persistence of elevated groundwater COC concentrations over several reaction iterations suggests a trailing geochemical gradient may affect the time to reach the GWPS.

The equilibrium thermodynamic modeling approach used herein allows that the solid and aqueous phases reach equilibrium during each step. The primary goal of this model is to inform the assessment of groundwater polishing as an appropriate remedy for the site by evaluating dominant geochemical reactions that may occur at time scales relevant to groundwater flow, including adsorption and certain mineral dissolution/precipitation (i.e., iron and aluminum (hydr)oxides, carbonates, and some sulfates) as

[8] The Groundwater Modeling Technical Memorandum serves as Appendix A of the Corrective Action Supporting Information Report; the Corrective Action Supporting Information Report serves as Appendix B of the CAAA to which this report is attached.

identified in the GCSM[9]. The model therefore includes those parameters that are expected to contribute to those reactions (as discussed below) and does not include every constituent of the solid phase and groundwater in order to capture "the salient aspects of the system's behavior without introducing unnecessary complexity" (USEPA 2015). This model is therefore a semi-quantitative estimation of chemical behavior in the subsurface rather than a prediction of groundwater quality, consistent with USEPA guidance that geochemical modeling "is often most helpful for identifying relative changes in contaminant speciation and distribution" (USEPA 2015).

3.1.1 MODEL SET-UP

Inputs to the model include solid phase composition, downgradient groundwater composition for wells with exceedances of any COC, and background groundwater composition. The data included for model parameterization is summarized in **Table 3-1** and detailed below. The PHREEQC input file and modified MINTEQ v4 database are provided in **Attachment B**. All data used in the model and discussed below are provided in the Nature and Extent Report[10.]

3.1.1.1 Solid Phase Inputs

Iron hydroxide (ferrihydrite) and aluminum hydroxide (gibbsite) are widespread in the environment and are known to act as sorbing phases for many groundwater constituents, including boron and sulfate (Dzombak and Morel 1990; Karamalidis and Dzombak 2010). Model input concentrations for ferrihydrite and gibbsite were derived using site-specific SEP data (details provided in **Attachment C**). SEP data were available from nine solid phase samples from the UA and two solid phase samples from the USCU. Metal oxide concentrations representing the 25th percentile, median, and 75th percentile of the observed data were used to test the sensitivity of the model to the amount of sorbing phase present. Both ferrihydrite and gibbsite were allowed to dissolve or precipitate in the reaction phase of the model.

Calcite and dolomite were included as mineral phases in the model because carbonate mineral formation and dissolution are often major controls on groundwater pH (Stumm and Morgan 1996; Stackelberg et al. 2020). Calcite and dolomite are present in site aquifer solids in excess, and model input concentrations were based on site-specific XRD results. Both calcite and dolomite were allowed to dissolve or precipitate in the reaction phase of the model.

Barite (BaSO4) and gypsum (CaSO4) are minerals that contain sulfate and have the potential to form under ambient environmental conditions in a timeframe consistent with the remedial effort. These minerals therefore may affect sulfate attenuation. Neither mineral phase was observed in mineralogical results for the site; therefore, both were made available to precipitate from the aqueous solution but did not have initial concentrations provided.

---

[9] The GCSM is a component of the Nature and Extent Report previously submitted to IEPA (Ramboll 2024) and provided with relevant updates as Appendix D of the CAAA to which this report is attached.
[10] The Nature and Extent Report was previously submitted to IEPA (Ramboll 2024) and is provided [with relevant updates, if needed] as Appendix D of the CAAA to which this report is attached. The Nature and Extent report contains laboratory reports and tabulated results from solid phase analysis and tabulated results from groundwater analyses. Laboratory reports for groundwater data are provided quarterly to IEPA and posted to the facility's operating record in accordance with 35 I.A.C. § 845.800(d)(15).

3.1.1.2 Aqueous Inputs

In addition to the COCs, the following parameters are included to capture the expected attenuation and mobilization mechanisms (see **Section 2.3**):

- Temperature, pH, and redox (represented in the model as "pe"[11])
- Major ions: Carbonate and bicarbonate alkalinity, chloride, fluoride, calcium, magnesium, potassium, and sodium
- Oxyanions: Silicon and phosphate
- Redox-active metals: Aluminum, iron, and manganese
- Remaining constituents regulated under 35 I.A.C. § 845.600[12]

This full suite of geochemical parameters for this model was measured in Quarter 2 and Quarter 3, 2023. The median of each respective result was used in the model to represent average groundwater interacting with the solid phase. For downgradient wells with exceedances of the COCs (**Section 2.2**), the median for each parameter was calculated for each location individually. For background wells, a single median for each parameter was calculated using data from both background locations (see **Section 2.1**).

3.2 RESULTS AND DISCUSSION

Modeling outputs are presented in full in **Attachment D** and discussed below.

3.2.1 SPECIATION MODELING

Results of the speciation modeling are presented in **Figure 3-1 through Figure 3-4**. Model results indicate the majority of boron (on the order of 50 to 98 percent [%]; Figure 3-1) and a lesser proportion of sulfate (on the order of 2 to 25%; Figure 3-2) present in the aquifer is likely sorbed to the mineral surfaces and is not mobile in groundwater under current conditions. The sensitivity assessment indicated that the amount of sorbing phase modeled does influence the proportion of boron and sulfate predicted to be sorbed to the mineral surfaces. However, these results are broadly consistent with conclusions presented in the GCSM, which confirmed adsorption of both boron and sulfate has occurred in association with the oxidized mineral surfaces found in the underlying soils (based on site-specific sequential extraction results). These results in combination are interpreted to confirm that chemical attenuation has occurred at the site under the current conditions.

[11] See **Appendix C** for details.
[12] Mercury, thallium, total dissolved solids, and radium were not included in the model. Mercury reactions within the environment are highly complex and would require a separate modeling effort, and the high frequency of non-detect concentrations in the groundwater indicate it would not contribute to model outcomes. Thallium forms a non-reactive monovalent cation and is rarely detected in the groundwater and is therefore not expected to contribute to model outcomes. Total dissolved solids are not a chemical parameter, but rather the result of other chemical abundances taken together. Radium is not included in most thermodynamic databases.

3.2.2 REACTION MODELING

In the reaction modeling, the solid phase generated during the speciation modeling phase is reacted iteratively with background groundwater. The reaction modeling results represent the geochemical conditions expected after the source is controlled during which a trailing geochemical gradient may be created (SRNL 2011).

Table 3-2 shows the modeled mass of ferrihydrite and gibbsite during each reaction, the change in mass from the previous step, and the percent of total mass that change represents. The changes in ferrihydrite and gibbsite quantities are positive, indicating that both phases may precipitate as conditions return to background groundwater quality. However, the change during each reaction step represents less than 0.01% of the total mass available, indicating that any changes in ferrihydrite or gibbsite mass would likely be minor as conditions return to background.

Barite is predicted to precipitate based on model simulation results and would therefore additionally limit the transport of sulfate through precipitation of barium sulfate ($BaSO_4$). Barite has a low solubility and is a likely stable sink for sulfate over time, though the modeled mass of sulfate removal was relatively low in comparison to the adsorbed fraction (Figure 3-4, Attachment D). The solid phase reaction modeling results suggest that while only a minor amount of attenuation capacity (as either sorbing phases or insoluble minerals) will be added through time as conditions return to background, the attenuation that does occur is likely to be relatively stable.

The reaction model results further show both boron and sulfate attenuation by adsorption to the aquifer solids is likely to be sustained upon return to background. Boron is predicted to sorb during the initial equilibration, and while a small proportion of boron is released during the first reaction step, sorption to the solid phase is predicted to rebound during the second reaction step. Boron concentrations approach the GWPS during the first reaction and largely achieve GWPS during the second reaction step for most conditions evaluated. The sensitivity run with the highest proportion of adsorbent mass (75^{th} percentile condition) did reflect a concentration of boron above GWPS for well locations MW-12 and MW-28 (**Figure 3-1**) after the second reaction step, indicating that under some circumstances, there may be discrete areas where a residual trailing gradient is observed. These results suggest overall that the trailing gradient will not be persistent over the long-term.

Sulfate was similarly shown to adsorb during the initial equilibration, although to a lesser degree than boron. Sulfate exhibited a similar behavior to boron in that a small proportion of the sorbed mass was predicted to be released during the first reaction step, and then rebound in the second reaction step. For all conditions evaluated, sulfate concentrations are predicted to drop below the GWPS during the first reaction step, indicating the likelihood of a persistent attenuation of sulfate in all areas of the site (**Figure 3-2**) with little indicated potential for a trailing gradient.

4 CONCLUSIONS

This report evaluated the contribution of chemical mechanisms to groundwater polishing using geochemical modeling. The results of the groundwater polishing evaluation also contextualize estimates of the modeled time to reach the GWPS by evaluating potential changes in boron and sulfate attenuation as groundwater quality returns to background conditions.

Results from the speciation modeling show that a substantial proportion of boron and sulfate are retained on the solid phase under current conditions. Reaction modeling results indicate that substantial remobilization of COCs back to the groundwater phase is unlikely as conditions return to background. Simulations show a minor increase in adsorbent mineral masses is possible and solid sorbing phases are anticipated to be stable. Notably the precipitation of barite is also simulated, which provides a further sink for sulfate. These data suggest that the changing geochemical conditions that come with the “return to background”, such as a more oxidized redox condition, are overall unlikely to cause a longer observed time to reach the GWPS. These results will inform corrective action groundwater monitoring and adaptive management, critical components of every corrective action considered in the CAAA.

5 REFERENCES

Dzombak D.A. and Morel F.M.M. 1990. Surface Complexation Modeling: Hydrous Ferric Oxide. John Wiley & Sons, New York.

Burns and McDonnell. 2021. Initial Operating Permit Application, Kincaid Power Plant Ash Pond. October 2021.

Karamalidis A.K. and Dzombak D.A. 2010. Surface Complexation Modeling: Gibbsite. John Wiley & Sons, New York.

Ramboll. 2024. Nature and Extent Report – Kincaid Power Plant, Ash Pond, IEPA ID No. W0218140002-01. May 12.

Savannah River National Laboratory. 2011. The Scenarios Approach to Attenuation-Based Remedies for Inorganic and Radionuclide Contaminants. SRNL-STI-2011-00459. August.

Stackelberg P.E., Belitz K., Brown C.J., Erickson M.L., Elliot S.M., Kauffman L.J., Ransom K.M., and Reddy J.E. 2020. Machine Learning Predictions of pH in the Glacial Aquifer System, Northern USA. Groundwater, 59(3):352-368. https://doi.org/10.1111/gwat.13063

Stumm W. and Morgan J.J. 1996. Aquatic Chemistry: Chemical Equilibria and Rates in Natural Waters. Third edition. John Wiley & Sons, New York.

USEPA. 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. Office of Solid Waste and Emergency Response. Directive 9200.4-17P. April.

USEPA. 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. Office of Solid Waste and Emergency Response. Directive 9283.1-36. August.

United States Geological Survey (USGS). 2021. PHREEQC Version 3. December. https://www.usgs.gov/software/phreeqc-version-3

TABLES

Table 3-1. Summary of geochemical model inputs.

Model Component	Parameters	Data source(s)
Solid Phase	Iron (hydr)oxides, aluminum (hydr)oxides	Site-specific concentrations from sequential extraction data
	Calcite and dolomite	X-ray diffraction results
Downgradient groundwater (COC exceedance locations)	Boron, sulfate, iron, manganese, major ions[1], 845 constituents[1]	Median concentrations per well from data collected in Q2 and Q3 2023
Background groundwater		Median concentrations from representative wells using data collected in Q2 and Q3 2023

[1]See Section 3.1.1.2 for details.

Table 3-2. Response of sorbing phases.

Parameter	Hydrostratigraphic Unit	Location	Summary Type	Speciation	First Reaction			Second Reaction		
				mg/kg	mg/kg	Δ mg/kg	%	mg/kg	Δ mg/kg	%
Barite	UA	MW-12	25p	0	0.0304	0.03	NA	0.0614	0.031	101.95
			median	0	0.0302	0.03	NA	0.0608	0.031	100.91
			75p	0	0.0308	0.031	NA	0.0607	0.03	97.25
Barite	UA	MW-28	25p	0	0.0311	0.031	NA	0.0622	0.031	99.85
			median	0	0.0313	0.031	NA	0.0619	0.031	97.88
			75p	0	0.0325	0.032	NA	0.0624	0.03	92.21
Barite	UA	MW-32	25p	0	0.0307	0.031	NA	0.0618	0.031	101.22
			median	0	0.0306	0.031	NA	0.0613	0.031	100.08
			75p	0	0.0312	0.031	NA	0.0615	0.03	97.14
Barite	USCU	MW-20S	25p	0	0.0512	0.051	NA	0.101	0.05	96.79
			median	0	0.0514	0.051	NA	0.101	0.049	95.87
			75p	0	0.0516	0.052	NA	0.101	0.049	94.94
Ferrihydrite	UA	MW-12	25p	970	970	0.06	<0.01	971	0.056	<0.01
			median	1340	1340	0.064	<0.01	1340	0.055	<0.01
			75p	1640	1640	0.074	<0.01	1640	0.052	<0.01
Ferrihydrite	UA	MW-28	25p	970	970	0.058	<0.01	971	0.058	<0.01
			median	1340	1340	0.058	<0.01	1340	0.058	<0.01
			75p	1640	1640	0.058	<0.01	1640	0.058	<0.01
Ferrihydrite	UA	MW-32	25p	970	970	0.058	<0.01	971	0.058	<0.01
			median	1340	1340	0.058	<0.01	1340	0.058	<0.01
			75p	1640	1640	0.058	<0.01	1640	0.058	<0.01
Ferrihydrite	USCU	MW-20S	25p	2720	2720	0.094	<0.01	2720	0.094	<0.01
			median	3650	3650	0.094	<0.01	3650	0.094	<0.01
			75p	4630	4630	0.094	<0.01	4630	0.094	<0.01
Gibbsite	UA	MW-12	25p	806	806	0.018	<0.01	806	0.018	<0.01
			median	1760	1760	0.018	<0.01	1760	0.018	<0.01
			75p	6350	6350	0.018	<0.01	6350	0.018	<0.01
Gibbsite	UA	MW-28	25p	806	806	0.018	<0.01	806	0.018	<0.01
			median	1760	1760	0.018	<0.01	1760	0.018	<0.01
			75p	6350	6350	0.018	<0.01	6350	0.018	<0.01
Gibbsite	UA	MW-32	25p	806	806	0.018	<0.01	806	0.018	<0.01
			median	1760	1760	0.018	<0.01	1760	0.018	<0.01
			75p	6350	6350	0.018	<0.01	6350	0.018	<0.01
Gibbsite	USCU	MW-20S	25p	8340	8340	0.029	<0.01	8340	0.029	<0.01
			median	9140	9140	0.029	<0.01	9140	0.029	<0.01
			75p	9930	9930	0.029	<0.01	9930	0.029	<0.01

Notes: UA - upper aquifer; USCU - upper semi-confining unit; 25p - 25th percentile; 75p - 75th percentile; < less than; mg/kg - milligrams per liter; Δ - change; % - percent.

FIGURES

Figure 3-1: Speciation Model Results for Boron

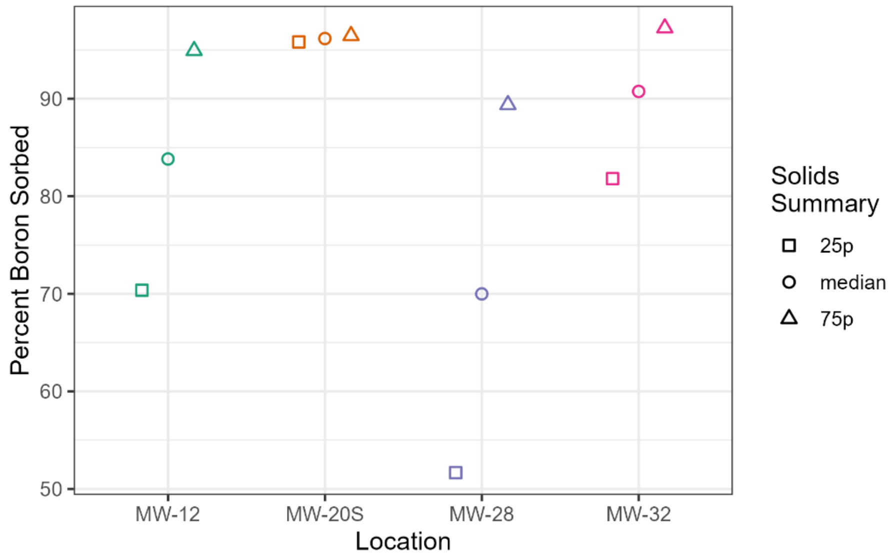


Figure 3-2: Speciation Model Results for Sulfate

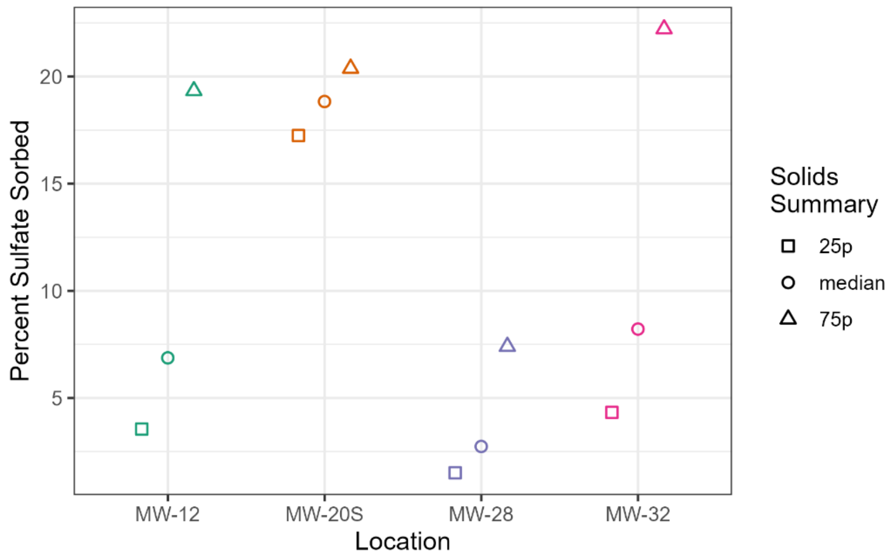


Figure 3-3: Speciation and Reaction Model Results for Boron

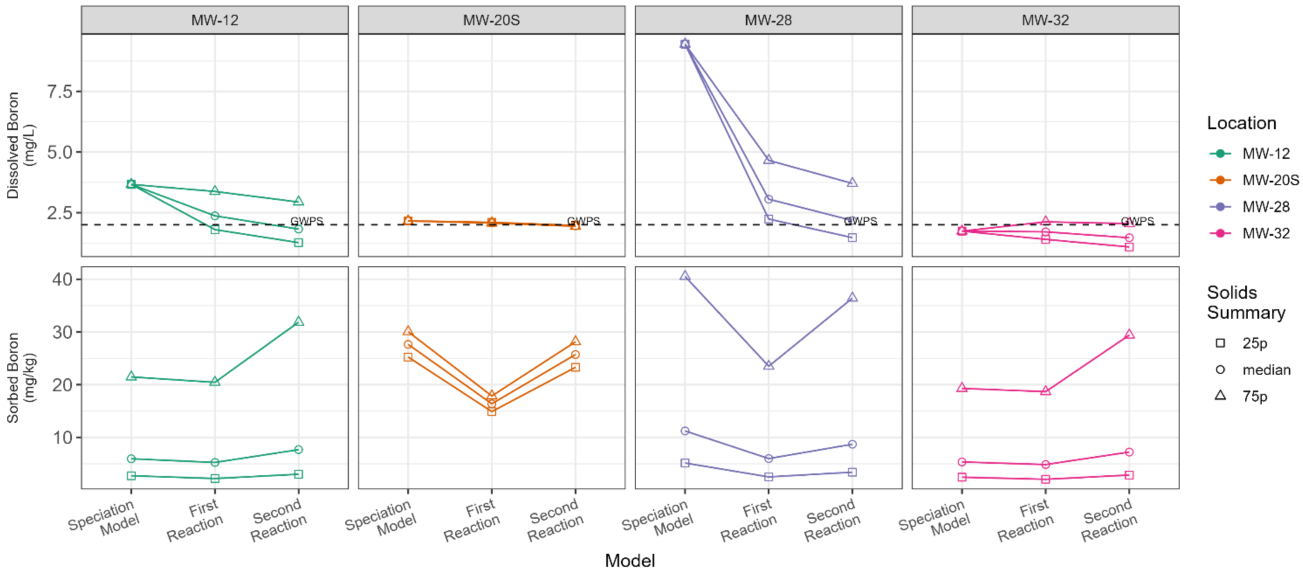
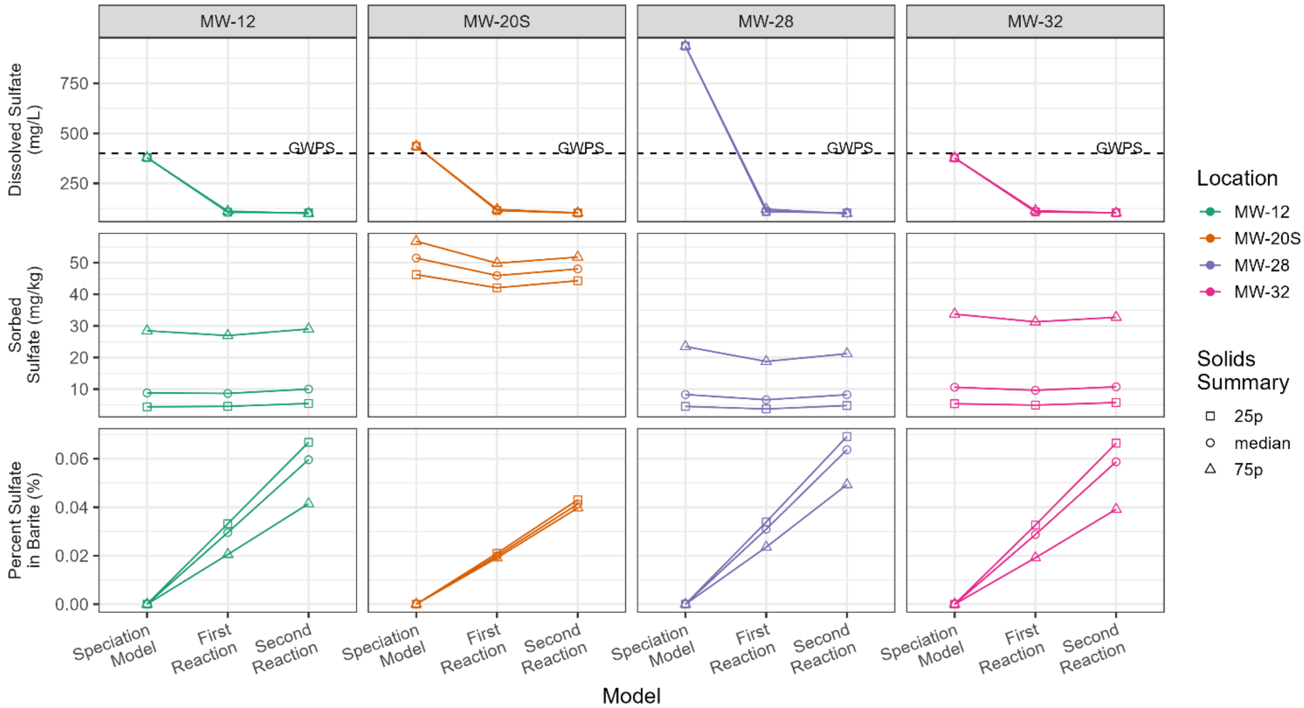


Figure 3-4: Speciation and Reaction Model Results for Sulfate



ATTACHMENT A

NOTES:
**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE (SG-02). ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. THE AVERAGE ELEVATION FROM SEPTEMBER 5, 2023 WAS ESTIMATED TO THE NEAREST 0.01 FOOT.
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. ELEVATIONS IN BRACKETS WERE OBTAINED OUTSIDE OF THE 24-HOUR PERIOD FROM INITIATION OF DEPTH TO GROUNDWATER MEASUREMENTS BUT WITHIN THE SAME SAMPLING EVENT.

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
PORE WATER WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
PROPERTY BOUNDARY
REGULATED UNIT (SUBJECT UNIT)
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 250 500 Feet

POTENTIOMETRIC SURFACE MAP
SEPTEMBER 5-6, 2023

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 11/14/2023 | DESIGNER: GALARNMC

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2023\Kincaid\2023_04_Kincaid_Pot_Map.aprx

ATTACHMENT B

25th Percentile Metal Oxides/No Charge Balance

SELECTED_OUTPUT 1
-file KIN_845_141_25p_cb-false_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l

density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135

Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.21
Ferrihydrite 0 0.05
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

25th Percentile Metal Oxides/Charge Balance on Chloride

```
SELECTED_OUTPUT 1
-file KIN_845_141_25p_cb-true_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w
Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30 charge
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l
```

density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5 charge
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5 charge
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135

Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16 charge
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.033
Ferrihydrite 0 0.029
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - 25p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.21
Ferrihydrite 0 0.05
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

```
pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end
```

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

75th Percentile Metal Oxides/No Charge Balance

SELECTED_OUTPUT 1
-file KIN_845_141_75p_cb-false_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l

```
density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135
```

```
Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
```

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.25
Ferrihydrite 0 0.085
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

```
pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end
```

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

75th Percentile Metal Oxides/Charge Balance on Chloride

```
SELECTED_OUTPUT 1
-file KIN_845_141_75p_cb-true_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w
Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30 charge
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l
```

density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5 charge
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5 charge
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135

```
Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end
SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16 charge
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end
EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2
SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
```

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.26
Ferrihydrite 0 0.049
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - 75p
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.25
Ferrihydrite 0 0.085
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

```
pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end
```

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

Median Metal Oxides/No Charge Balance

```
SELECTED_OUTPUT 1
-file KIN_845_141_median_cb-false_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w
Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l
```

density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135

Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.23
Ferrihydrite 0 0.067
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

```
pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end
```

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

Median Metal Oxides/Charge Balance on Chloride

SELECTED_OUTPUT 1
-file KIN_845_141_median_cb-true_out.csv
-charge_balance true
-percent_error true
-totals S(6) B Li As C(4) Cl F Ca Mg Na K Ba Si P Mn Fe Al Sb Be Cd Cr Co Pb Mo Se Hfo_s Hfo_w Hao_
-molalities Hfo_wOBa+ Hfo_wOCa+ Hfo_wOMg+ Hfo_wOH
Hfo_wOH2+ Hfo_wOHSO4-2 Hfo_wSO4- Hfo_wOSi(OH)3
Hfo_wOSiO(OH)2- Hfo_wHCO3 Hfo_wCO3- Hfo_wPO4-2
Hfo_wHPO4- Hfo_wH2PO4 Hfo_sCO3- Hfo_sHCO3
Hfo_sHPO4- Hfo_sH2BO3 Hfo_sH2PO4 Hfo_sOSi(OH)3
Hfo_sOSiO(OH)2- Hfo_sOHSO4-2 Hfo_sSO4-
Hao_SO4- Hao_OHSO4-2 Hao_H2BO3 Hao_H3BO4-
-equilibrium_phases Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite
-saturation_indices Ferrihydrite Gibbsite Barite Calcite Dolomite(ordered) Gypsum Kaolinite

SOLUTION 1 #MW-12 (C - UA)
redox pe
units mg/l
density 1
pH 6.59
pe 2.91
temp 15.2
S(6) 379 as SO4
B 3.665
Li 0.00955
As 0.002275
C(4) 319.5 as CO3
Cl 30 charge
F 0.2
Ca 207
Mg 87.9
Na 56.05
K 2.38
Ba 0.0905
Si 10.7
P 0.029
Mn 0.444
Fe 3.505
Al 0.018175
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 2 #MW-28 (C - UA)
redox pe
units mg/l

density 1
pH 6.785
pe 4.84
temp 15.1
S(6) 935.5 as SO4
B 9.44
Li 0.0062
As 0.002375
C(4) 276 as CO3
Cl 14.5 charge
F 0.14
Ca 275
Mg 126
Na 125
K 0.9875
Ba 0.0252
Si 10.8
P 0.0025
Mn 1.1565
Fe 0.034655
Al 0.024575
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000375
Pb 0.00115
Mo 0.003175
Se 0.0003
end

SOLUTION 3 #MW-32 (C - UA)
redox pe
units mg/l
density 1
pH 6.575
pe 4.425
temp 15.8
S(6) 377 as SO4
B 1.74
Li 0.001125
As 0.002425
C(4) 313 as CO3
Cl 10.5 charge
F 0.18
Ca 172.5
Mg 87.7
Na 60.75
K 0.4
Ba 0.0544
Si 9.08
P 0.0025
Mn 3.255
Fe 0.08135

Al 0.019525
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.000475
Pb 0.00115
Mo 0.001075
Se 0.0003
end

SOLUTION 4 #MW-20S (C - USCU)
redox pe
units mg/l
density 1
pH 6.74
pe 2.785
temp 16.9
S(6) 435.5 as SO4
B 2.16
Li 0.00075
As 0.002475
C(4) 283.5 as CO3
Cl 16 charge
F 0.205
Ca 192
Mg 96.05
Na 27.6
K 0.2055
Ba 0.0358
Si 8.055
P 0.00625
Mn 0.2665
Fe 0.149505
Al 0.020275
Sb 0.0002
Be 0.0001
Cd 0.000175
Cr 0.000875
Co 0.00015
Pb 0.00115
Mo 0.001075
Se 0.0003
end

EQUILIBRIUM_PHASES 1 #MW-12 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 1
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400

```
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 1
save surface 1
end

EQUILIBRIUM_PHASES 2 #MW-28 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 2
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 2
save surface 2
end

EQUILIBRIUM_PHASES 3 #MW-32 (C - UA) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.072
Ferrihydrite 0 0.04
Calcite 0 1
Dolomite(ordered) 0 2

SURFACE 3
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 3
save surface 3
end

EQUILIBRIUM_PHASES 4 #MW-20S (C - USCU) - median
Barite 0 0
Gypsum 0 0
Gibbsite 0 0.23
Ferrihydrite 0 0.067
Calcite 0 0.08
Dolomite(ordered) 0 0.02

SURFACE 4
Hfo_wOH Ferrihydrite equilibrium_phase 0.2 53400
Hfo_sOH Ferrihydrite equilibrium_phase 0.005 53400
Hao_OH Gibbsite equilibrium_phase 0.033 2496
-equil 4
save surface 4
end

SOLUTION 5 #average background
redox pe
units mg/l
density 1
pH 6.595
```

```
pe 5.085
temp 14.7
S(6) 106.5
B 0.1355
Li 0.00565
As 0.003725
C(4) 136.5
Cl 14.5 charge
F 0.37
Ca 79.15
Mg 31.5
Na 19.9
K 1.2825
Ba 0.09055
Si 7.765
P 0.0025
Mn 0.4095
Fe 0.15975
Al 0.02095
Sb 0.0002
Be 0.00025
Cd 0.000175
Cr 0.00435
Co 0.001475
Pb 0.00285
Mo 0.00185
Se 0.0003

SAVE solution 5

end

#FIRST FLUSH

#MW-12 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-12 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 1
USE SURFACE 1
SAVE equilibrium_phases 1
SAVE surface 1
end

#MW-28 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end
```

```
#MW-28 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 2
USE SURFACE 2
SAVE equilibrium_phases 2
SAVE surface 2
end

#MW-32 (C - UA) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-32 (C - UA) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 3
USE SURFACE 3
SAVE equilibrium_phases 3
SAVE surface 3
end

#MW-20S (C - USCU) - First Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end

#MW-20S (C - USCU) - Second Flush
USE SOLUTION 5
USE EQUILIBRIUM_PHASES 4
USE SURFACE 4
SAVE equilibrium_phases 4
SAVE surface 4
end
```

Database

#$Id: minteq.v4.dat 12387 2017-02-09 16:41:47Z dlpark $
SOLUTION_MASTER_SPECIES
Alkalinity CO3-2 2.0 HCO3 61.0173
E e- 0 0 0
O H2O 0 O 16.00
O(-2) H2O 0 O
O(0) O2 0 O
Ag Ag+ 0.0 Ag 107.868
Al Al+3 0.0 Al 26.9815
As H3AsO4 -1.0 As 74.9216
As(3) H3AsO3 0.0 As
As(5) H3AsO4 -1.0 As
B H3BO3 0.0 B 10.81
Ba Ba+2 0.0 Ba 137.33
Be Be+2 0.0 Be 9.0122
Br Br- 0.0 Br 79.904
C CO3-2 2.0 CO3 12.0111
C(4) CO3-2 2.0 CO3 12.0111
Cyanide Cyanide- 1.0 Cyanide 26.0177
Dom_a Dom_a 0.0 C 12.0111
Dom_b Dom_b 0.0 C 12.0111
Dom_c Dom_c 0.0 C 12.0111
Ca Ca+2 0.0 Ca 40.078
Cd Cd+2 0.0 Cd 112.41
Cl Cl- 0.0 Cl 35.453
Co Co+3 -1.0 Co 58.9332
Co(2) Co+2 0.0 Co
Co(3) Co+3 -1.0 Co
Cr CrO4-2 1.0 Cr 51.996
Cr(2) Cr+2 0.0 Cr
Cr(3) Cr(OH)2+ 0.0 Cr
Cr(6) CrO4-2 1.0 Cr
Cu Cu+2 0.0 Cu 63.546
Cu(1) Cu+ 0.0 Cu
Cu(2) Cu+2 0.0 Cu
F F- 0.0 F 18.9984
Fe Fe+3 -2.0 Fe 55.847
Fe(2) Fe+2 0.0 Fe
Fe(3) Fe+3 -2.0 Fe
H H+ -1.0 H 1.0079
H(0) H2 0 H
H(1) H+ -1.0 H
Hg Hg(OH)2 0.0 Hg 200.59
Hg(0) Hg 0.0 Hg
Hg(1) Hg2+2 0.0 Hg
Hg(2) Hg(OH)2 0.0 Hg
I I- 0.0 I 126.904
K K+ 0.0 K 39.0983
Li Li+ 0.0 Li 6.941
Mg Mg+2 0.0 Mg 24.305
Mn Mn+3 0.0 Mn 54.938
Mn(2) Mn+2 0.0 Mn

Mn(3) Mn+3 0.0 Mn
Mn(6) MnO4-2 0.0 Mn
Mn(7) MnO4- 0.0 Mn
Mo MoO4-2 0.0 Mo 95.94
N NO3- 0.0 N 14.0067
N(-3) NH4+ 0.0 N
N(3) NO2- 0.0 N
N(5) NO3- 0.0 N
Na Na+ 0.0 Na 22.9898
Ni Ni+2 0.0 Ni 58.69
P PO4-3 2.0 P 30.9738
Pb Pb+2 0.0 Pb 207.2
S SO4-2 0.0 SO4 32.066
S(-2) HS- 1.0 S
#S(0) S 0.0 S
S(6) SO4-2 0.0 SO4
Sb Sb(OH)6- 0.0 Sb 121.75
Sb(3) Sb(OH)3 0.0 Sb
Sb(5) Sb(OH)6- 0.0 Sb
Se SeO4-2 0.0 Se 78.96
Se(-2) HSe- 0.0 Se
Se(4) HSeO3- 0.0 Se
Se(6) SeO4-2 0.0 Se
Si H4SiO4 0.0 SiO2 28.0843
Sn Sn(OH)6-2 0.0 Sn 118.71
Sn(2) Sn(OH)2 0.0 Sn
Sn(4) Sn(OH)6-2 0.0 Sn
Sr Sr+2 0.0 Sr 87.62
Tl Tl(OH)3 0.0 Tl 204.383
Tl(1) Tl+ 0.0 Tl
Tl(3) Tl(OH)3 0.0 Tl
U UO2+2 0.0 U 238.029
U(3) U+3 0.0 U
U(4) U+4 -4.0 U
U(5) UO2+ 0.0 U
U(6) UO2+2 0.0 U
V VO2+ -2.0 V 50.94
V(2) V+2 0.0 V
V(3) V+3 -3.0 V
V(4) VO+2 0.0 V
V(5) VO2+ -2.0 V
Zn Zn+2 0.0 Zn 65.39
Benzoate Benzoate- 0.0 121.116 121.116
Phenylacetate Phenylacetate- 0.0 135.142 135.142
Isophthalate Isophthalate-2 0.0 164.117 164.117
Diethylamine Diethylamine 1.0 73.138 73.138
Butylamine Butylamine 1.0 73.138 73.138
Methylamine Methylamine 1.0 31.057 31.057
Dimethylamine Dimethylamine 1.0 45.084 45.084
Hexylamine Hexylamine 1.0 101.192 101.192
Ethylenediamine Ethylenediamine 2.0 60.099 60.099
Propylamine Propylamine 1.0 59.111 59.111
Isopropylamine Isopropylamine 1.0 59.111 59.111
Trimethylamine Trimethylamine 1.0 59.111 59.111

Citrate Citrate-3 2.0 189.102 189.102
Nta Nta-3 1.0 188.117 188.117
Edta Edta-4 2.0 288.214 288.214
Propionate Propionate- 1.0 73.072 73.072
Butyrate Butyrate- 1.0 87.098 87.098
Isobutyrate Isobutyrate- 1.0 87.098 87.098
Two_picoline Two_picoline 1.0 93.128 93.128
Three_picoline Three_picoline 1.0 93.128 93.128
Four_picoline Four_picoline 1.0 93.128 93.128
Formate Formate- 0.0 45.018 45.018
Isovalerate Isovalerate- 1.0 101.125 101.125
Valerate Valerate- 1.0 101.125 101.125
Acetate Acetate- 1.0 59.045 59.045
Tartarate Tartarate-2 0.0 148.072 148.072
Glycine Glycine- 1.0 74.059 74.059
Salicylate Salicylate-2 1.0 136.107 136.107
Glutamate Glutamate-2 1.0 145.115 145.115
Phthalate Phthalate-2 1.0 164.117 164.117
SOLUTION_SPECIES
e- = e-
log_k 0
H2O = H2O
log_k 0
Ag+ = Ag+
log_k 0
Al+3 = Al+3
log_k 0
H3AsO4 = H3AsO4
log_k 0
H3BO3 = H3BO3
log_k 0
Ba+2 = Ba+2
log_k 0
Be+2 = Be+2
log_k 0
Br- = Br-
log_k 0
CO3-2 = CO3-2
log_k 0
Cyanide- = Cyanide-
log_k 0
Dom_a = Dom_a
log_k 0
Dom_b = Dom_b
log_k 0
Dom_c = Dom_c
log_k 0
Ca+2 = Ca+2
log_k 0
Cd+2 = Cd+2
log_k 0
Cl- = Cl-
log_k 0
Co+3 = Co+3

log_k 0
CrO4-2 = CrO4-2
log_k 0
Cu+2 = Cu+2
log_k 0
F- = F-
log_k 0
Fe+3 = Fe+3
log_k 0
H+ = H+
log_k 0
Hg(OH)2 = Hg(OH)2
log_k 0
I- = I-
log_k 0
K+ = K+
log_k 0
Li+ = Li+
log_k 0
Mg+2 = Mg+2
log_k 0
Mn+3 = Mn+3
log_k 0
MoO4-2 = MoO4-2
log_k 0
NO3- = NO3-
log_k 0
Na+ = Na+
log_k 0
Ni+2 = Ni+2
log_k 0
PO4-3 = PO4-3
log_k 0
Pb+2 = Pb+2
log_k 0
SO4-2 = SO4-2
log_k 0
Sb(OH)6- = Sb(OH)6-
log_k 0
SeO4-2 = SeO4-2
log_k 0
H4SiO4 = H4SiO4
log_k 0
Sn(OH)6-2 = Sn(OH)6-2
log_k 0
Sr+2 = Sr+2
log_k 0
Tl(OH)3 = Tl(OH)3
log_k 0
UO2+2 = UO2+2
log_k 0
VO2+ = VO2+
log_k 0
Benzoate- = Benzoate-

log_k 0
Phenylacetate- = Phenylacetate-
log_k 0
Isophthalate-2 = Isophthalate-2
log_k 0
Zn+2 = Zn+2
log_k 0
Diethylamine = Diethylamine
log_k 0
Butylamine = Butylamine
log_k 0
Methylamine = Methylamine
log_k 0
Dimethylamine = Dimethylamine
log_k 0
Hexylamine = Hexylamine
log_k 0
Ethylenediamine = Ethylenediamine
log_k 0
Propylamine = Propylamine
log_k 0
Isopropylamine = Isopropylamine
log_k 0
Trimethylamine = Trimethylamine
log_k 0
Citrate-3 = Citrate-3
log_k 0
Nta-3 = Nta-3
log_k 0
Edta-4 = Edta-4
log_k 0
Propionate- = Propionate-
log_k 0
Butyrate- = Butyrate-
log_k 0
Isobutyrate- = Isobutyrate-
log_k 0
Two_picoline = Two_picoline
log_k 0
Three_picoline = Three_picoline
log_k 0
Four_picoline = Four_picoline
log_k 0
Formate- = Formate-
log_k 0
Isovalerate- = Isovalerate-
log_k 0
Valerate- = Valerate-
log_k 0
Acetate- = Acetate-
log_k 0
Tartarate-2 = Tartarate-2
log_k 0
Glycine- = Glycine-

log_k 0
Salicylate-2 = Salicylate-2
log_k 0
Glutamate-2 = Glutamate-2
log_k 0
Phthalate-2 = Phthalate-2
log_k 0
SOLUTION_SPECIES
Fe+3 + e- = Fe+2
log_k 13.032
delta_h -42.7 kJ
-gamma 0 0
Id: 2802810
log K source: Bard85
Delta H source: Bard85
#T and ionic strength:
H3AsO4 + 2e- + 2H+ = H3AsO3 + H2O
log_k 18.898
delta_h -125.6 kJ
-gamma 0 0
Id: 600610
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Sb(OH)6- + 2e- + 3H+ = Sb(OH)3 + 3H2O
log_k 24.31
delta_h 0 kJ
-gamma 0 0
Id: 7407410
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + 3e- + 4H+ = U+3 + 2H2O
log_k 0.42
delta_h -42 kJ
-gamma 0 0
Id: 8908930
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + 2e- + 4H+ = U+4 + 2H2O
log_k 9.216
delta_h -144.1 kJ
-gamma 0 0
Id: 8918930
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + e- = UO2+
log_k 2.785
delta_h -13.8 kJ
-gamma 0 0
Id: 8928930
log K source: MTQ3.11

Delta H source: MTQ3.11
#T and ionic strength:
e- + Mn+3 = Mn+2
log_k 25.35
delta_h -107.8 kJ
-gamma 0 0
Id: 4704710
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Co+3 + e- = Co+2
log_k 32.4
delta_h 0 kJ
-gamma 0 0
Id: 2002010
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Cu+2 + e- = Cu+
log_k 2.69
delta_h 6.9 kJ
-gamma 0 0
Id: 2302310
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
V+3 + e- = V+2
log_k -4.31
delta_h 0 kJ
-gamma 0 0
Id: 9009010
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
VO+2 + e- + 2H+ = V+3 + H2O
log_k 5.696
delta_h 0 kJ
-gamma 0 0
Id: 9019020
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
VO2+ + e- + 2H+ = VO+2 + H2O
log_k 16.903
delta_h -122.7 kJ
-gamma 0 0
Id: 9029030
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
SO4-2 + 9H+ + 8e- = HS- + 4H2O
log_k 33.66
delta_h -60.14 kJ
-gamma 0 0

Id: 7307320
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Sn(OH)6-2 + 2e- + 4H+ = Sn(OH)2 + 4H2O
log_k 19.2
delta_h 0 kJ
-gamma 0 0
Id: 7907910
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Tl(OH)3 + 2e- + 3H+ = Tl+ + 3H2O
log_k 45.55
delta_h 0 kJ
-gamma 0 0
Id: 8708710
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
HSeO3- + 6e- + 6H+ = HSe- + 3H2O
log_k 44.86
delta_h 0 kJ
-gamma 0 0
Id: 7607610
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
SeO4-2 + 2e- + 3H+ = HSeO3- + H2O
log_k 36.308
delta_h -201.2 kJ
-gamma 0 0
Id: 7617620
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
0.5Hg2+2 + e- = Hg
log_k 6.5667
delta_h -45.735 kJ
-gamma 0 0
Id: 3600000
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:

2Hg(OH)2 + 4H+ + 2e- = Hg2+2 + 4H2O
log_k 43.185
delta_h -63.59 kJ
-gamma 0 0
Id: 3603610
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + 2H+ + e- = Cr+2 + 2H2O

log_k 2.947
delta_h 6.36 kJ
-gamma 0 0
Id: 2102110
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
CrO4-2 + 6H+ + 3e- = Cr(OH)2+ + 2H2O
log_k 67.376
delta_h -103 kJ
-gamma 0 0
Id: 2112120
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:

2H2O = O2 + 4H+ + 4e-
# Adjusted for equation to aqueous species
log_k -85.9951
-analytic 38.0229 7.99407E-03 -2.7655e+004 -1.4506e+001 199838.45

2 H+ + 2 e- = H2
log_k -3.15
delta_h -1.759 kcal

NO3- + 2 H+ + 2 e- = NO2- + H2O
log_k 28.570
delta_h -43.760 kcal
-gamma 3.0000 0.0000

NO3- + 10 H+ + 8 e- = NH4+ + 3 H2O
log_k 119.077
delta_h -187.055 kcal
-gamma 2.5000 0.0000

Mn+2 + 4H2O = MnO4- + 8H+ + 5e-
log_k -127.794
delta_h 822.67 kJ
-gamma 3 0
Id: 4700020
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Mn+2 + 4H2O = MnO4-2 + 8H+ + 4e-
log_k -118.422
delta_h 711.07 kJ
-gamma 5 0
Id: 4700021
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
HS- = S-2 + H+
log_k -17.3
delta_h 49.4 kJ
-gamma 5 0
Id: 3307301
log K source: LMa1987

Delta H source: NIST2.1.1
#T and ionic strength: 0.00 25.0
HSe- = Se-2 + H+
log_k -15
delta_h 48.116 kJ
-gamma 0 0
Id: 3307601
log K source: SCD3.02 (1968 DKa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 3H+ = Tl+3 + 3H2O
log_k 3.291
delta_h 0 kJ
-gamma 0 0
Id: 8713300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
0.5Hg2+2 + e- = Hg
log_k 6.5667
delta_h -45.735 kJ
-gamma 0 0
Id: 3600000
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Hg(OH)2 + 2H+ = Hg+2 + 2H2O
log_k 6.194
delta_h -39.72 kJ
-gamma 0 0
Id: 3613300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H+ = Cr+3 + 2H2O
log_k 9.5688
delta_h -129.62 kJ
-gamma 0 0
Id: 2113300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.10 20.0
H2O = OH- + H+
log_k -13.997
delta_h 55.81 kJ
-gamma 3.5 0
Id: 3300020
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ = Sn+2 + 2H2O
log_k 7.094
delta_h 0 kJ
-gamma 0 0

Id: 7903301
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Sn(OH)2 + H+ = SnOH+ + H2O
log_k 3.697
delta_h 0 kJ
-gamma 0 0
Id: 7903302
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Sn(OH)2 + H2O = Sn(OH)3- + H+
log_k -9.497
delta_h 0 kJ
-gamma 0 0
Id: 7903303
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Sn(OH)2 + 2H+ = Sn2(OH)2+2 + 2H2O
log_k 9.394
delta_h 0 kJ
-gamma 0 0
Id: 7903304
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
3Sn(OH)2 + 2H+ = Sn3(OH)4+2 + 2H2O
log_k 14.394
delta_h 0 kJ
-gamma 0 0
Id: 7903305
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Sn(OH)2 = HSnO2- + H+
log_k -8.9347
delta_h 0 kJ
-gamma 0 0
Id: 7903306
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Sn(OH)6-2 + 6H+ = Sn+4 + 6H2O
log_k 21.2194
delta_h 0 kJ
-gamma 0 0
Id: 7913301
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Sn(OH)6-2 = SnO3-2 + 3H2O
log_k -2.2099

delta_h 0 kJ
-gamma 0 0
Id: 7913302
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Pb+2 + H2O = PbOH+ + H+
log_k -7.597
delta_h 0 kJ
-gamma 0 0
Id: 6003300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Pb+2 + 2H2O = Pb(OH)2 + 2H+
log_k -17.094
delta_h 0 kJ
-gamma 0 0
Id: 6003301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Pb+2 + 3H2O = Pb(OH)3- + 3H+
log_k -28.091
delta_h 0 kJ
-gamma 0 0
Id: 6003302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Pb+2 + H2O = Pb2OH+3 + H+
log_k -6.397
delta_h 0 kJ
-gamma 0 0
Id: 6003303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
3Pb+2 + 4H2O = Pb3(OH)4+2 + 4H+
log_k -23.888
delta_h 115.24 kJ
-gamma 0 0
Id: 6003304
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 4H2O = Pb(OH)4-2 + 4H+
log_k -39.699
delta_h 0 kJ
-gamma 0 0
Id: 6003305
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:

4Pb+2 + 4H2O = Pb4(OH)4+4 + 4H+
log_k -19.988
delta_h 88.24 kJ
-gamma 0 0
Id: 6003306
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H3BO3 + F- = BF(OH)3-
log_k -0.399
delta_h 7.7404 kJ
-gamma 2.5 0
Id: 902700
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H3BO3 + 2F- + H+ = BF2(OH)2- + H2O
log_k 7.63
delta_h 6.8408 kJ
-gamma 2.5 0
Id: 902701
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H3BO3 + 3F- + 2H+ = BF3OH- + 2H2O
log_k 13.22
delta_h -20.4897 kJ
-gamma 2.5 0
Id: 902702
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Al+3 + H2O = AlOH+2 + H+
log_k -4.997
delta_h 47.81 kJ
-gamma 5.4 0
Id: 303300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Al+3 + 2H2O = Al(OH)2+ + 2H+
log_k -10.094
delta_h 0 kJ
-gamma 5.4 0
Id: 303301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Al+3 + 3H2O = Al(OH)3 + 3H+
log_k -16.791
delta_h 0 kJ
-gamma 0 0
Id: 303303
log K source: NIST46.3

Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Al+3 + 4H2O = Al(OH)4- + 4H+
log_k -22.688
delta_h 173.24 kJ
-gamma 4.5 0
Id: 303302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl+ + H2O = TlOH + H+
log_k -13.207
delta_h 56.81 kJ
-gamma 0 0
Id: 8703300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 2H+ = TlOH+2 + 2H2O
log_k 2.694
delta_h 0 kJ
-gamma 0 0
Id: 8713301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + H+ = Tl(OH)2+ + H2O
log_k 1.897
delta_h 0 kJ
-gamma 0 0
Id: 8713302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Tl(OH)3 + H2O = Tl(OH)4- + H+
log_k -11.697
delta_h 0 kJ
-gamma 0 0
Id: 8713303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + H2O = ZnOH+ + H+
log_k -8.997
delta_h 55.81 kJ
-gamma 0 0
Id: 9503300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + 2H2O = Zn(OH)2 + 2H+
log_k -17.794
delta_h 0 kJ
-gamma 0 0

Id: 9503301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 3H2O = Zn(OH)3- + 3H+
log_k -28.091
delta_h 0 kJ
-gamma 0 0
Id: 9503302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 4H2O = Zn(OH)4-2 + 4H+
log_k -40.488
delta_h 0 kJ
-gamma 0 0
Id: 9503303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cd+2 + H2O = CdOH+ + H+
log_k -10.097
delta_h 54.81 kJ
-gamma 0 0
Id: 1603300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2H2O = Cd(OH)2 + 2H+
log_k -20.294
delta_h 0 kJ
-gamma 0 0
Id: 1603301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cd+2 + 3H2O = Cd(OH)3- + 3H+
log_k -32.505
delta_h 0 kJ
-gamma 0 0
Id: 1603302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Cd+2 + 4H2O = Cd(OH)4-2 + 4H+
log_k -47.288
delta_h 0 kJ
-gamma 0 0
Id: 1603303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Cd+2 + H2O = Cd2OH+3 + H+
log_k -9.397

delta_h 45.81 kJ
-gamma 0 0
Id: 1603304
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + H+ = HgOH+ + H2O
log_k 2.797
delta_h -18.91 kJ
-gamma 0 0
Id: 3613302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + H2O = Hg(OH)3- + H+
log_k -14.897
delta_h 0 kJ
-gamma 0 0
Id: 3613303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + H2O = CuOH+ + H+
log_k -7.497
delta_h 35.81 kJ
-gamma 4 0
Id: 2313300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cu+2 + 2H2O = Cu(OH)2 + 2H+
log_k -16.194
delta_h 0 kJ
-gamma 0 0
Id: 2313301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + 3H2O = Cu(OH)3- + 3H+
log_k -26.879
delta_h 0 kJ
-gamma 0 0
Id: 2313302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Cu+2 + 4H2O = Cu(OH)4-2 + 4H+
log_k -39.98
delta_h 0 kJ
-gamma 0 0
Id: 2313303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0

2Cu+2 + 2H2O = Cu2(OH)2+2 + 2H+
log_k -10.594
delta_h 76.62 kJ
-gamma 0 0
Id: 2313304
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + H2O = AgOH + H+
log_k -11.997
delta_h 0 kJ
-gamma 0 0
Id: 203300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + 2H2O = Ag(OH)2- + 2H+
log_k -24.004
delta_h 0 kJ
-gamma 0 0
Id: 203301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + H2O = NiOH+ + H+
log_k -9.897
delta_h 51.81 kJ
-gamma 0 0
Id: 5403300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ni+2 + 2H2O = Ni(OH)2 + 2H+
log_k -18.994
delta_h 0 kJ
-gamma 0 0
Id: 5403301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + 3H2O = Ni(OH)3- + 3H+
log_k -29.991
delta_h 0 kJ
-gamma 0 0
Id: 5403302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + H2O = CoOH+ + H+
log_k -9.697
delta_h 0 kJ
-gamma 0 0
Id: 2003300
log K source: NIST46.4

Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + 2H2O = Co(OH)2 + 2H+
log_k -18.794
delta_h 0 kJ
-gamma 0 0
Id: 2003301
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + 3H2O = Co(OH)3- + 3H+
log_k -31.491
delta_h 0 kJ
-gamma 0 0
Id: 2003302
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + 4H2O = Co(OH)4-2 + 4H+
log_k -46.288
delta_h 0 kJ
-gamma 0 0
Id: 2003303
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Co+2 + H2O = Co2OH+3 + H+
log_k -10.997
delta_h 0 kJ
-gamma 0 0
Id: 2003304
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
4Co+2 + 4H2O = Co4(OH)4+4 + 4H+
log_k -30.488
delta_h 0 kJ
-gamma 0 0
Id: 2003306
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + 2H2O = CoOOH- + 3H+
log_k -32.0915
delta_h 260.454 kJ
-gamma 0 0
Id: 2003305
log K source: NIST2.1.1
Delta H source: MTQ3.11
#T and ionic strength:
Co+3 + H2O = CoOH+2 + H+
log_k -1.291
delta_h 0 kJ
-gamma 0 0

Id: 2013300
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Fe+2 + H2O = FeOH+ + H+
log_k -9.397
delta_h 55.81 kJ
-gamma 5 0
Id: 2803300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+2 + 2H2O = Fe(OH)2 + 2H+
log_k -20.494
delta_h 119.62 kJ
-gamma 0 0
Id: 2803302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+2 + 3H2O = Fe(OH)3- + 3H+
log_k -28.991
delta_h 126.43 kJ
-gamma 5 0
Id: 2803301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+3 + H2O = FeOH+2 + H+
log_k -2.187
delta_h 41.81 kJ
-gamma 5 0
Id: 2813300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+3 + 2H2O = Fe(OH)2+ + 2H+
log_k -4.594
delta_h 0 kJ
-gamma 5.4 0
Id: 2813301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Fe+3 + 3H2O = Fe(OH)3 + 3H+
log_k -12.56
delta_h 103.8 kJ
-gamma 0 0
Id: 2813302
log K source: Nord90
Delta H source: Nord90
#T and ionic strength: 0.00 25.0
Fe+3 + 4H2O = Fe(OH)4- + 4H+
log_k -21.588

delta_h 0 kJ
-gamma 5.4 0
Id: 2813303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Fe+3 + 2H2O = Fe2(OH)2+4 + 2H+
log_k -2.854
delta_h 57.62 kJ
-gamma 0 0
Id: 2813304
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
3Fe+3 + 4H2O = Fe3(OH)4+5 + 4H+
log_k -6.288
delta_h 65.24 kJ
-gamma 0 0
Id: 2813305
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Mn+2 + H2O = MnOH+ + H+
log_k -10.597
delta_h 55.81 kJ
-gamma 5 0
Id: 4703300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Mn+2 + 3H2O = Mn(OH)3- + 3H+
log_k -34.8
delta_h 0 kJ
-gamma 5 0
Id: 4703301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Mn+2 + 4H2O = Mn(OH)4-2 + 4H+
log_k -48.288
delta_h 0 kJ
-gamma 5 0
Id: 4703302
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mn+2 + 4H2O = MnO4- + 8H+ + 5e-
log_k -127.794
delta_h 822.67 kJ
-gamma 3 0
Id: 4700020
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:

Mn+2 + 4H2O = MnO4-2 + 8H+ + 4e-
log_k -118.422
delta_h 711.07 kJ
-gamma 5 0
Id: 4700021
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Cr(OH)2+ + H+ = Cr(OH)+2 + H2O
log_k 5.9118
delta_h -77.91 kJ
-gamma 0 0
Id: 2113301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + H2O = Cr(OH)3 + H+
log_k -8.4222
delta_h 0 kJ
-gamma 0 0
Id: 2113302
log K source: SCD3.02 (1983 RCa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H2O = Cr(OH)4- + 2H+
log_k -17.8192
delta_h 0 kJ
-gamma 0 0
Id: 2113303
log K source: SCD3.02 (1983 RCa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cr(OH)2+ = CrO2- + 2H+
log_k -17.7456
delta_h 0 kJ
-gamma 0 0
Id: 2113304
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
V+2 + H2O = VOH+ + H+
log_k -6.487
delta_h 59.81 kJ
-gamma 0 0
Id: 9003300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
V+3 + H2O = VOH+2 + H+
log_k -2.297
delta_h 43.81 kJ
-gamma 0 0
Id: 9013300
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
V+3 + 2H2O = V(OH)2+ + 2H+
log_k -6.274
delta_h 0 kJ
-gamma 0 0
Id: 9013301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
V+3 + 3H2O = V(OH)3 + 3H+
log_k -3.0843
delta_h 0 kJ
-gamma 0 0
Id: 9013302
log K source: SCD3.02 (1978 TKa)
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
2V+3 + 2H2O = V2(OH)2+4 + 2H+
log_k -3.794
delta_h 0 kJ
-gamma 0 0
Id: 9013304
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2V+3 + 3H2O = V2(OH)3+3 + 3H+
log_k -10.1191
delta_h 0 kJ
-gamma 0 0
Id: 9013303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
VO+2 + 2H2O = V(OH)3+ + H+
log_k -5.697
delta_h 0 kJ
-gamma 0 0
Id: 9023300
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2VO+2 + 2H2O = H2V2O4+2 + 2H+
log_k -6.694
delta_h 53.62 kJ
-gamma 0 0
Id: 9023301
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
U+4 + H2O = UOH+3 + H+
log_k -0.597
delta_h 47.81 kJ
-gamma 0 0

Id: 8913300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
U+4 + 2H2O = U(OH)2+2 + 2H+
log_k -2.27
delta_h 74.1823 kJ
-gamma 0 0
Id: 8913301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 3H2O = U(OH)3+ + 3H+
log_k -4.935
delta_h 94.7467 kJ
-gamma 0 0
Id: 8913302
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 4H2O = U(OH)4 + 4H+
log_k -8.498
delta_h 103.596 kJ
-gamma 0 0
Id: 8913303
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 5H2O = U(OH)5- + 5H+
log_k -13.12
delta_h 115.374 kJ
-gamma 0 0
Id: 8913304
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
6U+4 + 15H2O = U6(OH)15+9 + 15H+
log_k -17.155
delta_h 0 kJ
-gamma 0 0
Id: 8913305
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
UO2+2 + H2O = UO2OH+ + H+
log_k -5.897
delta_h 47.81 kJ
-gamma 0 0
Id: 8933300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
2UO2+2 + 2H2O = (UO2)2(OH)2+2 + 2H+
log_k -5.574

delta_h 41.82 kJ
-gamma 0 0
Id: 8933301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
3UO2+2 + 5H2O = (UO2)3(OH)5+ + 5H+
log_k -15.585
delta_h 108.05 kJ
-gamma 0 0
Id: 8933302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Be+2 + H2O = BeOH+ + H+
log_k -5.397
delta_h 0 kJ
-gamma 6.5 0
Id: 1103301
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Be+2 + 2H2O = Be(OH)2 + 2H+
log_k -13.594
delta_h 0 kJ
-gamma 6.5 0
Id: 1103302
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Be+2 + 3H2O = Be(OH)3- + 3H+
log_k -23.191
delta_h 0 kJ
-gamma 6.5 0
Id: 1103303
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Be+2 + 4H2O = Be(OH)4-2 + 4H+
log_k -37.388
delta_h 0 kJ
-gamma 6.5 0
Id: 1103304
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2Be+2 + H2O = Be2OH+3 + H+
log_k -3.177
delta_h 0 kJ
-gamma 6.5 0
Id: 1103305
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0

3Be+2 + 3H2O = Be3(OH)3+3 + 3H+
log_k -8.8076
delta_h 0 kJ
-gamma 6.5 0
Id: 1103306
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Mg+2 + H2O = MgOH+ + H+
log_k -11.397
delta_h 67.81 kJ
-gamma 6.5 0
Id: 4603300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + H2O = CaOH+ + H+
log_k -12.697
delta_h 64.11 kJ
-gamma 6 0
Id: 1503300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Sr+2 + H2O = SrOH+ + H+
log_k -13.177
delta_h 60.81 kJ
-gamma 5 0
Id: 8003300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ba+2 + H2O = BaOH+ + H+
log_k -13.357
delta_h 60.81 kJ
-gamma 5 0
Id: 1003300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
H+ + F- = HF
log_k 3.17
delta_h 13.3 kJ
-gamma 0 0
Id: 3302700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
H+ + 2F- = HF2-
log_k 3.75
delta_h 17.4 kJ
-gamma 3.5 0
Id: 3302701
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
2F- + 2H+ = H2F2
log_k 6.768
delta_h 0 kJ
-gamma 0 0
Id: 3302702
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Sb(OH)3 + F- + H+ = SbOF + 2H2O
log_k 6.1864
delta_h 0 kJ
-gamma 0 0
Id: 7402700
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)3 + F- + H+ = Sb(OH)2F + H2O
log_k 6.1937
delta_h 0 kJ
-gamma 0 0
Id: 7402702
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
H4SiO4 + 4H+ + 6F- = SiF6-2 + 4H2O
log_k 30.18
delta_h -68 kJ
-gamma 5 0
Id: 7702700
log K source: Nord90
Delta H source: Nord90
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + F- = SnF+ + 2H2O
log_k 11.582
delta_h 0 kJ
-gamma 0 0
Id: 7902701
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Sn(OH)2 + 2H+ + 2F- = SnF2 + 2H2O
log_k 14.386
delta_h 0 kJ
-gamma 0 0
Id: 7902702
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Sn(OH)2 + 2H+ + 3F- = SnF3- + 2H2O
log_k 17.206
delta_h 0 kJ
-gamma 0 0

Id: 7902703
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Sn(OH)6-2 + 6H+ + 6F- = SnF6-2 + 6H2O
log_k 33.5844
delta_h 0 kJ
-gamma 0 0
Id: 7912701
log K source: Bard85
Delta H source: MTQ3.11
#T and ionic strength:
Pb+2 + F- = PbF+
log_k 1.848
delta_h 0 kJ
-gamma 0 0
Id: 6002700
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Pb+2 + 2F- = PbF2
log_k 3.142
delta_h 0 kJ
-gamma 0 0
Id: 6002701
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Pb+2 + 3F- = PbF3-
log_k 3.42
delta_h 0 kJ
-gamma 0 0
Id: 6002702
log K source: SCD3.02 (1956 TKa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Pb+2 + 4F- = PbF4-2
log_k 3.1
delta_h 0 kJ
-gamma 0 0
Id: 6002703
log K source: SCD3.02 (1956 TKa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
H3BO3 + 3H+ + 4F- = BF4- + 3H2O
log_k 19.912
delta_h -18.67 kJ
-gamma 2.5 0
Id: 902703
log K source: NIST46.3
Delta H source: NIST2.1.1
#T and ionic strength: 1.00 25.0
Al+3 + F- = AlF+2
log_k 7

delta_h 4.6 kJ
-gamma 5.4 0
Id: 302700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Al+3 + 2F- = AlF2+
log_k 12.6
delta_h 8.3 kJ
-gamma 5.4 0
Id: 302701
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Al+3 + 3F- = AlF3
log_k 16.7
delta_h 8.7 kJ
-gamma 0 0
Id: 302702
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Al+3 + 4F- = AlF4-
log_k 19.4
delta_h 8.7 kJ
-gamma 4.5 0
Id: 302703
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl+ + F- = TlF
log_k 0.1
delta_h 0 kJ
-gamma 0 0
Id: 8702700
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + F- = ZnF+
log_k 1.3
delta_h 11 kJ
-gamma 0 0
Id: 9502700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + F- = CdF+
log_k 1.2
delta_h 5 kJ
-gamma 0 0
Id: 1602700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

Cd+2 + 2F- = CdF2
log_k 1.5
delta_h 0 kJ
-gamma 0 0
Id: 1602701
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + 2H+ + F- = HgF+ + 2H2O
log_k 7.763
delta_h -35.72 kJ
-gamma 0 0
Id: 3612701
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Cu+2 + F- = CuF+
log_k 1.8
delta_h 13 kJ
-gamma 0 0
Id: 2312700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + F- = AgF
log_k 0.4
delta_h 12 kJ
-gamma 0 0
Id: 202700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ni+2 + F- = NiF+
log_k 1.4
delta_h 7.1 kJ
-gamma 0 0
Id: 5402700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Co+2 + F- = CoF+
log_k 1.5
delta_h 9.2 kJ
-gamma 0 0
Id: 2002700
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Fe+3 + F- = FeF+2
log_k 6.04
delta_h 10 kJ
-gamma 5 0
Id: 2812700
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+3 + 2F- = FeF2+
log_k 10.4675
delta_h 17 kJ
-gamma 5 0
Id: 2812701
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Fe+3 + 3F- = FeF3
log_k 13.617
delta_h 29 kJ
-gamma 0 0
Id: 2812702
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Mn+2 + F- = MnF+
log_k 1.6
delta_h 11 kJ
-gamma 5 0
Id: 4702700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H+ + F- = CrF+2 + 2H2O
log_k 14.7688
delta_h -70.2452 kJ
-gamma 0 0
Id: 2112700
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
VO+2 + F- = VOF+
log_k 3.778
delta_h 7.9 kJ
-gamma 0 0
Id: 9022700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
VO+2 + 2F- = VOF2
log_k 6.352
delta_h 14 kJ
-gamma 0 0
Id: 9022701
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
VO+2 + 3F- = VOF3-
log_k 7.902
delta_h 20 kJ
-gamma 0 0

Id: 9022702
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
VO+2 + 4F- = VOF4-2
log_k 8.508
delta_h 26 kJ
-gamma 0 0
Id: 9022703
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
VO2+ + F- = VO2F
log_k 3.244
delta_h 0 kJ
-gamma 0 0
Id: 9032700
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
VO2+ + 2F- = VO2F2-
log_k 5.804
delta_h 0 kJ
-gamma 0 0
Id: 9032701
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
VO2+ + 3F- = VO2F3-2
log_k 6.9
delta_h 0 kJ
-gamma 0 0
Id: 9032702
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
VO2+ + 4F- = VO2F4-3
log_k 6.592
delta_h 0 kJ
-gamma 0 0
Id: 9032703
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
U+4 + F- = UF+3
log_k 9.3
delta_h 21.1292 kJ
-gamma 0 0
Id: 8912700
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
U+4 + 2F- = UF2+2
log_k 16.4

delta_h 30.1248 kJ
-gamma 0 0
Id: 8912701
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
U+4 + 3F- = UF3+
log_k 21.6
delta_h 29.9156 kJ
-gamma 0 0
Id: 8912702
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
U+4 + 4F- = UF4
log_k 23.64
delta_h 19.2464 kJ
-gamma 0 0
Id: 8912703
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 5F- = UF5-
log_k 25.238
delta_h 20.2924 kJ
-gamma 0 0
Id: 8912704
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 6F- = UF6-2
log_k 27.718
delta_h 13.8072 kJ
-gamma 0 0
Id: 8912705
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + F- = UO2F+
log_k 5.14
delta_h 1 kJ
-gamma 0 0
Id: 8932700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + 2F- = UO2F2
log_k 8.6
delta_h 2 kJ
-gamma 0 0
Id: 8932701
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

UO2+2 + 3F- = UO2F3-
log_k 11
delta_h 2 kJ
-gamma 0 0
Id: 8932702
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + 4F- = UO2F4-2
log_k 11.9
delta_h 0.4 kJ
-gamma 0 0
Id: 8932703
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Be+2 + F- = BeF+
log_k 5.249
delta_h 0 kJ
-gamma 0 0
Id: 1102701
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Be+2 + 2F- = BeF2
log_k 9.1285
delta_h -4 kJ
-gamma 0 0
Id: 1102702
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Be+2 + 3F- = BeF3-
log_k 11.9085
delta_h -8 kJ
-gamma 0 0
Id: 1102703
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Mg+2 + F- = MgF+
log_k 2.05
delta_h 13 kJ
-gamma 4.5 0
Id: 4602700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + F- = CaF+
log_k 1.038
delta_h 14 kJ
-gamma 5 0
Id: 1502700
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
Sr+2 + F- = SrF+
log_k 0.548
delta_h 16 kJ
-gamma 0 0
Id: 8002701
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 1.00 25.0
Na+ + F- = NaF
log_k -0.2
delta_h 12 kJ
-gamma 0 0
Id: 5002700
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + Cl- = SnCl+ + 2H2O
log_k 8.734
delta_h 0 kJ
-gamma 0 0
Id: 7901801
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + 2Cl- = SnCl2 + 2H2O
log_k 9.524
delta_h 0 kJ
-gamma 0 0
Id: 7901802
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + 3Cl- = SnCl3- + 2H2O
log_k 8.3505
delta_h 0 kJ
-gamma 0 0
Id: 7901803
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 2.00 25.0
Pb+2 + Cl- = PbCl+
log_k 1.55
delta_h 8.7 kJ
-gamma 0 0
Id: 6001800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 2Cl- = PbCl2
log_k 2.2
delta_h 12 kJ
-gamma 0 0

Id: 6001801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 3Cl- = PbCl3-
log_k 1.8
delta_h 4 kJ
-gamma 0 0
Id: 6001802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 4Cl- = PbCl4-2
log_k 1.46
delta_h 14.7695 kJ
-gamma 0 0
Id: 6001803
log K source: SCD3.02 (1984 SEa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Tl+ + Cl- = TlCl
log_k 0.51
delta_h -6.2 kJ
-gamma 0 0
Id: 8701800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl+ + 2Cl- = TlCl2-
log_k 0.28
delta_h 0 kJ
-gamma 0 0
Id: 8701801
log K source: SCD3.02 (1992 RAb)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 3H+ + Cl- = TlCl+2 + 3H2O
log_k 11.011
delta_h 0 kJ
-gamma 0 0
Id: 8711800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 3H+ + 2Cl- = TlCl2+ + 3H2O
log_k 16.771
delta_h 0 kJ
-gamma 0 0
Id: 8711801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 3H+ + 3Cl- = TlCl3 + 3H2O
log_k 19.791

delta_h 0 kJ
-gamma 0 0
Id: 8711802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + 3H+ + 4Cl- = TlCl4- + 3H2O
log_k 21.591
delta_h 0 kJ
-gamma 0 0
Id: 8711803
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + Cl- + 2H+ = TlOHCl+ + 2H2O
log_k 10.629
delta_h 0 kJ
-gamma 0 0
Id: 8711804
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + Cl- = ZnCl+
log_k 0.4
delta_h 5.4 kJ
-gamma 4 0
Id: 9501800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + 2Cl- = ZnCl2
log_k 0.6
delta_h 37 kJ
-gamma 0 0
Id: 9501801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + 3Cl- = ZnCl3-
log_k 0.5
delta_h 39.999 kJ
-gamma 4 0
Id: 9501802
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + 4Cl- = ZnCl4-2
log_k 0.199
delta_h 45.8566 kJ
-gamma 5 0
Id: 9501803
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:

Zn+2 + H2O + Cl- = ZnOHCl + H+
log_k -7.48
delta_h 0 kJ
-gamma 0 0
Id: 9501804
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cd+2 + Cl- = CdCl+
log_k 1.98
delta_h 1 kJ
-gamma 0 0
Id: 1601800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2Cl- = CdCl2
log_k 2.6
delta_h 3 kJ
-gamma 0 0
Id: 1601801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 3Cl- = CdCl3-
log_k 2.4
delta_h 10 kJ
-gamma 0 0
Id: 1601802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + H2O + Cl- = CdOHCl + H+
log_k -7.404
delta_h 18.2213 kJ
-gamma 0 0
Id: 1601803
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + 2H+ + Cl- = HgCl+ + 2H2O
log_k 13.494
delta_h -62.72 kJ
-gamma 0 0
Id: 3611800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 2Cl- = HgCl2 + 2H2O
log_k 20.194
delta_h -92.42 kJ
-gamma 0 0
Id: 3611801
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 3Cl- = HgCl3- + 2H2O
log_k 21.194
delta_h -94.02 kJ
-gamma 0 0
Id: 3611802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 4Cl- = HgCl4-2 + 2H2O
log_k 21.794
delta_h -100.72 kJ
-gamma 0 0
Id: 3611803
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + Cl- + I- + 2H+ = HgClI + 2H2O
log_k 25.532
delta_h -135.3 kJ
-gamma 0 0
Id: 3611804
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Hg(OH)2 + H+ + Cl- = HgClOH + H2O
log_k 10.444
delta_h -42.72 kJ
-gamma 0 0
Id: 3611805
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
Cu+2 + Cl- = CuCl+
log_k 0.2
delta_h 8.3 kJ
-gamma 4 0
Id: 2311800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cu+2 + 2Cl- = CuCl2
log_k -0.26
delta_h 44.183 kJ
-gamma 0 0
Id: 2311801
log K source: SCD3.02 (1989 IPa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + 3Cl- = CuCl3-
log_k -2.29
delta_h 57.279 kJ
-gamma 4 0

```
# Id: 2311802
# log K source: MTQ3.11
# Delta H source: MTQ3.11
#T and ionic strength:
Cu+2 + 4Cl- = CuCl4-2
log_k -4.59
delta_h 32.5515 kJ
-gamma 5 0
# Id: 2311803
# log K source: MTQ3.11
# Delta H source: MTQ3.11
#T and ionic strength:
Cu+ + 2Cl- = CuCl2-
log_k 5.42
delta_h -1.7573 kJ
-gamma 4 0
# Id: 2301800
# log K source: NIST46.3
# Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+ + 3Cl- = CuCl3-2
log_k 4.75
delta_h 1.0878 kJ
-gamma 5 0
# Id: 2301801
# log K source: NIST46.3
# Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+ + Cl- = CuCl
log_k 3.1
delta_h 0 kJ
-gamma 0 0
# Id: 2301802
# log K source: NIST46.4
# Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + Cl- = AgCl
log_k 3.31
delta_h -12 kJ
-gamma 0 0
# Id: 201800
# log K source: NIST46.3
# Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + 2Cl- = AgCl2-
log_k 5.25
delta_h -16 kJ
-gamma 0 0
# Id: 201801
# log K source: NIST46.3
# Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + 3Cl- = AgCl3-2
log_k 5.2
```

delta_h 0 kJ
-gamma 0 0
Id: 201802
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + 4Cl- = AgCl4-3
log_k 5.51
delta_h 0 kJ
-gamma 0 0
Id: 201803
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ni+2 + Cl- = NiCl+
log_k 0.408
delta_h 2 kJ
-gamma 0 0
Id: 5401800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
Ni+2 + 2Cl- = NiCl2
log_k -1.89
delta_h 0 kJ
-gamma 0 0
Id: 5401801
log K source: SCD3.02 (1989 IPa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + Cl- = CoCl+
log_k 0.539
delta_h 2 kJ
-gamma 0 0
Id: 2001800
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Co+3 + Cl- = CoCl+2
log_k 2.3085
delta_h 16 kJ
-gamma 0 0
Id: 2011800
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Fe+3 + Cl- = FeCl+2
log_k 1.48
delta_h 23 kJ
-gamma 5 0
Id: 2811800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

Fe+3 + 2Cl- = FeCl2+
log_k 2.13
delta_h 0 kJ
-gamma 5 0
Id: 2811801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Fe+3 + 3Cl- = FeCl3
log_k 1.13
delta_h 0 kJ
-gamma 0 0
Id: 2811802
log K source: Nord90
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mn+2 + Cl- = MnCl+
log_k 0.1
delta_h 0 kJ
-gamma 5 0
Id: 4701800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 20.0
Mn+2 + 2Cl- = MnCl2
log_k 0.25
delta_h 0 kJ
-gamma 0 0
Id: 4701801
log K source: Nord90
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mn+2 + 3Cl- = MnCl3-
log_k -0.31
delta_h 0 kJ
-gamma 5 0
Id: 4701802
log K source: Nord90
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H+ + Cl- = CrCl+2 + 2H2O
log_k 9.6808
delta_h -103.62 kJ
-gamma 0 0
Id: 2111800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
Cr(OH)2+ + 2Cl- + 2H+ = CrCl2+ + 2H2O
log_k 8.658
delta_h -39.2208 kJ
-gamma 0 0
Id: 2111801
log K source: MTQ3.11

Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + 2Cl- + H+ = CrOHCl2 + H2O
log_k 2.9627
delta_h 0 kJ
-gamma 0 0
Id: 2111802
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
VO+2 + Cl- = VOCl+
log_k 0.448
delta_h 0 kJ
-gamma 0 0
Id: 9021800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
U+4 + Cl- = UCl+3
log_k 1.7
delta_h -20 kJ
-gamma 0 0
Id: 8911800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + Cl- = UO2Cl+
log_k 0.21
delta_h 16 kJ
-gamma 0 0
Id: 8931800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Be+2 + Cl- = BeCl+
log_k 0.2009
delta_h 0 kJ
-gamma 5 0
Id: 1101801
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.70 20.0
Sn(OH)2 + 2H+ + Br- = SnBr+ + 2H2O
log_k 8.254
delta_h 0 kJ
-gamma 0 0
Id: 7901301
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + 2Br- = SnBr2 + 2H2O
log_k 8.794
delta_h 0 kJ
-gamma 0 0

Id: 7901302
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + 3Br- = SnBr3- + 2H2O
log_k 7.48
delta_h 0 kJ
-gamma 0 0
Id: 7901303
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 3.00 25.0
Pb+2 + Br- = PbBr+
log_k 1.7
delta_h 8 kJ
-gamma 0 0
Id: 6001300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 2Br- = PbBr2
log_k 2.6
delta_h -4 kJ
-gamma 0 0
Id: 6001301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl+ + Br- = TlBr
log_k 0.91
delta_h -12 kJ
-gamma 0 0
Id: 8701300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl+ + 2Br- = TlBr2-
log_k -0.384
delta_h 12.36 kJ
-gamma 0 0
Id: 8701301
log K source: NIST46.3
Delta H source: NIST2.1.1
#T and ionic strength: 4.00 25.0
Tl+ + Br- + Cl- = TlBrCl-
log_k 0.8165
delta_h 0 kJ
-gamma 0 0
Id: 8701302
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl+ + I- + Br- = TlIBr-
log_k 2.185

delta_h 0 kJ
-gamma 0 0
Id: 8703802
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl(OH)3 + 3H+ + Br- = TlBr+2 + 3H2O
log_k 12.803
delta_h 0 kJ
-gamma 0 0
Id: 8711300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Tl(OH)3 + 3H+ + 2Br- = TlBr2+ + 3H2O
log_k 20.711
delta_h 0 kJ
-gamma 0 0
Id: 8711301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Tl(OH)3 + 3Br- + 3H+ = TlBr3 + 3H2O
log_k 27.0244
delta_h 0 kJ
-gamma 0 0
Id: 8711302
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl(OH)3 + 4Br- + 3H+ = TlBr4- + 3H2O
log_k 31.1533
delta_h 0 kJ
-gamma 0 0
Id: 8711303
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + Br- = ZnBr+
log_k -0.07
delta_h 1 kJ
-gamma 0 0
Id: 9501300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + 2Br- = ZnBr2
log_k -0.98
delta_h 0 kJ
-gamma 0 0
Id: 9501301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:

Cd+2 + Br- = CdBr+
log_k 2.15
delta_h -3 kJ
-gamma 0 0
Id: 1601300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2Br- = CdBr2
log_k 3
delta_h -3 kJ
-gamma 0 0
Id: 1601301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + Br- = HgBr+ + 2H2O
log_k 15.803
delta_h -81.92 kJ
-gamma 0 0
Id: 3611301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 2Br- = HgBr2 + 2H2O
log_k 24.2725
delta_h -127.12 kJ
-gamma 0 0
Id: 3611302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 3Br- = HgBr3- + 2H2O
log_k 26.7025
delta_h -138.82 kJ
-gamma 0 0
Id: 3611303
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 4Br- = HgBr4-2 + 2H2O
log_k 27.933
delta_h -153.72 kJ
-gamma 0 0
Id: 3611304
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.50 25.0
Hg(OH)2 + Br- + Cl- + 2H+ = HgBrCl + 2H2O
log_k 22.1811
delta_h -113.77 kJ
-gamma 0 0
Id: 3611305
log K source: NIST2.1.1

Delta H source: NIST2.1.1
#T and ionic strength:
Hg(OH)2 + Br- + I- + 2H+ = HgBrI + 2H2O
log_k 27.3133
delta_h -151.27 kJ
-gamma 0 0
Id: 3611306
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Hg(OH)2 + Br- + 3I- + 2H+ = HgBrI3-2 + 2H2O
log_k 34.2135
delta_h 0 kJ
-gamma 0 0
Id: 3611307
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + 2Br- + 2I- + 2H+ = HgBr2I2-2 + 2H2O
log_k 32.3994
delta_h 0 kJ
-gamma 0 0
Id: 3611308
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + 3Br- + I- + 2H+ = HgBr3I-2 + 2H2O
log_k 30.1528
delta_h 0 kJ
-gamma 0 0
Id: 3611309
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + H+ + Br- = HgBrOH + H2O
log_k 12.433
delta_h 0 kJ
-gamma 0 0
Id: 3613301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Ag+ + Br- = AgBr
log_k 4.6
delta_h 0 kJ
-gamma 0 0
Id: 201300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + 2Br- = AgBr2-
log_k 7.5
delta_h 0 kJ
-gamma 0 0

Id: 201301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + 3Br- = AgBr3-2
log_k 8.1
delta_h 0 kJ
-gamma 0 0
Id: 201302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + Br- = NiBr+
log_k 0.5
delta_h 0 kJ
-gamma 0 0
Id: 5401300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + Br- + 2H+ = CrBr+2 + 2H2O
log_k 7.5519
delta_h -46.9068 kJ
-gamma 0 0
Id: 2111300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Be+2 + Br- = BeBr+
log_k 0.1009
delta_h 0 kJ
-gamma 5 0
Id: 1101301
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.70 20.0
Pb+2 + I- = PbI+
log_k 2
delta_h 0 kJ
-gamma 0 0
Id: 6003800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Pb+2 + 2I- = PbI2
log_k 3.2
delta_h 0 kJ
-gamma 0 0
Id: 6003801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Tl+ + I- = TlI
log_k 1.4279

delta_h 0 kJ
-gamma 0 0
Id: 8703800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl+ + 2I- = TlI2-
log_k 1.8588
delta_h 0 kJ
-gamma 0 0
Id: 8703801
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl(OH)3 + 4I- + 3H+ = TlI4- + 3H2O
log_k 34.7596
delta_h 0 kJ
-gamma 0 0
Id: 8713800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + I- = ZnI+
log_k -2.0427
delta_h -4 kJ
-gamma 0 0
Id: 9503800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 3.00 25.0
Zn+2 + 2I- = ZnI2
log_k -1.69
delta_h 0 kJ
-gamma 0 0
Id: 9503801
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cd+2 + I- = CdI+
log_k 2.28
delta_h -9.6 kJ
-gamma 0 0
Id: 1603800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2I- = CdI2
log_k 3.92
delta_h -12 kJ
-gamma 0 0
Id: 1603801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

Hg(OH)2 + 2H+ + I- = HgI+ + 2H2O
log_k 19.603
delta_h -111.22 kJ
-gamma 0 0
Id: 3613801
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 2I- = HgI2 + 2H2O
log_k 30.8225
delta_h -182.72 kJ
-gamma 0 0
Id: 3613802
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 3I- = HgI3- + 2H2O
log_k 34.6025
delta_h -194.22 kJ
-gamma 0 0
Id: 3613803
log K source: NIST46.4
Delta H source: NIST2.1.1
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 4I- = HgI4-2 + 2H2O
log_k 36.533
delta_h -220.72 kJ
-gamma 0 0
Id: 3613804
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Ag+ + I- = AgI
log_k 6.6
delta_h 0 kJ
-gamma 0 0
Id: 203800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 18.0
Ag+ + 2I- = AgI2-
log_k 11.7
delta_h 0 kJ
-gamma 0 0
Id: 203801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 18.0
Ag+ + 3I- = AgI3-2
log_k 12.6
delta_h -122 kJ
-gamma 0 0
Id: 203802
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + 4I- = AgI4-3
log_k 14.229
delta_h 0 kJ
-gamma 0 0
Id: 203803
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 2.00 25.0
Cr(OH)2+ + I- + 2H+ = CrI+2 + 2H2O
log_k 4.8289
delta_h 0 kJ
-gamma 0 0
Id: 2113800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H+ + HS- = H2S
log_k 7.02
delta_h -22 kJ
-gamma 0 0
Id: 3307300
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 2HS- = Pb(HS)2
log_k 15.27
delta_h 0 kJ
-gamma 0 0
Id: 6007300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Pb+2 + 3HS- = Pb(HS)3-
log_k 16.57
delta_h 0 kJ
-gamma 0 0
Id: 6007301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Tl+ + HS- = TlHS
log_k 2.474
delta_h 0 kJ
-gamma 0 0
Id: 8707300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
2Tl+ + HS- = Tl2HS+
log_k 5.974
delta_h 0 kJ
-gamma 0 0

Id: 8707301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
2Tl+ + 3HS- + H2O = Tl2OH(HS)3-2 + H+
log_k 1.0044
delta_h 0 kJ
-gamma 0 0
Id: 8707302
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
2Tl+ + 2HS- + 2H2O = Tl2(OH)2(HS)2-2 + 2H+
log_k -11.0681
delta_h 0 kJ
-gamma 0 0
Id: 8707303
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + 2HS- = Zn(HS)2
log_k 12.82
delta_h 0 kJ
-gamma 0 0
Id: 9507300
log K source: DHa1993
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 3HS- = Zn(HS)3-
log_k 16.1
delta_h 0 kJ
-gamma 0 0
Id: 9507301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + 3HS- = ZnS(HS)2-2 + H+
log_k 6.12
delta_h 0 kJ
-gamma 0 0
Id: 9507302
log K source: DHa1993
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 2HS- + 2HS- = Zn(HS)4-2
log_k 14.64
delta_h 0 kJ
-gamma 0 0
Id: 9507303
log K source: DHa1993
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 2HS- = ZnS(HS)- + H+
log_k 6.81

delta_h 0 kJ
-gamma 0 0
Id: 9507304
log K source: DHa1993
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cd+2 + HS- = CdHS+
log_k 8.008
delta_h 0 kJ
-gamma 0 0
Id: 1607300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Cd+2 + 2HS- = Cd(HS)2
log_k 15.212
delta_h 0 kJ
-gamma 0 0
Id: 1607301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Cd+2 + 3HS- = Cd(HS)3-
log_k 17.112
delta_h 0 kJ
-gamma 0 0
Id: 1607302
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Cd+2 + 4HS- = Cd(HS)4-2
log_k 19.308
delta_h 0 kJ
-gamma 0 0
Id: 1607303
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Hg(OH)2 + 2HS- = HgS2-2 + 2H2O
log_k 29.414
delta_h 0 kJ
-gamma 0 0
Id: 3617300
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
Hg(OH)2 + 2H+ + 2HS- = Hg(HS)2 + 2H2O
log_k 44.516
delta_h 0 kJ
-gamma 0 0
Id: 3617301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0

Hg(OH)2 + H+ + 2HS- = HgHS2- + 2H2O
log_k 38.122
delta_h 0 kJ
-gamma 0 0
Id: 3617302
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
Cu+2 + 3HS- = Cu(HS)3-
log_k 25.899
delta_h 0 kJ
-gamma 0 0
Id: 2317300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ag+ + HS- = AgHS
log_k 13.8145
delta_h 0 kJ
-gamma 0 0
Id: 207300
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
Ag+ + 2HS- = Ag(HS)2-
log_k 17.9145
delta_h 0 kJ
-gamma 0 0
Id: 207301
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
Fe+2 + 2HS- = Fe(HS)2
log_k 8.95
delta_h 0 kJ
-gamma 0 0
Id: 2807300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Fe+2 + 3HS- = Fe(HS)3-
log_k 10.987
delta_h 0 kJ
-gamma 0 0
Id: 2807301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
HS- = S2-2 + H+
log_k -11.7828
delta_h 46.4 kJ
-gamma 0 0
-no_check
Id: 7317300

log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
HS- = S3-2 + H+
log_k -10.7667
delta_h 42.2 kJ
-gamma 0 0
-no_check
Id: 7317301
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
HS- = S4-2 + H+
log_k -9.9608
delta_h 39.3 kJ
-gamma 0 0
-no_check
Id: 7317302
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
HS- = S5-2 + H+
log_k -9.3651
delta_h 37.6 kJ
-gamma 0 0
-no_check
Id: 7317303
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
HS- = S6-2 + H+
log_k -9.881
delta_h 0 kJ
-gamma 0 0
-no_check
Id: 7317304
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
2Sb(OH)3 + 4HS- + 2H+ = Sb2S4-2 + 6H2O
log_k 49.3886
delta_h -321.78 kJ
-gamma 0 0
Id: 7407300
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Cu+ + 2HS- = Cu(S4)2-3 + 2H+
log_k 3.39
delta_h 0 kJ
-gamma 23 0
-no_check
Id: 2307300
log K source: MTQ3.11

Delta H source: MTQ3.11
#T and ionic strength:
Cu+ + 2HS- = CuS4S5-3 + 2H+
log_k 2.66
delta_h 0 kJ
-gamma 25 0
-no_check
Id: 2307301
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ag+ + 2HS- = Ag(S4)2-3 + 2H+
log_k 0.991
delta_h 0 kJ
-gamma 22 0
-no_check
Id: 207302
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ag+ + 2HS- = AgS4S5-3 + 2H+
log_k 0.68
delta_h 0 kJ
-gamma 24 0
-no_check
Id: 207303
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ag+ + 2HS- = Ag(HS)S4-2 + H+
log_k 10.431
delta_h 0 kJ
-gamma 15 0
-no_check
Id: 207304
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H+ + SO4-2 = HSO4-
log_k 1.99
delta_h 22 kJ
-gamma 4.5 0
Id: 3307320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
NH4+ + SO4-2 = NH4SO4-
log_k 1.03
delta_h 0 kJ
-gamma 5 0
Id: 4907320
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0

Pb+2 + SO4-2 = PbSO4
log_k 2.69
delta_h 0 kJ
-gamma 0 0
Id: 6007320
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Pb+2 + 2SO4-2 = Pb(SO4)2-2
log_k 3.47
delta_h 0 kJ
-gamma 0 0
Id: 6007321
log K source: SCD3.02 (1960 RKa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Al+3 + SO4-2 = AlSO4+
log_k 3.89
delta_h 28 kJ
-gamma 4.5 0
Id: 307320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Al+3 + 2SO4-2 = Al(SO4)2-
log_k 4.92
delta_h 11.9 kJ
-gamma 4.5 0
Id: 307321
log K source: Nord90
Delta H source: Nord90
#T and ionic strength: 0.00 25.0
Tl+ + SO4-2 = TlSO4-
log_k 1.37
delta_h -0.8 kJ
-gamma 0 0
Id: 8707320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + SO4-2 = ZnSO4
log_k 2.34
delta_h 6.2 kJ
-gamma 0 0
Id: 9507320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Zn+2 + 2SO4-2 = Zn(SO4)2-2
log_k 3.28
delta_h 0 kJ
-gamma 0 0
Id: 9507321
log K source: MTQ3.11

Delta H source: MTQ3.11
#T and ionic strength:
Cd+2 + SO4-2 = CdSO4
log_k 2.37
delta_h 8.7 kJ
-gamma 0 0
Id: 1607320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2SO4-2 = Cd(SO4)2-2
log_k 3.5
delta_h 0 kJ
-gamma 0 0
Id: 1607321
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Hg(OH)2 + 2H+ + SO4-2 = HgSO4 + 2H2O
log_k 8.612
delta_h 0 kJ
-gamma 0 0
Id: 3617320
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Cu+2 + SO4-2 = CuSO4
log_k 2.36
delta_h 8.7 kJ
-gamma 0 0
Id: 2317320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + SO4-2 = AgSO4-
log_k 1.3
delta_h 6.2 kJ
-gamma 0 0
Id: 207320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ni+2 + SO4-2 = NiSO4
log_k 2.3
delta_h 5.8 kJ
-gamma 0 0
Id: 5407320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ni+2 + 2SO4-2 = Ni(SO4)2-2
log_k 0.82
delta_h 0 kJ
-gamma 0 0

Id: 5407321
log K source: SCD3.02 (1978 BLa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + SO4-2 = CoSO4
log_k 2.3
delta_h 6.2 kJ
-gamma 0 0
Id: 2007320
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Fe+2 + SO4-2 = FeSO4
log_k 2.39
delta_h 8 kJ
-gamma 0 0
Id: 2807320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+3 + SO4-2 = FeSO4+
log_k 4.05
delta_h 25 kJ
-gamma 5 0
Id: 2817320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Fe+3 + 2SO4-2 = Fe(SO4)2-
log_k 5.38
delta_h 19.2 kJ
-gamma 0 0
Id: 2817321
log K source: Nord90
Delta H source: Nord90
#T and ionic strength: 0.00 25.0
Mn+2 + SO4-2 = MnSO4
log_k 2.25
delta_h 8.7 kJ
-gamma 0 0
Id: 4707320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H+ + SO4-2 = CrSO4+ + 2H2O
log_k 12.9371
delta_h -98.62 kJ
-gamma 0 0
Id: 2117320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 50.0
Cr(OH)2+ + H+ + SO4-2 = CrOHSO4 + H2O
log_k 8.2871

delta_h 0 kJ
-gamma 0 0
Id: 2117321
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
2Cr(OH)2+ + SO4-2 + 2H+ = Cr2(OH)2SO4+2 + 2H2O
log_k 16.155
delta_h 0 kJ
-gamma 0 0
Id: 2117323
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
2Cr(OH)2+ + 2SO4-2 + 2H+ = Cr2(OH)2(SO4)2 + 2H2O
log_k 17.9288
delta_h 0 kJ
-gamma 0 0
Id: 2117324
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + SO4-2 = USO4+2
log_k 6.6
delta_h 8 kJ
-gamma 0 0
Id: 8917320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
U+4 + 2SO4-2 = U(SO4)2
log_k 10.5
delta_h 33 kJ
-gamma 0 0
Id: 8917321
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + SO4-2 = UO2SO4
log_k 3.18
delta_h 20 kJ
-gamma 0 0
Id: 8937320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + 2SO4-2 = UO2(SO4)2-2
log_k 4.3
delta_h 38 kJ
-gamma 0 0
Id: 8937321
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

V+3 + SO4-2 = VSO4+
log_k 2.674
delta_h 0 kJ
-gamma 0 0
Id: 9017320
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
VO+2 + SO4-2 = VOSO4
log_k 2.44
delta_h 17 kJ
-gamma 0 0
Id: 9027320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
VO2+ + SO4-2 = VO2SO4-
log_k 1.378
delta_h 0 kJ
-gamma 0 0
Id: 9037320
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
Be+2 + SO4-2 = BeSO4
log_k 2.19
delta_h 29 kJ
-gamma 0 0
Id: 1107321
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Be+2 + 2SO4-2 = Be(SO4)2-2
log_k 2.596
delta_h 0 kJ
-gamma 0 0
Id: 1107322
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Mg+2 + SO4-2 = MgSO4
log_k 2.26
delta_h 5.8 kJ
-gamma 0 0
Id: 4607320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + SO4-2 = CaSO4
log_k 2.36
delta_h 7.1 kJ
-gamma 0 0
Id: 1507320
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Sr+2 + SO4-2 = SrSO4
log_k 2.3
delta_h 8 kJ
-gamma 0 0
Id: 8007321
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Li+ + SO4-2 = LiSO4-
log_k 0.64
delta_h 0 kJ
-gamma 5 0
Id: 4407320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Na+ + SO4-2 = NaSO4-
log_k 0.73
delta_h 1 kJ
-gamma 5.4 0
Id: 5007320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
K+ + SO4-2 = KSO4-
log_k 0.85
delta_h 4.1 kJ
-gamma 5.4 0
Id: 4107320
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
HSe- + H+ = H2Se
log_k 3.89
delta_h 3.3 kJ
-gamma 0 0
Id: 3307600
log K source: NIST46.3
Delta H source: NIST2.1.1
#T and ionic strength: 0.00 25.0
2Ag+ + HSe- = Ag2Se + H+
log_k 34.911
delta_h 0 kJ
-gamma 0 0
Id: 207600
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Ag+ + H2O + 2HSe- = AgOH(Se)2-4 + 3H+
log_k -20.509
delta_h 0 kJ
-gamma 0 0

Id: 207601
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Mn+2 + HSe- = MnSe + H+
log_k -5.385
delta_h 0 kJ
-gamma 0 0
Id: 4707600
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
HSeO3- = SeO3-2 + H+
log_k -8.4
delta_h 5.02 kJ
-gamma 0 0
Id: 3307611
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
HSeO3- + H+ = H2SeO3
log_k 2.63
delta_h 6.2 kJ
-gamma 0 0
Id: 3307610
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2HSeO3- = Cd(SeO3)2-2 + 2H+
log_k -10.884
delta_h 0 kJ
-gamma 0 0
Id: 1607610
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Ag+ + HSeO3- = AgSeO3- + H+
log_k -5.592
delta_h 0 kJ
-gamma 0 0
Id: 207610
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Ag+ + 2HSeO3- = Ag(SeO3)2-3 + 2H+
log_k -13.04
delta_h 0 kJ
-gamma 0 0
Id: 207611
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Fe+3 + HSeO3- = FeHSeO3+2
log_k 3.422

delta_h 25 kJ
-gamma 0 0
Id: 2817610
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
SeO4-2 + H+ = HSeO4-
log_k 1.7
delta_h 23 kJ
-gamma 0 0
Id: 3307620
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Zn+2 + SeO4-2 = ZnSeO4
log_k 2.19
delta_h 0 kJ
-gamma 0 0
Id: 9507620
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + 2SeO4-2 = Zn(SeO4)2-2
log_k 2.196
delta_h 0 kJ
-gamma 0 0
Id: 9507621
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Cd+2 + SeO4-2 = CdSeO4
log_k 2.27
delta_h 0 kJ
-gamma 0 0
Id: 1607620
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + SeO4-2 = NiSeO4
log_k 2.67
delta_h 14 kJ
-gamma 0 0
Id: 5407620
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + SeO4-2 = CoSeO4
log_k 2.7
delta_h 12 kJ
-gamma 0 0
Id: 2007621
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0

Mn+2 + SeO4-2 = MnSeO4
log_k 2.43
delta_h 14 kJ
-gamma 0 0
Id: 4707620
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
NH4+ = NH3 + H+
log_k -9.244
delta_h 52 kJ
-gamma 0 0
Id: 3304900
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ag+ + NH4+ = AgNH3+ + H+
log_k -5.934
delta_h -72 kJ
-gamma 0 0
Id: 204901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + 2NH4+ = Ag(NH3)2+ + 2H+
log_k -11.268
delta_h -160 kJ
-gamma 0 0
Id: 204902
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Hg(OH)2 + H+ + NH4+ = HgNH3+2 + 2H2O
log_k 5.75
delta_h 0 kJ
-gamma 0 0
Id: 3614900
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 2.00 22.0
Hg(OH)2 + 2NH4+ = Hg(NH3)2+2 + 2H2O
log_k 5.506
delta_h -246.72 kJ
-gamma 0 0
Id: 3614901
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 1.00 25.0
Hg(OH)2 + 3NH4+ = Hg(NH3)3+2 + 2H2O + H+
log_k -3.138
delta_h -312.72 kJ
-gamma 0 0
Id: 3614902
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 2.00 25.0
Hg(OH)2 + 4NH4+ = Hg(NH3)4+2 + 2H2O + 2H+
log_k -11.482
delta_h -379.72 kJ
-gamma 0 0
Id: 3614903
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.10 25.0
Cu+2 + NH4+ = CuNH3+2 + H+
log_k -5.234
delta_h -72 kJ
-gamma 0 0
Id: 2314901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ni+2 + NH4+ = NiNH3+2 + H+
log_k -6.514
delta_h -67 kJ
-gamma 0 0
Id: 5404901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Ni+2 + 2NH4+ = Ni(NH3)2+2 + 2H+
log_k -13.598
delta_h -111.6 kJ
-gamma 0 0
Id: 5404902
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + NH4+ = Co(NH3)+2 + H+
log_k -7.164
delta_h -65 kJ
-gamma 0 0
Id: 2004900
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + 2NH4+ = Co(NH3)2+2 + 2H+
log_k -14.778
delta_h 0 kJ
-gamma 0 0
Id: 2004901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 2.00 25.0
Co+2 + 3NH4+ = Co(NH3)3+2 + 3H+
log_k -22.922
delta_h 0 kJ
-gamma 0 0

Id: 2004902
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 2.00 25.0
Co+2 + 4NH4+ = Co(NH3)4+2 + 4H+
log_k -31.446
delta_h 0 kJ
-gamma 0 0
Id: 2004903
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 2.00 30.0
Co+2 + 5NH4+ = Co(NH3)5+2 + 5H+
log_k -40.47
delta_h 0 kJ
-gamma 0 0
Id: 2004904
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 2.00 30.0
Co+3 + 6NH4+ + H2O = Co(NH3)6OH+2 + 7H+
log_k -43.7148
delta_h 0 kJ
-gamma 0 0
Id: 2014901
log K source: NIST2.1.1
Delta H source: MTQ3.11
#T and ionic strength:
Co+3 + 5NH4+ + Cl- = Co(NH3)5Cl+2 + 5H+
log_k -17.9584
delta_h 113.38 kJ
-gamma 0 0
Id: 2014902
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Co+3 + 6NH4+ + Cl- = Co(NH3)6Cl+2 + 6H+
log_k -33.9179
delta_h 104.34 kJ
-gamma 0 0
Id: 2014903
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Co+3 + 6NH4+ + Br- = Co(NH3)6Br+2 + 6H+
log_k -33.8884
delta_h 110.57 kJ
-gamma 0 0
Id: 2014904
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Co+3 + 6NH4+ + I- = Co(NH3)6I+2 + 6H+
log_k -33.4808

delta_h 115.44 kJ
-gamma 0 0
Id: 2014905
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Co+3 + 6NH4+ + SO4-2 = Co(NH3)6SO4+ + 6H+
log_k -28.9926
delta_h 124.5 kJ
-gamma 0 0
Id: 2014906
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Cr(OH)2+ + 6NH4+ = Cr(NH3)6+3 + 2H2O + 4H+
log_k -32.8952
delta_h 0 kJ
-gamma 0 0
Id: 2114900
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 4.50 25.0
Cr(OH)2+ + 5NH4+ = Cr(NH3)5OH+2 + 4H+ + H2O
log_k -30.2759
delta_h 0 kJ
-gamma 0 0
Id: 2114901
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + 6NH4+ + Cl- = Cr(NH3)6Cl+2 + 2H2O + 4H+
log_k -31.7932
delta_h 0 kJ
-gamma 0 0
Id: 2114904
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + 6NH4+ + Br- = Cr(NH3)6Br+2 + 4H+ + 2H2O
log_k -31.887
delta_h 0 kJ
-gamma 0 0
Id: 2114905
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cr(OH)2+ + 6NH4+ + I- = Cr(NH3)6I+2 + 4H+ + 2H2O
log_k -32.008
delta_h 0 kJ
-gamma 0 0
Id: 2114906
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:

#Cr(OH)2+ + 4NH4+ = cis+ + 4H+
log_k -29.8574
delta_h 0 kJ
-gamma 0 0
Id: 4902113
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
#Cr(OH)2+ + 4NH4+ = trans+ + 4H+
log_k -30.5537
delta_h 0 kJ
-gamma 0 0
Id: 4902114
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Ca+2 + NH4+ = CaNH3+2 + H+
log_k -9.144
delta_h 0 kJ
-gamma 0 0
Id: 1504901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Ca+2 + 2NH4+ = Ca(NH3)2+2 + 2H+
log_k -18.788
delta_h 0 kJ
-gamma 0 0
Id: 1504902
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Sr+2 + NH4+ = SrNH3+2 + H+
log_k -9.344
delta_h 0 kJ
-gamma 0 0
Id: 8004901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Ba+2 + NH4+ = BaNH3+2 + H+
log_k -9.444
delta_h 0 kJ
-gamma 0 0
Id: 1004901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Tl+ + NO2- = TlNO2
log_k 0.83
delta_h 0 kJ
-gamma 0 0
Id: 8704910
log K source: NIST46.3

Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + NO2- = AgNO2
log_k 2.32
delta_h -29 kJ
-gamma 0 0
Id: 204911
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + 2NO2- = Ag(NO2)2-
log_k 2.51
delta_h -46 kJ
-gamma 0 0
Id: 204910
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cu+2 + NO2- = CuNO2+
log_k 2.02
delta_h 0 kJ
-gamma 0 0
Id: 2314911
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + 2NO2- = Cu(NO2)2
log_k 3.03
delta_h 0 kJ
-gamma 0 0
Id: 2314912
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + NO2- = CoNO2+
log_k 0.848
delta_h 0 kJ
-gamma 0 0
Id: 2004911
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Sn(OH)2 + 2H+ + NO3- = SnNO3+ + 2H2O
log_k 7.942
delta_h 0 kJ
-gamma 0 0
Id: 7904921
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Pb+2 + NO3- = PbNO3+
log_k 1.17
delta_h 2 kJ
-gamma 0 0

Id: 6004920
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Pb+2 + 2NO3- = Pb(NO3)2
log_k 1.4
delta_h -6.6 kJ
-gamma 0 0
Id: 6004921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Tl+ + NO3- = TlNO3
log_k 0.33
delta_h -2 kJ
-gamma 0 0
Id: 8704920
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Tl(OH)3 + NO3- + 3H+ = TlNO3+2 + 3H2O
log_k 7.0073
delta_h 0 kJ
-gamma 0 0
Id: 8714920
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Cd+2 + NO3- = CdNO3+
log_k 0.5
delta_h -21 kJ
-gamma 0 0
Id: 1604920
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Cd+2 + 2NO3- = Cd(NO3)2
log_k 0.2
delta_h 0 kJ
-gamma 0 0
Id: 1604921
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + NO3- = HgNO3+ + 2H2O
log_k 5.7613
delta_h 0 kJ
-gamma 0 0
Id: 3614920
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Hg(OH)2 + 2H+ + 2NO3- = Hg(NO3)2 + 2H2O
log_k 5.38

delta_h 0 kJ
-gamma 0 0
Id: 3614921
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Cu+2 + NO3- = CuNO3+
log_k 0.5
delta_h -4.1 kJ
-gamma 0 0
Id: 2314921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+2 + 2NO3- = Cu(NO3)2
log_k -0.4
delta_h 0 kJ
-gamma 0 0
Id: 2314922
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + NO3- = ZnNO3+
log_k 0.4
delta_h -4.6 kJ
-gamma 0 0
Id: 9504921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Zn+2 + 2NO3- = Zn(NO3)2
log_k -0.3
delta_h 0 kJ
-gamma 0 0
Id: 9504922
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ag+ + NO3- = AgNO3
log_k -0.1
delta_h 22.6 kJ
-gamma 0 0
Id: 204920
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ni+2 + NO3- = NiNO3+
log_k 0.4
delta_h 0 kJ
-gamma 0 0
Id: 5404921
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0

Co+2 + NO3- = CoNO3+
log_k 0.2
delta_h 0 kJ
-gamma 0 0
Id: 2004921
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Co+2 + 2NO3- = Co(NO3)2
log_k 0.5085
delta_h 0 kJ
-gamma 0 0
Id: 2004922
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Fe+3 + NO3- = FeNO3+2
log_k 1
delta_h -37 kJ
-gamma 0 0
Id: 2814921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Mn+2 + NO3- = MnNO3+
log_k 0.2
delta_h 0 kJ
-gamma 0 0
Id: 4704921
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mn+2 + 2NO3- = Mn(NO3)2
log_k 0.6
delta_h -1.6569 kJ
-gamma 0 0
Id: 4704920
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + NO3- + 2H+ = CrNO3+2 + 2H2O
log_k 8.2094
delta_h -65.4378 kJ
-gamma 0 0
Id: 2114920
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + NO3- = UO2NO3+
log_k 0.3
delta_h -12 kJ
-gamma 0 0
Id: 8934921
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
VO2+ + NO3- = VO2NO3
log_k -0.296
delta_h 0 kJ
-gamma 0 0
Id: 9034920
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 1.00 20.0
Ca+2 + NO3- = CaNO3+
log_k 0.5
delta_h -5.4 kJ
-gamma 0 0
Id: 1504921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sr+2 + NO3- = SrNO3+
log_k 0.6
delta_h -10 kJ
-gamma 0 0
Id: 8004921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + NO3- = BaNO3+
log_k 0.7
delta_h -13 kJ
-gamma 0 0
Id: 1004921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H+ + Cyanide- = HCyanide
log_k 9.21
delta_h -43.63 kJ
-gamma 0 0
Id: 3301431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cd+2 + Cyanide- = CdCyanide+
log_k 6.01
delta_h -30 kJ
-gamma 0 0
Id: 1601431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cd+2 + 2Cyanide- = Cd(Cyanide)2
log_k 11.12
delta_h -54.3 kJ
-gamma 0 0

Id: 1601432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cd+2 + 3Cyanide- = Cd(Cyanide)3-
log_k 15.65
delta_h -90.3 kJ
-gamma 0 0
Id: 1601433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cd+2 + 4Cyanide- = Cd(Cyanide)4-2
log_k 17.92
delta_h -112 kJ
-gamma 0 0
Id: 1601434
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + Cyanide- = HgCyanide+ + 2H2O
log_k 23.194
delta_h -136.72 kJ
-gamma 0 0
Id: 3611431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 2Cyanide- = Hg(Cyanide)2 + 2H2O
log_k 38.944
delta_h 154.28 kJ
-gamma 0 0
Id: 3611432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 3Cyanide- = Hg(Cyanide)3- + 2H2O
log_k 42.504
delta_h -262.72 kJ
-gamma 0 0
Id: 3611433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 4Cyanide- = Hg(Cyanide)4-2 + 2H2O
log_k 45.164
delta_h -288.72 kJ
-gamma 0 0
Id: 3611434
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+ + 2Cyanide- = Cu(Cyanide)2-
log_k 21.9145

delta_h -121 kJ
-gamma 0 0
Id: 2301432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Cu+ + 3Cyanide- = Cu(Cyanide)3-2
log_k 27.2145
delta_h -167.4 kJ
-gamma 0 0
Id: 2301433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+ + 4Cyanide- = Cu(Cyanide)4-3
log_k 28.7145
delta_h -214.2 kJ
-gamma 0 0
Id: 2301431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + 2Cyanide- = Ag(Cyanide)2-
log_k 20.48
delta_h -137 kJ
-gamma 0 0
Id: 201432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + 3Cyanide- = Ag(Cyanide)3-2
log_k 21.7
delta_h -140 kJ
-gamma 0 0
Id: 201433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + H2O + Cyanide- = Ag(Cyanide)OH- + H+
log_k -0.777
delta_h 0 kJ
-gamma 0 0
Id: 201431
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + 4Cyanide- = Ni(Cyanide)4-2
log_k 30.2
delta_h -180 kJ
-gamma 0 0
Id: 5401431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0

Ni+2 + 4Cyanide- + H+ = NiH(Cyanide)4-
log_k 36.0289
delta_h 0 kJ
-gamma 0 0
Id: 5401432
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Ni+2 + 4Cyanide- + 2H+ = NiH2Cyanide4
log_k 40.7434
delta_h 0 kJ
-gamma 0 0
Id: 5401433
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Ni+2 + 4Cyanide- + 3H+ = NiH3(Cyanide)4+
log_k 43.3434
delta_h 0 kJ
-gamma 0 0
Id: 5401434
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Co+2 + 3Cyanide- = Co(Cyanide)3-
log_k 14.312
delta_h 0 kJ
-gamma 0 0
Id: 2001431
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 1.00 25.0
Co+2 + 5Cyanide- = Co(Cyanide)5-3
log_k 23
delta_h -257 kJ
-gamma 0 0
Id: 2001432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 1.00 25.0
Fe+2 + 6Cyanide- = Fe(Cyanide)6-4
log_k 35.4
delta_h -358 kJ
-gamma 0 0
Id: 2801431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H+ + Fe+2 + 6Cyanide- = HFe(Cyanide)6-3
log_k 39.71
delta_h -356 kJ
-gamma 0 0
Id: 2801432
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
2H+ + Fe+2 + 6Cyanide- = H2Fe(Cyanide)6-2
log_k 42.11
delta_h -352 kJ
-gamma 0 0
Id: 2801433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Fe+3 + 6Cyanide- = Fe(Cyanide)6-3
log_k 43.6
delta_h -293 kJ
-gamma 0 0
Id: 2811431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
2Fe+3 + 6Cyanide- = Fe2(Cyanide)6
log_k 47.6355
delta_h -218 kJ
-gamma 0 0
Id: 2811432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Sn(OH)2 + Fe+3 + 6Cyanide- + 2H+ = SnFe(Cyanide)6- + 2H2O
log_k 53.54
delta_h 0 kJ
-gamma 0 0
Id: 7901431
log K source: Ba1987
Delta H source:
#T and ionic strength: 0.00 25.0
NH4+ + Fe+2 + 6Cyanide- = NH4Fe(Cyanide)6-3
log_k 37.7
delta_h -354 kJ
-gamma 0 0
Id: 4901431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Tl+ + Fe+2 + 6Cyanide- = TlFe(Cyanide)6-3
log_k 38.4
delta_h -365.5 kJ
-gamma 0 0
Id: 8701432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Mg+2 + Fe+3 + 6Cyanide- = MgFe(Cyanide)6-
log_k 46.39
delta_h -290 kJ
-gamma 0 0

Id: 4601431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Mg+2 + Fe+2 + 6Cyanide- = MgFe(Cyanide)6-2
log_k 39.21
delta_h -346 kJ
-gamma 0 0
Id: 4601432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ca+2 + Fe+3 + 6Cyanide- = CaFe(Cyanide)6-
log_k 46.43
delta_h -291 kJ
-gamma 0 0
Id: 1501431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ca+2 + Fe+2 + 6Cyanide- = CaFe(Cyanide)6-2
log_k 39.1
delta_h -347 kJ
-gamma 0 0
Id: 1501432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
2Ca+2 + Fe+2 + 6Cyanide- = Ca2Fe(Cyanide)6
log_k 40.6
delta_h -350.201 kJ
-gamma 0 0
Id: 1501433
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Sr+2 + Fe+3 + 6Cyanide- = SrFe(Cyanide)6-
log_k 46.45
delta_h -292 kJ
-gamma 0 0
Id: 8001431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sr+2 + Fe+2 + 6Cyanide- = SrFe(Cyanide)6-2
log_k 39.1
delta_h -350 kJ
-gamma 0 0
Id: 8001432
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + Fe+2 + 6Cyanide- = BaFe(Cyanide)6-2
log_k 39.19

delta_h -342 kJ
-gamma 0 0
Id: 1001430
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + Fe+3 + 6Cyanide- = BaFe(Cyanide)6-
log_k 46.48
delta_h -292 kJ
-gamma 0 0
Id: 1001431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Na+ + Fe+2 + 6Cyanide- = NaFe(Cyanide)6-3
log_k 37.6
delta_h -354 kJ
-gamma 0 0
Id: 5001431
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
K+ + Fe+2 + 6Cyanide- = KFe(Cyanide)6-3
log_k 37.75
delta_h -353.9 kJ
-gamma 0 0
Id: 4101433
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
K+ + Fe+3 + 6Cyanide- = KFe(Cyanide)6-2
log_k 45.04
delta_h -291 kJ
-gamma 0 0
Id: 4101430
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H+ + PO4-3 = HPO4-2
log_k 12.375
delta_h -15 kJ
-gamma 5 0
Id: 3305800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
2H+ + PO4-3 = H2PO4-
log_k 19.573
delta_h -18 kJ
-gamma 5.4 0
Id: 3305801
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

3H+ + PO4-3 = H3PO4
log_k 21.721
delta_h -10.1 kJ
-gamma 0 0
Id: 3305802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Co+2 + H+ + PO4-3 = CoHPO4
log_k 15.4128
delta_h 0 kJ
-gamma 0 0
Id: 2005800
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Fe+2 + 2H+ + PO4-3 = FeH2PO4+
log_k 22.273
delta_h 0 kJ
-gamma 5.4 0
Id: 2805800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Fe+2 + H+ + PO4-3 = FeHPO4
log_k 15.975
delta_h 0 kJ
-gamma 0 0
Id: 2805801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Fe+3 + 2H+ + PO4-3 = FeH2PO4+2
log_k 23.8515
delta_h 0 kJ
-gamma 5.4 0
Id: 2815801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Fe+3 + H+ + PO4-3 = FeHPO4+
log_k 22.292
delta_h -30.5432 kJ
-gamma 5.4 0
Id: 2815800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Cr(OH)2+ + 4H+ + PO4-3 = CrH2PO4+2 + 2H2O
log_k 31.9068
delta_h 0 kJ
-gamma 0 0
Id: 2115800
log K source: MTQ3.11

Delta H source: MTQ3.11
#T and ionic strength:
U+4 + PO4-3 + H+ = UHPO4+2
log_k 24.443
delta_h 31.38 kJ
-gamma 0 0
Id: 8915800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 2PO4-3 + 2H+ = U(HPO4)2
log_k 46.833
delta_h 7.1128 kJ
-gamma 0 0
Id: 8915801
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 3PO4-3 + 3H+ = U(HPO4)3-2
log_k 67.564
delta_h -32.6352 kJ
-gamma 0 0
Id: 8915802
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
U+4 + 4PO4-3 + 4H+ = U(HPO4)4-4
log_k 88.483
delta_h -110.876 kJ
-gamma 0 0
Id: 8915803
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + H+ + PO4-3 = UO2HPO4
log_k 19.655
delta_h -8.7864 kJ
-gamma 0 0
Id: 8935800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
UO2+2 + 2PO4-3 + 2H+ = UO2(HPO4)2-2
log_k 42.988
delta_h -47.6934 kJ
-gamma 0 0
Id: 8935801
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + 2H+ + PO4-3 = UO2H2PO4+
log_k 22.833
delta_h -15.4808 kJ
-gamma 0 0

Id: 8935802
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
UO2+2 + 2PO4-3 + 4H+ = UO2(H2PO4)2
log_k 44.7
delta_h -69.036 kJ
-gamma 0 0
Id: 8935803
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + 3PO4-3 + 6H+ = UO2(H2PO4)3-
log_k 66.245
delta_h -119.662 kJ
-gamma 0 0
Id: 8935804
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
UO2+2 + PO4-3 = UO2PO4-
log_k 13.25
delta_h 0 kJ
-gamma 0 0
Id: 8935805
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mg+2 + PO4-3 = MgPO4-
log_k 4.654
delta_h 12.9704 kJ
-gamma 5.4 0
Id: 4605800
log K source: SCD3.02 (1993 GMa)
Delta H source: MTQ3.11
#T and ionic strength: 0.20 25.0
Mg+2 + 2H+ + PO4-3 = MgH2PO4+
log_k 21.2561
delta_h -4.6861 kJ
-gamma 5.4 0
Id: 4605801
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 37.0
Mg+2 + H+ + PO4-3 = MgHPO4
log_k 15.175
delta_h -3 kJ
-gamma 0 0
Id: 4605802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + H+ + PO4-3 = CaHPO4
log_k 15.035

delta_h -3 kJ
-gamma 0 0
Id: 1505800
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + PO4-3 = CaPO4-
log_k 6.46
delta_h 12.9704 kJ
-gamma 5.4 0
Id: 1505801
log K source: SCD3.02 (1993 GMa)
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ca+2 + 2H+ + PO4-3 = CaH2PO4+
log_k 20.923
delta_h -6 kJ
-gamma 5.4 0
Id: 1505802
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Sr+2 + H+ + PO4-3 = SrHPO4
log_k 14.8728
delta_h 0 kJ
-gamma 0 0
Id: 8005800
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Sr+2 + 2H+ + PO4-3 = SrH2PO4+
log_k 20.4019
delta_h 0 kJ
-gamma 0 0
Id: 8005801
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
Na+ + H+ + PO4-3 = NaHPO4-
log_k 13.445
delta_h 0 kJ
-gamma 5.4 0
Id: 5005800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
K+ + H+ + PO4-3 = KHPO4-
log_k 13.255
delta_h 0 kJ
-gamma 5.4 0
Id: 4105800
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0

H3AsO3 = AsO3-3 + 3H+
log_k -34.744
delta_h 84.726 kJ
-gamma 0 0
Id: 3300602
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H3AsO3 = HAsO3-2 + 2H+
log_k -21.33
delta_h 59.4086 kJ
-gamma 0 0
Id: 3300601
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H3AsO3 = H2AsO3- + H+
log_k -9.29
delta_h 27.41 kJ
-gamma 0 0
Id: 3300600
log K source: NIST46.4
Delta H source: NIST2.1.1
#T and ionic strength: 0.00 25.0
H3AsO3 + H+ = H4AsO3+
log_k -0.305
delta_h 0 kJ
-gamma 0 0
Id: 3300603
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
H3AsO4 = AsO4-3 + 3H+
log_k -20.7
delta_h 12.9 kJ
-gamma 0 0
Id: 3300613
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H3AsO4 = HAsO4-2 + 2H+
log_k -9.2
delta_h -4.1 kJ
-gamma 0 0
Id: 3300612
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H3AsO4 = H2AsO4- + H+
log_k -2.24
delta_h -7.1 kJ
-gamma 0 0
Id: 3300611
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sb(OH)3 + H2O = Sb(OH)4- + H+
log_k -12.0429
delta_h 69.8519 kJ
-gamma 0 0
Id: 7400020
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)3 + H+ = Sb(OH)2+ + H2O
log_k 1.3853
delta_h 0 kJ
-gamma 0 0
Id: 7403302
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)3 = HSbO2 + H2O
log_k -0.0105
delta_h -0.13 kJ
-gamma 0 0
Id: 7400021
log K source: NIST2.1.1
Delta H source: NIST2.1.1
#T and ionic strength:
Sb(OH)3 = SbO2- + H2O + H+
log_k -11.8011
delta_h 70.1866 kJ
-gamma 0 0
Id: 7403301
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)3 + H+ = SbO+ + 2H2O
log_k 0.9228
delta_h 8.2425 kJ
-gamma 0 0
Id: 7403300
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)6- = SbO3- + 3H2O
log_k 2.9319
delta_h 0 kJ
-gamma 0 0
Id: 7410021
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
Sb(OH)6- + 2H+ = SbO2+ + 4H2O
log_k 2.3895
delta_h 0 kJ
-gamma 0 0

Id: 7413300
log K source: PNL89
Delta H source: PNL89
#T and ionic strength:
H+ + CO3-2 = HCO3-
log_k 10.329
delta_h -14.6 kJ
-gamma 5.4 0
Id: 3301400
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
2H+ + CO3-2 = H2CO3
log_k 16.681
delta_h -23.76 kJ
-gamma 0 0
Id: 3301401
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Pb+2 + 2CO3-2 = Pb(CO3)2-2
log_k 9.938
delta_h 0 kJ
-gamma 0 0
Id: 6001400
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Pb+2 + CO3-2 = PbCO3
log_k 6.478
delta_h 0 kJ
-gamma 0 0
Id: 6001401
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Pb+2 + CO3-2 + H+ = PbHCO3+
log_k 13.2
delta_h 0 kJ
-gamma 0 0
Id: 6001402
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
Zn+2 + CO3-2 = ZnCO3
log_k 4.76
delta_h 0 kJ
-gamma 0 0
Id: 9501401
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Zn+2 + H+ + CO3-2 = ZnHCO3+
log_k 11.829

delta_h 0 kJ
-gamma 0 0
Id: 9501400
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + CO3-2 = HgCO3 + 2H2O
log_k 18.272
delta_h 0 kJ
-gamma 0 0
Id: 3611401
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 2H+ + 2CO3-2 = Hg(CO3)2-2 + 2H2O
log_k 21.772
delta_h 0 kJ
-gamma 0 0
Id: 3611402
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Hg(OH)2 + 3H+ + CO3-2 = HgHCO3+ + 2H2O
log_k 22.542
delta_h 0 kJ
-gamma 0 0
Id: 3611403
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Cd+2 + CO3-2 = CdCO3
log_k 4.3578
delta_h 0 kJ
-gamma 0 0
Id: 1601401
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
Cd+2 + H+ + CO3-2 = CdHCO3+
log_k 10.6863
delta_h 0 kJ
-gamma 0 0
Id: 1601400
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Cd+2 + 2CO3-2 = Cd(CO3)2-2
log_k 7.2278
delta_h 0 kJ
-gamma 0 0
Id: 1601403
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0

Cu+2 + CO3-2 = CuCO3
log_k 6.77
delta_h 0 kJ
-gamma 0 0
Id: 2311400
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + H+ + CO3-2 = CuHCO3+
log_k 12.129
delta_h 0 kJ
-gamma 0 0
Id: 2311402
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Cu+2 + 2CO3-2 = Cu(CO3)2-2
log_k 10.2
delta_h 0 kJ
-gamma 0 0
Id: 2311401
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Ni+2 + CO3-2 = NiCO3
log_k 4.5718
delta_h 0 kJ
-gamma 0 0
Id: 5401401
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.70 25.0
Ni+2 + H+ + CO3-2 = NiHCO3+
log_k 12.4199
delta_h 0 kJ
-gamma 0 0
Id: 5401400
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.70 25.0
Co+2 + CO3-2 = CoCO3
log_k 4.228
delta_h 0 kJ
-gamma 0 0
Id: 2001400
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
Co+2 + H+ + CO3-2 = CoHCO3+
log_k 12.2199
delta_h 0 kJ
-gamma 0 0
Id: 2001401
log K source: NIST46.4

Delta H source: MTQ3.11
#T and ionic strength: 0.70 25.0
Fe+2 + H+ + CO3-2 = FeHCO3+
log_k 11.429
delta_h 0 kJ
-gamma 6 0
Id: 2801400
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mn+2 + H+ + CO3-2 = MnHCO3+
log_k 11.629
delta_h -10.6 kJ
-gamma 5 0
Id: 4701400
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
UO2+2 + CO3-2 = UO2CO3
log_k 9.6
delta_h 4 kJ
-gamma 0 0
Id: 8931400
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + 2CO3-2 = UO2(CO3)2-2
log_k 16.9
delta_h 16 kJ
-gamma 0 0
Id: 8931401
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
UO2+2 + 3CO3-2 = UO2(CO3)3-4
log_k 21.6
delta_h -40 kJ
-gamma 0 0
Id: 8931402
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Be+2 + CO3-2 = BeCO3
log_k 6.2546
delta_h 0 kJ
-gamma 0 0
Id: 1101401
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 3.00 25.0
Mg+2 + CO3-2 = MgCO3
log_k 2.92
delta_h 12 kJ
-gamma 0 0

Id: 4601400
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Mg+2 + H+ + CO3-2 = MgHCO3+
log_k 11.339
delta_h -10.6 kJ
-gamma 4 0
Id: 4601401
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Ca+2 + H+ + CO3-2 = CaHCO3+
log_k 11.599
delta_h 5.4 kJ
-gamma 6 0
Id: 1501400
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
CO3-2 + Ca+2 = CaCO3
log_k 3.2
delta_h 16 kJ
-gamma 0 0
Id: 1501401
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
Sr+2 + CO3-2 = SrCO3
log_k 2.81
delta_h 20 kJ
-gamma 0 0
Id: 8001401
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sr+2 + H+ + CO3-2 = SrHCO3+
log_k 11.539
delta_h 10.4 kJ
-gamma 6 0
Id: 8001400
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + CO3-2 = BaCO3
log_k 2.71
delta_h 16 kJ
-gamma 0 0
Id: 1001401
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + H+ + CO3-2 = BaHCO3+
log_k 11.309

delta_h 10.4 kJ
-gamma 6 0
Id: 1001400
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Na+ + CO3-2 = NaCO3-
log_k 1.27
delta_h -20.35 kJ
-gamma 5.4 0
Id: 5001400
log K source: NIST46.3
Delta H source: NIST2.1.1
#T and ionic strength: 0.00 25.0
Na+ + H+ + CO3-2 = NaHCO3
log_k 10.079
delta_h -28.3301 kJ
-gamma 0 0
Id: 5001401
log K source: NIST46.3
Delta H source: NIST2.1.1
#T and ionic strength: 0.00 25.0
H4SiO4 = H2SiO4-2 + 2H+
log_k -23.04
delta_h 61 kJ
-gamma 5.4 0
Id: 3307701
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
H4SiO4 = H3SiO4- + H+
log_k -9.84
delta_h 20 kJ
-gamma 4 0
Id: 3307700
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
UO2+2 + H4SiO4 = UO2H3SiO4+ + H+
log_k -1.9111
delta_h 0 kJ
-gamma 0 0
Id: 8937700
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 25.0
H3BO3 = H2BO3- + H+
log_k -9.236
delta_h 13 kJ
-gamma 2.5 0
Id: 3300900
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0

2H3BO3 = H5(BO3)2- + H+
log_k -9.306
delta_h 8.4 kJ
-gamma 2.5 0
Id: 3300901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
3H3BO3 = H8(BO3)3- + H+
log_k -7.306
delta_h 29.4 kJ
-gamma 2.5 0
Id: 3300902
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + H3BO3 = AgH2BO3 + H+
log_k -8.036
delta_h 0 kJ
-gamma 2.5 0
Id: 200901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Mg+2 + H3BO3 = MgH2BO3+ + H+
log_k -7.696
delta_h 13 kJ
-gamma 2.5 0
Id: 4600901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ca+2 + H3BO3 = CaH2BO3+ + H+
log_k -7.476
delta_h 17 kJ
-gamma 2.5 0
Id: 1500901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sr+2 + H3BO3 = SrH2BO3+ + H+
log_k -7.686
delta_h 17 kJ
-gamma 2.5 0
Id: 8000901
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + H3BO3 = BaH2BO3+ + H+
log_k -7.746
delta_h 17 kJ
-gamma 2.5 0
Id: 1000901
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Na+ + H3BO3 = NaH2BO3 + H+
log_k -9.036
delta_h 0 kJ
-gamma 2.5 0
Id: 5000901
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
CrO4-2 + H+ = HCrO4-
log_k 6.51
delta_h 2 kJ
-gamma 0 0
Id: 2123300
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
CrO4-2 + 2H+ = H2CrO4
log_k 6.4188
delta_h 39 kJ
-gamma 0 0
Id: 2123301
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 20.0
2CrO4-2 + 2H+ = Cr2O7-2 + H2O
log_k 14.56
delta_h -15 kJ
-gamma 0 0
Id: 2123302
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
CrO4-2 + Cl- + 2H+ = CrO3Cl- + H2O
log_k 7.3086
delta_h 0 kJ
-gamma 0 0
Id: 2121800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
CrO4-2 + SO4-2 + 2H+ = CrO3SO4-2 + H2O
log_k 8.9937
delta_h 0 kJ
-gamma 0 0
Id: 2127320
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
CrO4-2 + 4H+ + PO4-3 = CrO3H2PO4- + H2O
log_k 29.3634
delta_h 0 kJ
-gamma 0 0

Id: 2125800
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
CrO4-2 + 3H+ + PO4-3 = CrO3HPO4-2 + H2O
log_k 26.6806
delta_h 0 kJ
-gamma 0 0
Id: 2125801
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
CrO4-2 + Na+ = NaCrO4-
log_k 0.6963
delta_h 0 kJ
-gamma 0 0
Id: 5002120
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
K+ + CrO4-2 = KCrO4-
log_k 0.57
delta_h 0 kJ
-gamma 0 0
Id: 4102120
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.00 18.0
MoO4-2 + H+ = HMoO4-
log_k 4.2988
delta_h 20 kJ
-gamma 0 0
Id: 3304801
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 20.0
MoO4-2 + 2H+ = H2MoO4
log_k 8.1636
delta_h -26 kJ
-gamma 0 0
Id: 3304802
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 20.0
7MoO4-2 + 8H+ = Mo7O24-6 + 4H2O
log_k 52.99
delta_h -228 kJ
-gamma 0 0
Id: 3304803
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
7MoO4-2 + 9H+ = HMo7O24-5 + 4H2O
log_k 59.3768

delta_h -218 kJ
-gamma 0 0
Id: 3304804
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
7MoO4-2 + 10H+ = H2Mo7O24-4 + 4H2O
log_k 64.159
delta_h -215 kJ
-gamma 0 0
Id: 3304805
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
7MoO4-2 + 11H+ = H3Mo7O24-3 + 4H2O
log_k 67.405
delta_h -217 kJ
-gamma 0 0
Id: 3304806
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 1.00 25.0
6MoO4-2 + Al+3 + 6H+ = AlMo6O21-3 + 3H2O
log_k 54.9925
delta_h 0 kJ
-gamma 0 0
Id: 304801
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.50 25.0
MoO4-2 + 2Ag+ = Ag2MoO4
log_k -0.4219
delta_h -1.18 kJ
-gamma 0 0
Id: 204801
log K source: Bard85
Delta H source: Bard85
#T and ionic strength:
VO2+ + 2H2O = VO4-3 + 4H+
log_k -30.2
delta_h -25 kJ
-gamma 0 0
Id: 9033303
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
VO2+ + 2H2O = HVO4-2 + 3H+
log_k -15.9
delta_h 0 kJ
-gamma 0 0
Id: 9033302
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0

VO2+ + 2H2O = H2VO4- + 2H+
log_k -7.3
delta_h 0 kJ
-gamma 0 0
Id: 9033301
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
VO2+ + 2H2O = H3VO4 + H+
log_k -3.3
delta_h 44.4759 kJ
-gamma 0 0
Id: 9033300
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
2VO2+ + 3H2O = V2O7-4 + 6H+
log_k -31.24
delta_h -28 kJ
-gamma 0 0
Id: 9030020
log K source: NIST46.3
Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
2VO2+ + 3H2O = HV2O7-3 + 5H+
log_k -20.67
delta_h 0 kJ
-gamma 0 0
Id: 9030021
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
2VO2+ + 3H2O = H3V2O7- + 3H+
log_k -3.79
delta_h 0 kJ
-gamma 0 0
Id: 9030022
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
3VO2+ + 3H2O = V3O9-3 + 6H+
log_k -15.88
delta_h 0 kJ
-gamma 0 0
Id: 9030023
log K source: MTQ3.11
Delta H source: MTQ3.11
#T and ionic strength:
4VO2+ + 4H2O = V4O12-4 + 8H+
log_k -20.56
delta_h -87 kJ
-gamma 0 0
Id: 9030024
log K source: NIST46.3

Delta H source: NIST46.3
#T and ionic strength: 0.00 25.0
10VO2+ + 8H2O = V10O28-6 + 16H+
log_k -24.0943
delta_h 0 kJ
-gamma 0 0
Id: 9030025
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
10VO2+ + 8H2O = HV10O28-5 + 15H+
log_k -15.9076
delta_h 90.0397 kJ
-gamma 0 0
Id: 9030026
log K source: NIST46.4
Delta H source: MTQ3.11
#T and ionic strength: 0.10 20.0
10VO2+ + 8H2O = H2V10O28-4 + 14H+
log_k -10.7
delta_h 0 kJ
-gamma 0 0
Id: 9030027
log K source: NIST46.3
Delta H source: MTQ3.11
#T and ionic strength: 0.00 25.0
Benzoate- + H+ = H(Benzoate)
log_k 4.202
delta_h -0.4602 kJ
-gamma 0 0
Id: 3309171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Pb+2 = Pb(Benzoate)+
log_k 2.4
delta_h 0 kJ
-gamma 0 0
Id: 6009171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Al+3 = Al(Benzoate)+2
log_k 2.05
delta_h 0 kJ
-gamma 0 0
Id: 309171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Al+3 + H2O = AlOH(Benzoate)+ + H+
log_k -0.56
delta_h 0 kJ
-gamma 0 0

Id: 309172
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Zn+2 = Zn(Benzoate)+
log_k 1.7
delta_h 0 kJ
-gamma 0 0
Id: 9509171
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Benzoate- + Cd+2 = Cd(Benzoate)+
log_k 1.8
delta_h 0 kJ
-gamma 0 0
Id: 1609171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2Benzoate- + Cd+2 = Cd(Benzoate)2
log_k 1.82
delta_h 0 kJ
-gamma 0 0
Id: 1609172
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Benzoate- + Cu+2 = Cu(Benzoate)+
log_k 2.19
delta_h 0 kJ
-gamma 0 0
Id: 2319171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Ag+ = Ag(Benzoate)
log_k 0.91
delta_h 0 kJ
-gamma 0 0
Id: 209171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Ni+2 = Ni(Benzoate)+
log_k 1.86
delta_h 0 kJ
-gamma 0 0
Id: 5409171
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Co+2 + Benzoate- = Co(Benzoate)+
log_k 1.0537

delta_h 12 kJ
-gamma 0 0
Id: 2009171
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 30.0
Benzoate- + Mn+2 = Mn(Benzoate)+
log_k 2.06
delta_h 0 kJ
-gamma 0 0
Id: 4709171
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Benzoate- + Mg+2 = Mg(Benzoate)+
log_k 1.26
delta_h 0 kJ
-gamma 0 0
Id: 4609171
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Benzoate- + Ca+2 = Ca(Benzoate)+
log_k 1.55
delta_h 0 kJ
-gamma 0 0
Id: 1509171
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Phenylacetate- + H+ = H(Phenylacetate)
log_k 4.31
delta_h 2.1757 kJ
-gamma 0 0
Id: 3309181
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Phenylacetate- + Zn+2 = Zn(Phenylacetate)+
log_k 1.57
delta_h 0 kJ
-gamma 0 0
Id: 9509181
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Phenylacetate- + Cu+2 = Cu(Phenylacetate)+
log_k 1.97
delta_h 0 kJ
-gamma 0 0
Id: 2319181
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Co+2 + Phenylacetate- = Co(Phenylacetate)+
log_k 0.591
delta_h 0 kJ
-gamma 0 0
Id: 2009181
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Co+2 + 2Phenylacetate- = Co(Phenylacetate)2
log_k 0.4765
delta_h 0 kJ
-gamma 0 0
Id: 2009182
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Isophthalate-2 + H+ = H(Isophthalate)-
log_k 4.5
delta_h 1.6736 kJ
-gamma 0 0
Id: 3309201
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + 2H+ = H2(Isophthalate)
log_k 8
delta_h 1.6736 kJ
-gamma 0 0
Id: 3309202
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Pb+2 = Pb(Isophthalate)
log_k 2.99
delta_h 0 kJ
-gamma 0 0
Id: 6009201
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2Isophthalate-2 + Pb+2 = Pb(Isophthalate)2-2
log_k 4.18
delta_h 0 kJ
-gamma 0 0
Id: 6009202
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Pb+2 + H+ = PbH(Isophthalate)+
log_k 6.69
delta_h 0 kJ
-gamma 0 0
Id: 6009203
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Cd+2 = Cd(Isophthalate)
log_k 2.15
delta_h 0 kJ
-gamma 0 0
Id: 1609201
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2Isophthalate-2 + Cd+2 = Cd(Isophthalate)2-2
log_k 2.99
delta_h 0 kJ
-gamma 0 0
Id: 1609202
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Cd+2 + H+ = CdH(Isophthalate)+
log_k 5.73
delta_h 0 kJ
-gamma 0 0
Id: 1609203
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Ca+2 = Ca(Isophthalate)
log_k 2
delta_h 0 kJ
-gamma 0 0
Id: 1509200
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Isophthalate-2 + Ba+2 = Ba(Isophthalate)
log_k 1.55
delta_h 0 kJ
-gamma 0 0
Id: 1009201
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Diethylamine = H(Diethylamine)+
log_k 10.933
delta_h -53.1368 kJ
-gamma 0 0
Id: 3309551
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Diethylamine = Zn(Diethylamine)+2
log_k 2.74
delta_h 0 kJ
-gamma 0 0

Id: 9509551
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 2Diethylamine = Zn(Diethylamine)2+2
log_k 5.27
delta_h 0 kJ
-gamma 0 0
Id: 9509552
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 3Diethylamine = Zn(Diethylamine)3+2
log_k 7.71
delta_h 0 kJ
-gamma 0 0
Id: 9509553
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 4Diethylamine = Zn(Diethylamine)4+2
log_k 9.84
delta_h 0 kJ
-gamma 0 0
Id: 9509554
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + Diethylamine = Cd(Diethylamine)+2
log_k 2.73
delta_h 0 kJ
-gamma 0 0
Id: 1609551
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 2Diethylamine = Cd(Diethylamine)2+2
log_k 4.86
delta_h 0 kJ
-gamma 0 0
Id: 1609552
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 3Diethylamine = Cd(Diethylamine)3+2
log_k 6.37
delta_h 0 kJ
-gamma 0 0
Id: 1609553
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 4Diethylamine = Cd(Diethylamine)4+2
log_k 7.32

delta_h 0 kJ
-gamma 0 0
Id: 1609554
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ag+ + Diethylamine = Ag(Diethylamine)+
log_k 2.98
delta_h 0 kJ
-gamma 0 0
Id: 209551
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Diethylamine = Ag(Diethylamine)2+
log_k 6.38
delta_h -44.7688 kJ
-gamma 0 0
Id: 209552
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Diethylamine = Ni(Diethylamine)+2
log_k 2.78
delta_h 0 kJ
-gamma 0 0
Id: 5409551
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 2Diethylamine = Ni(Diethylamine)2+2
log_k 4.97
delta_h 0 kJ
-gamma 0 0
Id: 5409552
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 3Diethylamine = Ni(Diethylamine)3+2
log_k 6.72
delta_h 0 kJ
-gamma 0 0
Id: 5409553
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 4Diethylamine = Ni(Diethylamine)4+2
log_k 7.93
delta_h 0 kJ
-gamma 0 0
Id: 5409554
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Ni+2 + 5Diethylamine = Ni(Diethylamine)5+2
log_k 8.87
delta_h 0 kJ
-gamma 0 0
Id: 5409555
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Butylamine = H(Butylamine)+
log_k 10.64
delta_h -58.2831 kJ
-gamma 0 0
Id: 3309561
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Butylamine + 2H+ = Hg(Butylamine)+2 + 2H2O
log_k 14.84
delta_h 0 kJ
-gamma 0 0
Id: 3619561
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 2Butylamine + 2H+ = Hg(Butylamine)2+2 + 2H2O
log_k 24.24
delta_h 0 kJ
-gamma 0 0
Id: 3619562
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 3Butylamine + 2H+ = Hg(Butylamine)3+2 + 2H2O
log_k 25.1
delta_h 0 kJ
-gamma 0 0
Id: 3619563
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 4Butylamine + 2H+ = Hg(Butylamine)4+2 + 2H2O
log_k 26.1
delta_h 0 kJ
-gamma 0 0
Id: 3619564
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Butylamine = Ag(Butylamine)+
log_k 3.42
delta_h -16.736 kJ
-gamma 0 0
Id: 209561
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Butylamine = Ag(Butylamine)2+
log_k 7.47
delta_h -52.7184 kJ
-gamma 0 0
Id: 209562
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Methylamine = H(Methylamine)+
log_k 10.64
delta_h -55.2288 kJ
-gamma 0 0
Id: 3309581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Methylamine = Cd(Methylamine)+2
log_k 2.75
delta_h 0 kJ
-gamma 0 0
Id: 1609581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Methylamine = Cd(Methylamine)2+2
log_k 4.81
delta_h -29.288 kJ
-gamma 0 0
Id: 1609582
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 3Methylamine = Cd(Methylamine)3+2
log_k 5.94
delta_h 0 kJ
-gamma 0 0
Id: 1609583
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 4Methylamine = Cd(Methylamine)4+2
log_k 6.55
delta_h -58.576 kJ
-gamma 0 0
Id: 1609584
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Methylamine + 2H+ = Hg(Methylamine)+2 + 2H2O
log_k 14.76
delta_h 0 kJ
-gamma 0 0

Id: 3619581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 2Methylamine + 2H+ = Hg(Methylamine)2+2 + 2H2O
log_k 23.96
delta_h 0 kJ
-gamma 0 0
Id: 3619582
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 3Methylamine + 2H+ = Hg(Methylamine)3+2 + 2H2O
log_k 24.3
delta_h 0 kJ
-gamma 0 0
Id: 3619583
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 4Methylamine + 2H+ = Hg(Methylamine)4+2 + 2H2O
log_k 24.6
delta_h 0 kJ
-gamma 0 0
Id: 3619584
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Methylamine = Cu(Methylamine)+2
log_k 4.11
delta_h 0 kJ
-gamma 0 0
Id: 2319581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Methylamine = Cu(Methylamine)2+2
log_k 7.51
delta_h 0 kJ
-gamma 0 0
Id: 2319582
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 3Methylamine = Cu(Methylamine)3+2
log_k 10.21
delta_h 0 kJ
-gamma 0 0
Id: 2319583
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 4Methylamine = Cu(Methylamine)4+2
log_k 12.08

delta_h 0 kJ
-gamma 0 0
Id: 2319584
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Methylamine = Ag(Methylamine)+
log_k 3.07
delta_h -12.552 kJ
-gamma 0 0
Id: 209581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Methylamine = Ag(Methylamine)2+
log_k 6.89
delta_h -48.9528 kJ
-gamma 0 0
Id: 209582
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Methylamine = Ni(Methylamine)+2
log_k 2.23
delta_h 0 kJ
-gamma 0 0
Id: 5409581
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Dimethylamine = H(Dimethylamine)+
log_k 10.774
delta_h -50.208 kJ
-gamma 0 0
Id: 3309591
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Dimethylamine = Ag(Dimethylamine)2+
log_k 5.37
delta_h -40.5848 kJ
-gamma 0 0
Id: 209591
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Dimethylamine = Ni(Dimethylamine)+2
log_k 1.47
delta_h 0 kJ
-gamma 0 0
Id: 5409591
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

H+ + Hexylamine = H(Hexylamine)+
log_k 10.63
delta_h -58.576 kJ
-gamma 0 0
Id: 3309611
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Hexylamine = Ag(Hexylamine)+
log_k 3.54
delta_h -25.104 kJ
-gamma 0 0
Id: 209611
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Hexylamine = Ag(Hexylamine)2+
log_k 7.55
delta_h -53.1368 kJ
-gamma 0 0
Id: 209612
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Ethylenediamine = H(Ethylenediamine)+
log_k 9.928
delta_h -49.7896 kJ
-gamma 0 0
Id: 3309631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Ethylenediamine = H2(Ethylenediamine)+2
log_k 16.776
delta_h -95.3952 kJ
-gamma 0 0
Id: 3309632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Ethylenediamine = Pb(Ethylenediamine)+2
log_k 5.04
delta_h 0 kJ
-gamma 0 0
Id: 6009631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + 2Ethylenediamine = Pb(Ethylenediamine)2+2
log_k 8.5
delta_h 0 kJ
-gamma 0 0
Id: 6009632
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Ethylenediamine = Zn(Ethylenediamine)+2
log_k 5.66
delta_h -29.288 kJ
-gamma 0 0
Id: 9509631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Ethylenediamine = Zn(Ethylenediamine)2+2
log_k 10.6
delta_h -48.116 kJ
-gamma 0 0
Id: 9509632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 3Ethylenediamine = Zn(Ethylenediamine)3+2
log_k 13.9
delta_h -71.5464 kJ
-gamma 0 0
Id: 9509633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Ethylenediamine = Cd(Ethylenediamine)+2
log_k 5.41
delta_h -28.4512 kJ
-gamma 0 0
Id: 1609631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Ethylenediamine = Cd(Ethylenediamine)2+2
log_k 9.9
delta_h -55.6472 kJ
-gamma 0 0
Id: 1609632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 3Ethylenediamine = Cd(Ethylenediamine)3+2
log_k 11.6
delta_h -82.4248 kJ
-gamma 0 0
Id: 1609633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Ethylenediamine + 2H+ = Hg(Ethylenediamine)+2 + 2H2O
log_k 20.4
delta_h 0 kJ
-gamma 0 0

Id: 3619631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 2Ethylenediamine + 2H+ = Hg(Ethylenediamine)2+2 + 2H2O
log_k 29.3
delta_h -173.218 kJ
-gamma 0 0
Id: 3619632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 2Ethylenediamine + 3H+ = HgH(Ethylenediamine)2+3 + 2H2O
log_k 34.7
delta_h 0 kJ
-gamma 0 0
Id: 3619633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 2Ethylenediamine = Cu(Ethylenediamine)2+
log_k 11.2
delta_h 0 kJ
-gamma 0 0
Id: 2309631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Ethylenediamine = Cu(Ethylenediamine)+2
log_k 10.5
delta_h -52.7184 kJ
-gamma 0 0
Id: 2319631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Ethylenediamine = Cu(Ethylenediamine)2+2
log_k 19.6
delta_h -105.437 kJ
-gamma 0 0
Id: 2319632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Ethylenediamine = Ag(Ethylenediamine)+
log_k 4.6
delta_h -48.9528 kJ
-gamma 0 0
Id: 209631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Ethylenediamine = Ag(Ethylenediamine)2+
log_k 7.5

delta_h -52.3 kJ
-gamma 0 0
Id: 209632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Ethylenediamine + H+ = AgH(Ethylenediamine)+2
log_k 11.99
delta_h -75.312 kJ
-gamma 0 0
Id: 209633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2Ag+ + Ethylenediamine = Ag2(Ethylenediamine)+2
log_k 6.5
delta_h 0 kJ
-gamma 0 0
Id: 209634
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2Ag+ + 2Ethylenediamine = Ag2(Ethylenediamine)2+2
log_k 12.7
delta_h -97.0688 kJ
-gamma 0 0
Id: 209635
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Ethylenediamine + 2H+ = Ag(HEthylenediamine)2+3
log_k 24
delta_h -150.206 kJ
-gamma 0 0
Id: 209636
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Ethylenediamine + H+ = AgH(Ethylenediamine)2+2
log_k 8.4
delta_h -47.6976 kJ
-gamma 0 0
Id: 209637
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Ethylenediamine = Ni(Ethylenediamine)+2
log_k 7.32
delta_h -37.656 kJ
-gamma 0 0
Id: 5409631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Ni+2 + 2Ethylenediamine = Ni(Ethylenediamine)2+2
log_k 13.5
delta_h -76.5672 kJ
-gamma 0 0
Id: 5409632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 3Ethylenediamine = Ni(Ethylenediamine)3+2
log_k 17.6
delta_h -117.152 kJ
-gamma 0 0
Id: 5409633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Ethylenediamine = Co(Ethylenediamine)+2
log_k 5.5
delta_h -28 kJ
-gamma 0 0
Id: 2009631
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + 2Ethylenediamine = Co(Ethylenediamine)2+2
log_k 10.1
delta_h -58.5 kJ
-gamma 0 0
Id: 2009632
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + 3Ethylenediamine = Co(Ethylenediamine)3+2
log_k 13.2
delta_h -92.8 kJ
-gamma 0 0
Id: 2009633
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+3 + 2Ethylenediamine = Co(Ethylenediamine)2+3
log_k 34.7
delta_h 0 kJ
-gamma 0 0
Id: 2019631
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Co+3 + 3Ethylenediamine = Co(Ethylenediamine)3+3
log_k 48.69
delta_h 0 kJ
-gamma 0 0
Id: 2019632
log K source: NIST46.4

Delta H source: NIST46.2
#T and ionic strength: 1.50 30.0
Fe+2 + Ethylenediamine = Fe(Ethylenediamine)+2
log_k 4.26
delta_h 0 kJ
-gamma 0 0
Id: 2809631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + 2Ethylenediamine = Fe(Ethylenediamine)2+2
log_k 7.73
delta_h 0 kJ
-gamma 0 0
Id: 2809632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + 3Ethylenediamine = Fe(Ethylenediamine)3+2
log_k 10.17
delta_h 0 kJ
-gamma 0 0
Id: 2809633
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Ethylenediamine = Mn(Ethylenediamine)+2
log_k 2.74
delta_h -11.7152 kJ
-gamma 0 0
Id: 4709631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + 2Ethylenediamine = Mn(Ethylenediamine)2+2
log_k 4.8
delta_h -25.104 kJ
-gamma 0 0
Id: 4709632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + 2Ethylenediamine + 2H+ = Cr(Ethylenediamine)2+3 + 2H2O
log_k 22.57
delta_h 0 kJ
-gamma 0 0
Id: 2119631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + 3Ethylenediamine + 2H+ = Cr(Ethylenediamine)3+3 + 2H2O
log_k 29
delta_h 0 kJ
-gamma 0 0

Id: 2119632
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Ethylenediamine = Mg(Ethylenediamine)+2
log_k 0.37
delta_h 0 kJ
-gamma 0 0
Id: 4609631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Ethylenediamine = Ca(Ethylenediamine)+2
log_k 0.11
delta_h 0 kJ
-gamma 0 0
Id: 1509631
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Propylamine = H(Propylamine)+
log_k 10.566
delta_h -57.53 kJ
-gamma 0 0
Id: 3309641
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Propylamine = Zn(Propylamine)+2
log_k 2.42
delta_h 0 kJ
-gamma 0 0
Id: 9509641
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 2Propylamine = Zn(Propylamine)2+2
log_k 4.85
delta_h 0 kJ
-gamma 0 0
Id: 9509642
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 3Propylamine = Zn(Propylamine)3+2
log_k 7.38
delta_h 0 kJ
-gamma 0 0
Id: 9509643
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 4Propylamine = Zn(Propylamine)4+2
log_k 9.49

delta_h 0 kJ
-gamma 0 0
Id: 9509644
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + Propylamine = Cd(Propylamine)+2
log_k 2.62
delta_h 0 kJ
-gamma 0 0
Id: 1609641
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 2Propylamine = Cd(Propylamine)2+2
log_k 4.64
delta_h 0 kJ
-gamma 0 0
Id: 1609642
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 3Propylamine = Cd(Propylamine)3+2
log_k 6.03
delta_h 0 kJ
-gamma 0 0
Id: 1609643
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ag+ + Propylamine = Ag(Propylamine)+
log_k 3.45
delta_h -12.552 kJ
-gamma 0 0
Id: 209641
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Propylamine = Ag(Propylamine)2+
log_k 7.44
delta_h -53.1368 kJ
-gamma 0 0
Id: 209642
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Propylamine = Ni(Propylamine)+2
log_k 2.81
delta_h 0 kJ
-gamma 0 0
Id: 5409641
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Ni+2 + 2Propylamine = Ni(Propylamine)2+2
log_k 5.02
delta_h 0 kJ
-gamma 0 0
Id: 5409642
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 3Propylamine = Ni(Propylamine)3+2
log_k 6.79
delta_h 0 kJ
-gamma 0 0
Id: 5409643
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 4Propylamine = Ni(Propylamine)4+2
log_k 8.31
delta_h 0 kJ
-gamma 0 0
Id: 5409644
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Isopropylamine = H(Isopropylamine)+
log_k 10.67
delta_h -58.3668 kJ
-gamma 0 0
Id: 3309651
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Isopropylamine = Zn(Isopropylamine)+2
log_k 2.37
delta_h 0 kJ
-gamma 0 0
Id: 9509651
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 2Isopropylamine = Zn(Isopropylamine)2+2
log_k 4.67
delta_h 0 kJ
-gamma 0 0
Id: 9509652
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 3Isopropylamine = Zn(Isopropylamine)3+2
log_k 7.14
delta_h 0 kJ
-gamma 0 0
Id: 9509653
log K source: SCD2.62

Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 4Isopropylamine = Zn(Isopropylamine)4+2
log_k 9.44
delta_h 0 kJ
-gamma 0 0
Id: 9509654
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + Isopropylamine = Cd(Isopropylamine)+2
log_k 2.55
delta_h 0 kJ
-gamma 0 0
Id: 1609651
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 2Isopropylamine = Cd(Isopropylamine)2+2
log_k 4.57
delta_h 0 kJ
-gamma 0 0
Id: 1609652
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 3Isopropylamine = Cd(Isopropylamine)3+2
log_k 6.07
delta_h 0 kJ
-gamma 0 0
Id: 1609653
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 4Isopropylamine = Cd(Isopropylamine)4+2
log_k 6.9
delta_h 0 kJ
-gamma 0 0
Id: 1609654
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Hg(OH)2 + Isopropylamine + 2H+ = Hg(Isopropylamine)+2 + 2H2O
log_k 14.85
delta_h 0 kJ
-gamma 0 0
Id: 3619651
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + 2Isopropylamine + 2H+ = Hg(Isopropylamine)2+2 + 2H2O
log_k 24.37
delta_h 0 kJ
-gamma 0 0

Id: 3619652
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Isopropylamine = Ag(Isopropylamine)+
log_k 3.67
delta_h -23.8488 kJ
-gamma 0 0
Id: 209651
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Isopropylamine = Ag(Isopropylamine)2+
log_k 7.77
delta_h -59.8312 kJ
-gamma 0 0
Id: 209652
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Isopropylamine = Ni(Isopropylamine)+2
log_k 2.71
delta_h 0 kJ
-gamma 0 0
Id: 5409651
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 2Isopropylamine = Ni(Isopropylamine)2+2
log_k 4.86
delta_h 0 kJ
-gamma 0 0
Id: 5409652
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 3Isopropylamine = Ni(Isopropylamine)3+2
log_k 6.57
delta_h 0 kJ
-gamma 0 0
Id: 5409653
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 4Isopropylamine = Ni(Isopropylamine)4+2
log_k 7.83
delta_h 0 kJ
-gamma 0 0
Id: 5409654
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + 5Isopropylamine = Ni(Isopropylamine)5+2
log_k 8.43

delta_h 0 kJ
-gamma 0 0
Id: 5409655
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Trimethylamine = H(Trimethylamine)+
log_k 9.8
delta_h -36.8192 kJ
-gamma 0 0
Id: 3309661
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Trimethylamine = Ag(Trimethylamine)+
log_k 1.701
delta_h 0 kJ
-gamma 0 0
Id: 209661
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Citrate-3 = H(Citrate)-2
log_k 6.396
delta_h 3.3472 kJ
-gamma 0 0
Id: 3309671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Citrate-3 = H2(Citrate)-
log_k 11.157
delta_h 1.297 kJ
-gamma 0 0
Id: 3309672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
3H+ + Citrate-3 = H3(Citrate)
log_k 14.285
delta_h -2.7614 kJ
-gamma 0 0
Id: 3309673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Citrate-3 = Pb(Citrate)-
log_k 7.27
delta_h 0 kJ
-gamma 0 0
Id: 6009671
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Pb+2 + 2Citrate-3 = Pb(Citrate)2-4
log_k 6.53
delta_h 0 kJ
-gamma 0 0
Id: 6009672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Citrate-3 = Al(Citrate)
log_k 9.97
delta_h 0 kJ
-gamma 0 0
Id: 309671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + 2Citrate-3 = Al(Citrate)2-3
log_k 14.8
delta_h 0 kJ
-gamma 0 0
Id: 309672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Citrate-3 + H+ = AlH(Citrate)+
log_k 12.85
delta_h 0 kJ
-gamma 0 0
Id: 309673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Citrate-3 = Tl(Citrate)-2
log_k 1.48
delta_h 0 kJ
-gamma 0 0
Id: 8709671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Citrate-3 = Zn(Citrate)-
log_k 6.21
delta_h 8.368 kJ
-gamma 0 0
Id: 9509671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Citrate-3 = Zn(Citrate)2-4
log_k 7.4
delta_h 25.104 kJ
-gamma 0 0
Id: 9509672
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Citrate-3 + H+ = ZnH(Citrate)
log_k 10.2
delta_h 3.3472 kJ
-gamma 0 0
Id: 9509673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Citrate-3 + 2H+ = ZnH2(Citrate)+
log_k 12.84
delta_h 0 kJ
-gamma 0 0
Id: 9509674
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + Citrate-3 = Cd(Citrate)-
log_k 4.98
delta_h 8.368 kJ
-gamma 0 0
Id: 1609671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Citrate-3 + H+ = CdH(Citrate)
log_k 9.44
delta_h 3.3472 kJ
-gamma 0 0
Id: 1609672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Citrate-3 + 2H+ = CdH2(Citrate)+
log_k 12.9
delta_h 0 kJ
-gamma 0 0
Id: 1609673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Citrate-3 = Cd(Citrate)2-4
log_k 5.9
delta_h 20.92 kJ
-gamma 0 0
Id: 1609674
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Citrate-3 + 2H+ = Hg(Citrate)- + 2H2O
log_k 18.3
delta_h 0 kJ
-gamma 0 0

Id: 3619671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Citrate-3 = Cu(Citrate)-
log_k 7.57
delta_h 0 kJ
-gamma 0 0
Id: 2319671
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cu+2 + 2Citrate-3 = Cu(Citrate)2-4
log_k 8.9
delta_h 0 kJ
-gamma 0 0
Id: 2319672
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cu+2 + Citrate-3 + H+ = CuH(Citrate)
log_k 10.87
delta_h 11.7152 kJ
-gamma 0 0
Id: 2319673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Citrate-3 + 2H+ = CuH2(Citrate)+
log_k 13.23
delta_h 0 kJ
-gamma 0 0
Id: 2319674
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
2Cu+2 + 2Citrate-3 = Cu2(Citrate)2-2
log_k 16.9
delta_h 41.84 kJ
-gamma 0 0
Id: 2319675
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Citrate-3 = Ni(Citrate)-
log_k 6.59
delta_h 16.736 kJ
-gamma 0 0
Id: 5409671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Citrate-3 + H+ = NiH(Citrate)
log_k 10.5

delta_h 15.8992 kJ
-gamma 0 0
Id: 5409672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Citrate-3 + 2H+ = NiH2(Citrate)+
log_k 13.3
delta_h 0 kJ
-gamma 0 0
Id: 5409673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Citrate-3 = Ni(Citrate)2-4
log_k 8.77
delta_h 12.552 kJ
-gamma 0 0
Id: 5409674
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Citrate-3 + H+ = NiH(Citrate)2-3
log_k 14.9
delta_h 32.6352 kJ
-gamma 0 0
Id: 5409675
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Citrate-3 = Co(Citrate)-
log_k 6.1867
delta_h 0 kJ
-gamma 0 0
Id: 2009671
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Co+2 + H+ + Citrate-3 = CoHCitrate
log_k 10.4438
delta_h 0 kJ
-gamma 0 0
Id: 2009672
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Co+2 + 2H+ + Citrate-3 = CoH2Citrate+
log_k 12.7859
delta_h 0 kJ
-gamma 0 0
Id: 2009673
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0

Fe+2 + Citrate-3 = Fe(Citrate)-
log_k 6.1
delta_h 0 kJ
-gamma 0 0
Id: 2809671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + Citrate-3 + H+ = FeH(Citrate)
log_k 10.2
delta_h 0 kJ
-gamma 0 0
Id: 2809672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Citrate-3 = Fe(Citrate)
log_k 13.1
delta_h 0 kJ
-gamma 0 0
Id: 2819671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Citrate-3 + H+ = FeH(Citrate)+
log_k 14.4
delta_h 0 kJ
-gamma 0 0
Id: 2819672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Citrate-3 = Mn(Citrate)-
log_k 4.28
delta_h 0 kJ
-gamma 0 0
Id: 4709671
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mn+2 + Citrate-3 + H+ = MnH(Citrate)
log_k 9.6
delta_h 0 kJ
-gamma 0 0
Id: 4709672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Be+2 + Citrate-3 = Be(Citrate)-
log_k 5.534
delta_h 0 kJ
-gamma 0 0
Id: 1109671
log K source: NIST46.4

Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Be+2 + H+ + Citrate-3 = BeH(Citrate)
log_k 9.442
delta_h 0 kJ
-gamma 0 0
Id: 1109672
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Ca+2 + Citrate-3 = Ca(Citrate)-
log_k 4.87
delta_h -8.368 kJ
-gamma 0 0
Id: 1509671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Citrate-3 + H+ = CaH(Citrate)
log_k 9.26
delta_h -0.8368 kJ
-gamma 0 0
Id: 1509672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Citrate-3 + 2H+ = CaH2(Citrate)+
log_k 12.257
delta_h 0 kJ
-gamma 0 0
Id: 1509673
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mg+2 + Citrate-3 = Mg(Citrate)-
log_k 4.89
delta_h 8.368 kJ
-gamma 0 0
Id: 4609671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Citrate-3 + H+ = MgH(Citrate)
log_k 8.91
delta_h 3.3472 kJ
-gamma 0 0
Id: 4609672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Citrate-3 + 2H+ = MgH2(Citrate)+
log_k 12.2
delta_h 0 kJ
-gamma 0 0

Id: 4609673
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Sr+2 + Citrate-3 = Sr(Citrate)-
log_k 4.3367
delta_h 0 kJ
-gamma 0 0
Id: 8009671
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Sr+2 + H+ + Citrate-3 = SrH(Citrate)
log_k 8.9738
delta_h 0 kJ
-gamma 0 0
Id: 8009672
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Sr+2 + 2H+ + Citrate-3 = SrH2(Citrate)+
log_k 12.4859
delta_h 0 kJ
-gamma 0 0
Id: 8009673
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Ba+2 + Citrate-3 = Ba(Citrate)-
log_k 4.1
delta_h 0 kJ
-gamma 0 0
Id: 1009671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ba+2 + Citrate-3 + H+ = BaH(Citrate)
log_k 8.74
delta_h 0 kJ
-gamma 0 0
Id: 1009672
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ba+2 + Citrate-3 + 2H+ = BaH2(Citrate)+
log_k 12.3
delta_h 0 kJ
-gamma 0 0
Id: 1009673
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Na+ + Citrate-3 = Na(Citrate)-2
log_k 1.03

delta_h -2.8033 kJ
-gamma 0 0
Id: 5009671
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
2Na+ + Citrate-3 = Na2(Citrate)-
log_k 1.5
delta_h -5.1045 kJ
-gamma 0 0
Id: 5009672
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Na+ + Citrate-3 + H+ = NaH(Citrate)-
log_k 6.45
delta_h -3.5982 kJ
-gamma 0 0
Id: 5009673
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
K+ + Citrate-3 = K(Citrate)-2
log_k 1.1
delta_h 5.4392 kJ
-gamma 0 0
Id: 4109671
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Nta-3 = H(Nta)-2
log_k 10.278
delta_h -18.828 kJ
-gamma 0 0
Id: 3309681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Nta-3 = H2(Nta)-
log_k 13.22
delta_h -17.9912 kJ
-gamma 0 0
Id: 3309682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
3H+ + Nta-3 = H3(Nta)
log_k 15.22
delta_h -16.3176 kJ
-gamma 0 0
Id: 3309683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

4H+ + Nta-3 = H4(Nta)+
log_k 16.22
delta_h -16.3176 kJ
-gamma 0 0
Id: 3309684
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Nta-3 = Pb(Nta)-
log_k 12.7
delta_h -15.8992 kJ
-gamma 0 0
Id: 6009681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Nta-3 + H+ = PbH(Nta)
log_k 15.3
delta_h 0 kJ
-gamma 0 0
Id: 6009682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Nta-3 = Al(Nta)
log_k 13.3
delta_h 0 kJ
-gamma 0 0
Id: 309681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Nta-3 + H+ = AlH(Nta)+
log_k 15.2
delta_h 0 kJ
-gamma 0 0
Id: 309682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Nta-3 + H2O = AlOH(Nta)- + H+
log_k 8
delta_h 0 kJ
-gamma 0 0
Id: 309683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Nta-3 = Tl(Nta)-2
log_k 5.39
delta_h 0 kJ
-gamma 0 0
Id: 8709681
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Nta-3 = Zn(Nta)-
log_k 11.95
delta_h -3.7656 kJ
-gamma 0 0
Id: 9509681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Nta-3 = Zn(Nta)2-4
log_k 14.88
delta_h -15.0624 kJ
-gamma 0 0
Id: 9509682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Nta-3 + H2O = ZnOH(Nta)-2 + H+
log_k 1.46
delta_h 46.4424 kJ
-gamma 0 0
Id: 9509683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Nta-3 = Cd(Nta)-
log_k 11.07
delta_h -16.736 kJ
-gamma 0 0
Id: 1609681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Nta-3 = Cd(Nta)2-4
log_k 15.03
delta_h -38.0744 kJ
-gamma 0 0
Id: 1609682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Nta-3 + H2O = CdOH(Nta)-2 + H+
log_k -0.61
delta_h 29.288 kJ
-gamma 0 0
Id: 1609683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Nta-3 + 2H+ = Hg(Nta)- + 2H2O
log_k 21.7
delta_h 0 kJ
-gamma 0 0

Id: 3619681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Nta-3 = Cu(Nta)-
log_k 14.4
delta_h -7.9496 kJ
-gamma 0 0
Id: 2319681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Nta-3 = Cu(Nta)2-4
log_k 18.1
delta_h -37.2376 kJ
-gamma 0 0
Id: 2319682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Nta-3 + H+ = CuH(Nta)
log_k 16.2
delta_h 0 kJ
-gamma 0 0
Id: 2319683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Nta-3 + H2O = CuOH(Nta)-2 + H+
log_k 4.8
delta_h 25.5224 kJ
-gamma 0 0
Id: 2319684
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Nta-3 = Ag(Nta)-2
log_k 6
delta_h -26.3592 kJ
-gamma 0 0
Id: 209681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Nta-3 = Ni(Nta)-
log_k 12.79
delta_h -10.0416 kJ
-gamma 0 0
Id: 5409681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Nta-3 = Ni(Nta)2-4
log_k 16.96

delta_h -32.6352 kJ
-gamma 0 0
Id: 5409682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Nta-3 + H2O = NiOH(Nta)-2 + H+
log_k 1.5
delta_h 15.0624 kJ
-gamma 0 0
Id: 5409683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Nta-3 = Co(Nta)-
log_k 11.6667
delta_h -0.4 kJ
-gamma 0 0
Id: 2009681
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + 2Nta-3 = Co(Nta)2-4
log_k 14.9734
delta_h -20 kJ
-gamma 0 0
Id: 2009682
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + Nta-3 + H2O = CoOH(Nta)-2 + H+
log_k 0.4378
delta_h 45.6 kJ
-gamma 0 0
Id: 2009683
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Fe+2 + Nta-3 = Fe(Nta)-
log_k 10.19
delta_h 0 kJ
-gamma 0 0
Id: 2809681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + 2Nta-3 = Fe(Nta)2-4
log_k 12.62
delta_h 0 kJ
-gamma 0 0
Id: 2809682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Fe+2 + Nta-3 + H+ = FeH(Nta)
log_k 12.29
delta_h 0 kJ
-gamma 0 0
Id: 2809683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + Nta-3 + H2O = FeOH(Nta)-2 + H+
log_k -1.06
delta_h 0 kJ
-gamma 0 0
Id: 2809684
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Nta-3 = Fe(Nta)
log_k 17.8
delta_h 13.3888 kJ
-gamma 0 0
Id: 2819681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + 2Nta-3 = Fe(Nta)2-3
log_k 25.9
delta_h 0 kJ
-gamma 0 0
Id: 2819682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Nta-3 + H2O = FeOH(Nta)- + H+
log_k 13.23
delta_h 0 kJ
-gamma 0 0
Id: 2819683
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Nta-3 = Mn(Nta)-
log_k 8.573
delta_h 5.8576 kJ
-gamma 0 0
Id: 4709681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + 2Nta-3 = Mn(Nta)2-4
log_k 11.58
delta_h -17.1544 kJ
-gamma 0 0
Id: 4709682
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + Nta-3 + 2H+ = Cr(Nta) + 2H2O
log_k 21.2
delta_h 0 kJ
-gamma 0 0
Id: 2119681
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 2Nta-3 + 2H+ = Cr(Nta)2-3 + 2H2O
log_k 29.5
delta_h 0 kJ
-gamma 0 0
Id: 2119682
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
MoO4-2 + 2H+ + Nta-3 = MoO3(Nta)-3 + H2O
log_k 19.5434
delta_h -69 kJ
-gamma 0 0
Id: 4809681
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
MoO4-2 + 3H+ + Nta-3 = MoO3H(Nta)-2 + H2O
log_k 23.3954
delta_h -71 kJ
-gamma 0 0
Id: 4809682
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 1.00 25.0
MoO4-2 + 4H+ + Nta-3 = MoO3H2(Nta)- + H2O
log_k 25.3534
delta_h -71 kJ
-gamma 0 0
Id: 4809683
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 1.00 25.0
Be+2 + Nta-3 = Be(Nta)-
log_k 9.0767
delta_h 25 kJ
-gamma 0 0
Id: 1109681
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Mg+2 + Nta-3 = Mg(Nta)-
log_k 6.5
delta_h 17.9912 kJ
-gamma 0 0

Id: 4609681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Nta-3 = Ca(Nta)-
log_k 7.608
delta_h -5.6902 kJ
-gamma 0 0
Id: 1509681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + 2Nta-3 = Ca(Nta)2-4
log_k 8.81
delta_h -32.6352 kJ
-gamma 0 0
Id: 1509682
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Nta-3 = Sr(Nta)-
log_k 6.2767
delta_h -2.2 kJ
-gamma 0 0
Id: 8009681
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Ba+2 + Nta-3 = Ba(Nta)-
log_k 5.875
delta_h -6.025 kJ
-gamma 0 0
Id: 1009681
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Edta-4 = H(Edta)-3
log_k 10.948
delta_h -23.4304 kJ
-gamma 0 0
Id: 3309691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Edta-4 = H2(Edta)-2
log_k 17.221
delta_h -41.0032 kJ
-gamma 0 0
Id: 3309692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
3H+ + Edta-4 = H3(Edta)-
log_k 20.34

delta_h -35.564 kJ
-gamma 0 0
Id: 3309693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
4H+ + Edta-4 = H4(Edta)
log_k 22.5
delta_h -34.3088 kJ
-gamma 0 0
Id: 3309694
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
5H+ + Edta-4 = H5(Edta)+
log_k 24
delta_h -32.2168 kJ
-gamma 0 0
Id: 3309695
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sn(OH)2 + 2H+ + Edta-4 = Sn(Edta)-2 + 2H2O
log_k 27.026
delta_h 0 kJ
-gamma 0 0
Id: 7909691
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 20.0
Sn(OH)2 + 3H+ + Edta-4 = SnH(Edta)- + 2H2O
log_k 29.934
delta_h 0 kJ
-gamma 0 0
Id: 7909692
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 20.0
Sn(OH)2 + 4H+ + Edta-4 = SnH2(Edta) + 2H2O
log_k 31.638
delta_h 0 kJ
-gamma 0 0
Id: 7909693
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 20.0
Pb+2 + Edta-4 = Pb(Edta)-2
log_k 19.8
delta_h -54.8104 kJ
-gamma 0 0
Id: 6009691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Pb+2 + Edta-4 + H+ = PbH(Edta)-
log_k 23
delta_h 0 kJ
-gamma 0 0
Id: 6009692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Edta-4 + 2H+ = PbH2(Edta)
log_k 24.9
delta_h 0 kJ
-gamma 0 0
Id: 6009693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Edta-4 = Al(Edta)-
log_k 19.1
delta_h 52.7184 kJ
-gamma 0 0
Id: 309690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Edta-4 + H+ = AlH(Edta)
log_k 21.8
delta_h 36.4008 kJ
-gamma 0 0
Id: 309691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Edta-4 + H2O = AlOH(Edta)-2 + H+
log_k 12.8
delta_h 73.6384 kJ
-gamma 0 0
Id: 309692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Edta-4 = Tl(Edta)-3
log_k 7.27
delta_h -43.5136 kJ
-gamma 0 0
Id: 8709691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Edta-4 + H+ = TlH(Edta)-2
log_k 13.68
delta_h 0 kJ
-gamma 0 0
Id: 8709692
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Edta-4 = Zn(Edta)-2
log_k 18
delta_h -19.2464 kJ
-gamma 0 0
Id: 9509691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Edta-4 + H+ = ZnH(Edta)-
log_k 21.4
delta_h -28.4512 kJ
-gamma 0 0
Id: 9509692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Edta-4 + H2O = ZnOH(Edta)-3 + H+
log_k 5.8
delta_h 0 kJ
-gamma 0 0
Id: 9509693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Edta-4 = Cd(Edta)-2
log_k 18.2
delta_h -38.0744 kJ
-gamma 0 0
Id: 1609691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Edta-4 + H+ = CdH(Edta)-
log_k 21.5
delta_h -39.748 kJ
-gamma 0 0
Id: 1609692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Edta-4 + 2H+ = Hg(Edta)-2 + 2H2O
log_k 29.3
delta_h -125.102 kJ
-gamma 0 0
Id: 3619691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Edta-4 + 3H+ = HgH(Edta)- + 2H2O
log_k 32.9
delta_h -128.449 kJ
-gamma 0 0

Id: 3619692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Edta-4 = Cu(Edta)-2
log_k 20.5
delta_h -34.7272 kJ
-gamma 0 0
Id: 2319691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Edta-4 + H+ = CuH(Edta)-
log_k 24
delta_h -43.0952 kJ
-gamma 0 0
Id: 2319692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Edta-4 + 2H+ = CuH2(Edta)
log_k 26.2
delta_h 0 kJ
-gamma 0 0
Id: 2319693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Edta-4 + H2O = CuOH(Edta)-3 + H+
log_k 8.5
delta_h 0 kJ
-gamma 0 0
Id: 2319694
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Edta-4 = Ag(Edta)-3
log_k 8.08
delta_h -31.38 kJ
-gamma 0 0
Id: 209691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Edta-4 + H+ = AgH(Edta)-2
log_k 15.21
delta_h 0 kJ
-gamma 0 0
Id: 209693
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ni+2 + Edta-4 = Ni(Edta)-2
log_k 20.1

delta_h -30.9616 kJ
-gamma 0 0
Id: 5409691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Edta-4 + H+ = NiH(Edta)-
log_k 23.6
delta_h -38.4928 kJ
-gamma 0 0
Id: 5409692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Edta-4 + H2O = NiOH(Edta)-3 + H+
log_k 7.6
delta_h 0 kJ
-gamma 0 0
Id: 5409693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Edta-4 = Co(Edta)-2
log_k 18.1657
delta_h -15 kJ
-gamma 0 0
Id: 2009691
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + Edta-4 + H+ = CoH(Edta)-
log_k 21.5946
delta_h -22.9 kJ
-gamma 0 0
Id: 2009692
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Co+2 + Edta-4 + 2H+ = CoH2(Edta)
log_k 23.4986
delta_h 0 kJ
-gamma 0 0
Id: 2009693
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Co+3 + Edta-4 = Co(Edta)-
log_k 43.9735
delta_h 0 kJ
-gamma 0 0
Id: 2019691
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0

Co+3 + Edta-4 + H+ = CoH(Edta)
log_k 47.168
delta_h 0 kJ
-gamma 0 0
Id: 2019692
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Fe+2 + Edta-4 = Fe(Edta)-2
log_k 16
delta_h -16.736 kJ
-gamma 0 0
Id: 2809690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + Edta-4 + H+ = FeH(Edta)-
log_k 19.06
delta_h -27.6144 kJ
-gamma 0 0
Id: 2809691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + Edta-4 + H2O = FeOH(Edta)-3 + H+
log_k 6.5
delta_h 0 kJ
-gamma 0 0
Id: 2809692
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Fe+2 + Edta-4 + 2H2O = Fe(OH)2(Edta)-4 + 2H+
log_k -4
delta_h 0 kJ
-gamma 0 0
Id: 2809693
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Fe+3 + Edta-4 = Fe(Edta)-
log_k 27.7
delta_h -11.2968 kJ
-gamma 0 0
Id: 2819690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Edta-4 + H+ = FeH(Edta)
log_k 29.2
delta_h -11.7152 kJ
-gamma 0 0
Id: 2819691
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Edta-4 + H2O = FeOH(Edta)-2 + H+
log_k 19.9
delta_h 0 kJ
-gamma 0 0
Id: 2819692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Edta-4 + 2H2O = Fe(OH)2(Edta)-3 + 2H+
log_k 9.85
delta_h 0 kJ
-gamma 0 0
Id: 2819693
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mn+2 + Edta-4 = Mn(Edta)-2
log_k 15.6
delta_h -19.2464 kJ
-gamma 0 0
Id: 4709691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Edta-4 + H+ = MnH(Edta)-
log_k 19.1
delta_h -24.2672 kJ
-gamma 0 0
Id: 4709692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr+2 + Edta-4 = Cr(Edta)-2
log_k 15.3
delta_h 0 kJ
-gamma 0 0
Id: 2109691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr+2 + Edta-4 + H+ = CrH(Edta)-
log_k 19.1
delta_h 0 kJ
-gamma 0 0
Id: 2109692
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + Edta-4 + 2H+ = Cr(Edta)- + 2H2O
log_k 35.5
delta_h 0 kJ
-gamma 0 0

Id: 2119691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + Edta-4 + 3H+ = CrH(Edta) + 2H2O
log_k 37.4
delta_h 0 kJ
-gamma 0 0
Id: 2119692
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + Edta-4 + H+ = CrOH(Edta)-2 + H2O
log_k 27.7
delta_h 0 kJ
-gamma 0 0
Id: 2119693
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Be+2 + Edta-4 = Be(Edta)-2
log_k 11.4157
delta_h 41 kJ
-gamma 0 0
Id: 1109691
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Mg+2 + Edta-4 = Mg(Edta)-2
log_k 10.57
delta_h 13.8072 kJ
-gamma 0 0
Id: 4609690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Edta-4 + H+ = MgH(Edta)-
log_k 14.97
delta_h 0 kJ
-gamma 0 0
Id: 4609691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Edta-4 = Ca(Edta)-2
log_k 12.42
delta_h -25.5224 kJ
-gamma 0 0
Id: 1509690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Edta-4 + H+ = CaH(Edta)-
log_k 15.9

delta_h 0 kJ
-gamma 0 0
Id: 1509691
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Edta-4 = Sr(Edta)-2
log_k 10.4357
delta_h -17 kJ
-gamma 0 0
Id: 8009691
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Sr+2 + Edta-4 + H+ = SrH(Edta)-
log_k 14.7946
delta_h 0 kJ
-gamma 0 0
Id: 8009692
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Ba+2 + Edta-4 = Ba(Edta)-2
log_k 7.72
delta_h -20.5016 kJ
-gamma 0 0
Id: 1009691
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Na+ + Edta-4 = Na(Edta)-3
log_k 2.7
delta_h -5.8576 kJ
-gamma 0 0
Id: 5009690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
K+ + Edta-4 = K(Edta)-3
log_k 1.7
delta_h 0 kJ
-gamma 0 0
Id: 4109690
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Propionate- = H(Propionate)
log_k 4.874
delta_h 0.66 kJ
-gamma 0 0
Id: 3309711
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0

Pb+2 + Propionate- = Pb(Propionate)+
log_k 2.64
delta_h 0 kJ
-gamma 0 0
Id: 6009711
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.00 35.0
Pb+2 + 2Propionate- = Pb(Propionate)2
log_k 3.1765
delta_h 0 kJ
-gamma 0 0
Id: 6009712
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 2.00 25.0
Zn+2 + Propionate- = Zn(Propionate)+
log_k 1.4389
delta_h 0 kJ
-gamma 0 0
Id: 9509711
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Zn+2 + 2Propionate- = Zn(Propionate)2
log_k 1.842
delta_h 0 kJ
-gamma 0 0
Id: 9509712
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Cd+2 + Propionate- = Cd(Propionate)+
log_k 1.598
delta_h 0 kJ
-gamma 0 0
Id: 1609711
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Cd+2 + 2Propionate- = Cd(Propionate)2
log_k 2.472
delta_h 0 kJ
-gamma 0 0
Id: 1609712
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 25.0
Hg(OH)2 + 2H+ + Propionate- = Hg(Propionate)+ + 2H2O
log_k 10.594
delta_h 0 kJ
-gamma 0 0
Id: 3619711
log K source: NIST46.4

Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Cu+2 + Propionate- = Cu(Propionate)+
log_k 2.22
delta_h 4.1 kJ
-gamma 0 0
Id: 2319711
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+2 + 2Propionate- = Cu(Propionate)2
log_k 3.5
delta_h 0 kJ
-gamma 0 0
Id: 2319712
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Ni+2 + Propionate- = Ni(Propionate)+
log_k 0.908
delta_h 0 kJ
-gamma 0 0
Id: 5409711
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 1.00 25.0
Co+2 + Propionate- = Co(Propionate)+
log_k 0.671
delta_h 4.6 kJ
-gamma 0 0
Id: 2009711
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 2.00 25.0
Co+2 + 2Propionate- = Co(Propionate)2
log_k 0.5565
delta_h 16 kJ
-gamma 0 0
Id: 2009712
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 2.00 25.0
Fe+3 + Propionate- = Fe(Propionate)+2
log_k 4.012
delta_h 0 kJ
-gamma 0 0
Id: 2819711
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 20.0
Cr(OH)2+ + 2H+ + Propionate- = Cr(Propionate)+2 + 2H2O
log_k 15.0773
delta_h 0 kJ
-gamma 0 0

Id: 2119711
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.50 25.0
Cr(OH)2+ + 2H+ + 2Propionate- = Cr(Propionate)2+ + 2H2O
log_k 17.9563
delta_h 0 kJ
-gamma 0 0
Id: 2119712
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.50 25.0
Cr(OH)2+ + 2H+ + 3Propionate- = Cr(Propionate)3 + 2H2O
log_k 20.8858
delta_h 0 kJ
-gamma 0 0
Id: 2119713
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.50 25.0
Mg+2 + Propionate- = Mg(Propionate)+
log_k 0.9689
delta_h 4.2677 kJ
-gamma 0 0
Id: 4609710
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Ca+2 + Propionate- = Ca(Propionate)+
log_k 0.9289
delta_h 3.3472 kJ
-gamma 0 0
Id: 1509710
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Sr+2 + Propionate- = Sr(Propionate)+
log_k 0.8589
delta_h 0 kJ
-gamma 0 0
Id: 8009711
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Ba+2 + Propionate- = Ba(Propionate)+
log_k 0.7689
delta_h 0 kJ
-gamma 0 0
Id: 1009711
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Ba+2 + 2Propionate- = Ba(Propionate)2
log_k 0.9834

delta_h 0 kJ
-gamma 0 0
Id: 1009712
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
H+ + Butyrate- = H(Butyrate)
log_k 4.819
delta_h 2.8 kJ
-gamma 0 0
Id: 3309721
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Pb+2 + Butyrate- = Pb(Butyrate)+
log_k 2.101
delta_h 0 kJ
-gamma 0 0
Id: 6009721
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 2.00 25.0
Zn+2 + Butyrate- = Zn(Butyrate)+
log_k 1.4289
delta_h 0 kJ
-gamma 0 0
Id: 9509721
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Hg(OH)2 + 2H+ + Butyrate- = Hg(Butyrate)+ + 2H2O
log_k 10.3529
delta_h 0 kJ
-gamma 0 0
Id: 3619721
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Cu+2 + Butyrate- = Cu(Butyrate)+
log_k 2.14
delta_h 0 kJ
-gamma 0 0
Id: 2319721
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Ni+2 + Butyrate- = Ni(Butyrate)+
log_k 0.691
delta_h 0 kJ
-gamma 0 0
Id: 5409721
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 2.00 25.0

Co+2 + Butyrate- = Co(Butyrate)+
log_k 0.591
delta_h 0 kJ
-gamma 0 0
Id: 2009721
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Co+2 + 2Butyrate- = Co(Butyrate)2
log_k 0.7765
delta_h 0 kJ
-gamma 0 0
Id: 2009722
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Mg+2 + Butyrate- = Mg(Butyrate)+
log_k 0.9589
delta_h 0 kJ
-gamma 0 0
Id: 4609720
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Ca+2 + Butyrate- = Ca(Butyrate)+
log_k 0.9389
delta_h 3.3472 kJ
-gamma 0 0
Id: 1509720
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Sr+2 + Butyrate- = Sr(Butyrate)+
log_k 0.7889
delta_h 0 kJ
-gamma 0 0
Id: 8009721
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Ba+2 + Butyrate- = Ba(Butyrate)+
log_k 0.7389
delta_h 0 kJ
-gamma 0 0
Id: 1009721
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 0.10 25.0
Ba+2 + 2Butyrate- = Ba(Butyrate)2
log_k 0.88
delta_h 0 kJ
-gamma 0 0
Id: 1009722
log K source: SCD2.62

Delta H source: SCD2.62
#T and ionic strength:
H+ + Isobutyrate- = H(Isobutyrate)
log_k 4.849
delta_h 3.2217 kJ
-gamma 0 0
Id: 3309731
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Isobutyrate- = Zn(Isobutyrate)+
log_k 1.44
delta_h 0 kJ
-gamma 0 0
Id: 9509731
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Isobutyrate- = Cu(Isobutyrate)+
log_k 2.17
delta_h 0 kJ
-gamma 0 0
Id: 2319731
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Isobutyrate- = Cu(Isobutyrate)2
log_k 3.3
delta_h 0 kJ
-gamma 0 0
Id: 2319732
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Isobutyrate- = Fe(Isobutyrate)+2
log_k 4.2
delta_h 0 kJ
-gamma 0 0
Id: 2819731
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Isobutyrate- = Ca(Isobutyrate)+
log_k 0.51
delta_h 0 kJ
-gamma 0 0
Id: 1509731
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Two_picoline = H(Two_picoline)+
log_k 5.95
delta_h -25.5224 kJ
-gamma 0 0

Id: 3309801
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Two_picoline = Cu(Two_picoline)+2
log_k 1.3
delta_h 0 kJ
-gamma 0 0
Id: 2319801
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Two_picoline = Cu(Two_picoline)2+2
log_k 2.8
delta_h 0 kJ
-gamma 0 0
Id: 2319802
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + Two_picoline = Cu(Two_picoline)+
log_k 5.4
delta_h 0 kJ
-gamma 0 0
Id: 2309801
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 2Two_picoline = Cu(Two_picoline)2+
log_k 7.65
delta_h 0 kJ
-gamma 0 0
Id: 2309802
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 3Two_picoline = Cu(Two_picoline)3+
log_k 8.5
delta_h 0 kJ
-gamma 0 0
Id: 2309803
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Two_picoline = Ag(Two_picoline)+
log_k 2.32
delta_h -24.2672 kJ
-gamma 0 0
Id: 209801
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Two_picoline = Ag(Two_picoline)2+
log_k 4.68

delta_h -42.6768 kJ
-gamma 0 0
Id: 209802
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Two_picoline = Ni(Two_picoline)+2
log_k 0.4
delta_h 0 kJ
-gamma 0 0
Id: 5409801
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Three_picoline = H(Three_picoline)+
log_k 5.7
delta_h -23.8488 kJ
-gamma 0 0
Id: 3309811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Three_picoline = Zn(Three_picoline)+2
log_k 1
delta_h 0 kJ
-gamma 0 0
Id: 9509811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Three_picoline = Zn(Three_picoline)2+2
log_k 2.1
delta_h 0 kJ
-gamma 0 0
Id: 9509812
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 3Three_picoline = Zn(Three_picoline)3+2
log_k 2.6
delta_h 0 kJ
-gamma 0 0
Id: 9509813
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 4Three_picoline = Zn(Three_picoline)4+2
log_k 3.7
delta_h 0 kJ
-gamma 0 0
Id: 9509814
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Cd+2 + Three_picoline = Cd(Three_picoline)+2
log_k 1.42
delta_h 0 kJ
-gamma 0 0
Id: 1609811
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 2Three_picoline = Cd(Three_picoline)2+2
log_k 2.27
delta_h 0 kJ
-gamma 0 0
Id: 1609812
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 3Three_picoline = Cd(Three_picoline)3+2
log_k 3.6
delta_h 0 kJ
-gamma 0 0
Id: 1609813
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 4Three_picoline = Cd(Three_picoline)4+2
log_k 4
delta_h 0 kJ
-gamma 0 0
Id: 1609814
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + Three_picoline = Cu(Three_picoline)+
log_k 5.6
delta_h 0 kJ
-gamma 0 0
Id: 2309811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 2Three_picoline = Cu(Three_picoline)2+
log_k 7.78
delta_h 0 kJ
-gamma 0 0
Id: 2309812
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 3Three_picoline = Cu(Three_picoline)3+
log_k 8.6
delta_h 0 kJ
-gamma 0 0
Id: 2309813
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 4Three_picoline = Cu(Three_picoline)4+
log_k 9
delta_h 0 kJ
-gamma 0 0
Id: 2309814
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Three_picoline = Cu(Three_picoline)+2
log_k 2.77
delta_h 0 kJ
-gamma 0 0
Id: 2319811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Three_picoline = Cu(Three_picoline)2+2
log_k 4.8
delta_h 0 kJ
-gamma 0 0
Id: 2319812
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 3Three_picoline = Cu(Three_picoline)3+2
log_k 6.3
delta_h 0 kJ
-gamma 0 0
Id: 2319813
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 4Three_picoline = Cu(Three_picoline)4+2
log_k 7.2
delta_h 0 kJ
-gamma 0 0
Id: 2319814
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Three_picoline = Ag(Three_picoline)+
log_k 2.2
delta_h -21.7568 kJ
-gamma 0 0
Id: 209811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Three_picoline = Ag(Three_picoline)2+
log_k 4.46
delta_h -49.7896 kJ
-gamma 0 0

Id: 209812
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Three_picoline = Ni(Three_picoline)+2
log_k 1.87
delta_h 0 kJ
-gamma 0 0
Id: 5409811
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Three_picoline = Ni(Three_picoline)2+2
log_k 3.3
delta_h 0 kJ
-gamma 0 0
Id: 5409812
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 3Three_picoline = Ni(Three_picoline)3+2
log_k 4.1
delta_h 0 kJ
-gamma 0 0
Id: 5409813
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 4Three_picoline = Ni(Three_picoline)4+2
log_k 4.6
delta_h 0 kJ
-gamma 0 0
Id: 5409814
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Three_picoline = Co(Three_picoline)+2
log_k 1.4
delta_h 0 kJ
-gamma 0 0
Id: 2009811
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Co+2 + 2Three_picoline = Co(Three_picoline)2+2
log_k 2.2
delta_h 0 kJ
-gamma 0 0
Id: 2009812
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Co+2 + 3Three_picoline = Co(Three_picoline)3+2
log_k 2.5

delta_h 0 kJ
-gamma 0 0
Id: 2009813
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
H+ + Four_picoline = H(Four_picoline)+
log_k 6.03
delta_h -25.3132 kJ
-gamma 0 0
Id: 3309821
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Four_picoline = Zn(Four_picoline)+2
log_k 1.4
delta_h 0 kJ
-gamma 0 0
Id: 9509821
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Four_picoline = Zn(Four_picoline)2+2
log_k 2.11
delta_h 0 kJ
-gamma 0 0
Id: 9509822
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 3Four_picoline = Zn(Four_picoline)3+2
log_k 2.85
delta_h 0 kJ
-gamma 0 0
Id: 9509823
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Four_picoline = Cd(Four_picoline)+2
log_k 1.59
delta_h 0 kJ
-gamma 0 0
Id: 1609821
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 2Four_picoline = Cd(Four_picoline)2+2
log_k 2.4
delta_h 0 kJ
-gamma 0 0
Id: 1609822
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Cd+2 + 3Four_picoline = Cd(Four_picoline)3+2
log_k 3.18
delta_h 0 kJ
-gamma 0 0
Id: 1609823
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + 4Four_picoline = Cd(Four_picoline)4+2
log_k 4
delta_h 0 kJ
-gamma 0 0
Id: 1609824
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + Four_picoline = Cu(Four_picoline)+
log_k 5.65
delta_h 0 kJ
-gamma 0 0
Id: 2309821
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 2Four_picoline = Cu(Four_picoline)2+
log_k 8.2
delta_h 0 kJ
-gamma 0 0
Id: 2309822
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 3Four_picoline = Cu(Four_picoline)3+
log_k 8.8
delta_h 0 kJ
-gamma 0 0
Id: 2309823
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+ + 4Four_picoline = Cu(Four_picoline)4+
log_k 9.2
delta_h 0 kJ
-gamma 0 0
Id: 2309824
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Four_picoline = Cu(Four_picoline)+2
log_k 2.88
delta_h 0 kJ
-gamma 0 0
Id: 2319821
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Four_picoline = Cu(Four_picoline)2+2
log_k 5.16
delta_h 0 kJ
-gamma 0 0
Id: 2319822
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 3Four_picoline = Cu(Four_picoline)3+2
log_k 6.77
delta_h 0 kJ
-gamma 0 0
Id: 2319823
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 4Four_picoline = Cu(Four_picoline)4+2
log_k 8.08
delta_h 0 kJ
-gamma 0 0
Id: 2319824
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 5Four_picoline = Cu(Four_picoline)5+2
log_k 8.3
delta_h 0 kJ
-gamma 0 0
Id: 2319825
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Four_picoline = Ag(Four_picoline)+
log_k 2.03
delta_h -25.5224 kJ
-gamma 0 0
Id: 209821
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Four_picoline = Ag(Four_picoline)2+
log_k 4.39
delta_h -53.5552 kJ
-gamma 0 0
Id: 209822
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Four_picoline = Ni(Four_picoline)+2
log_k 2.11
delta_h 0 kJ
-gamma 0 0

Id: 5409821
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Four_picoline = Ni(Four_picoline)2+2
log_k 3.59
delta_h 0 kJ
-gamma 0 0
Id: 5409822
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 3Four_picoline = Ni(Four_picoline)3+2
log_k 4.34
delta_h 0 kJ
-gamma 0 0
Id: 5409823
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 4Four_picoline = Ni(Four_picoline)4+2
log_k 4.7
delta_h 0 kJ
-gamma 0 0
Id: 5409824
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Four_picoline = Co(Four_picoline)+2
log_k 1.56
delta_h 0 kJ
-gamma 0 0
Id: 2009821
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Co+2 + 2Four_picoline = Co(Four_picoline)2+2
log_k 2.51
delta_h 0 kJ
-gamma 0 0
Id: 2009822
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Co+2 + 3Four_picoline = Co(Four_picoline)3+2
log_k 2.94
delta_h 0 kJ
-gamma 0 0
Id: 2009823
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Co+2 + 4Four_picoline = Co(Four_picoline)4+2
log_k 3.17

delta_h 0 kJ
-gamma 0 0
Id: 2009824
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
H+ + Formate- = H(Formate)
log_k 3.745
delta_h 0.1674 kJ
-gamma 0 0
Id: 3309831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Formate- = Pb(Formate)+
log_k 2.2
delta_h 0 kJ
-gamma 0 0
Id: 6009831
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + Formate- = Zn(Formate)+
log_k 1.44
delta_h 0 kJ
-gamma 0 0
Id: 9509831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Formate- = Cd(Formate)+
log_k 1.7
delta_h 0 kJ
-gamma 0 0
Id: 1609831
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Hg(OH)2 + Formate- + 2H+ = Hg(Formate)+ + 2H2O
log_k 9.6
delta_h 0 kJ
-gamma 0 0
Id: 3619831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Formate- = Cu(Formate)+
log_k 2
delta_h 0 kJ
-gamma 0 0
Id: 2319831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Ni+2 + Formate- = Ni(Formate)+
log_k 1.22
delta_h 0 kJ
-gamma 0 0
Id: 5409831
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Co+2 + Formate- = Co(Formate)+
log_k 1.209
delta_h 0 kJ
-gamma 0 0
Id: 2009831
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 30.0
Co+2 + 2Formate- = Co(Formate)2
log_k 1.1365
delta_h 0 kJ
-gamma 0 0
Id: 2009832
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Cr+2 + Formate- = Cr(Formate)+
log_k 1.07
delta_h 0 kJ
-gamma 0 0
Id: 2109831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Formate- = Mg(Formate)+
log_k 1.43
delta_h 0 kJ
-gamma 0 0
Id: 4609831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Formate- = Ca(Formate)+
log_k 1.43
delta_h 4.184 kJ
-gamma 0 0
Id: 1509831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Formate- = Sr(Formate)+
log_k 1.39
delta_h 4 kJ
-gamma 0 0
Id: 8009831
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ba+2 + Formate- = Ba(Formate)+
log_k 1.38
delta_h 0 kJ
-gamma 0 0
Id: 1009831
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Isovalerate- = H(Isovalerate)
log_k 4.781
delta_h 4.5606 kJ
-gamma 0 0
Id: 3309841
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Isovalerate- = Zn(Isovalerate)+
log_k 1.39
delta_h 0 kJ
-gamma 0 0
Id: 9509841
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Isovalerate- = Cu(Isovalerate)+
log_k 2.08
delta_h 0 kJ
-gamma 0 0
Id: 2319841
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Isovalerate- = Ca(Isovalerate)+
log_k 0.2
delta_h 0 kJ
-gamma 0 0
Id: 1509841
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Valerate- = H(Valerate)
log_k 4.843
delta_h 2.887 kJ
-gamma 0 0
Id: 3309851
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Valerate- = Cu(Valerate)+
log_k 2.12
delta_h 0 kJ
-gamma 0 0

Id: 2319851
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Valerate- = Ca(Valerate)+
log_k 0.3
delta_h 0 kJ
-gamma 0 0
Id: 1509851
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ba+2 + Valerate- = Ba(Valerate)+
log_k -0.2
delta_h 0 kJ
-gamma 0 0
Id: 1009851
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Acetate- = H(Acetate)
log_k 4.757
delta_h 0.41 kJ
-gamma 0 0
Id: 3309921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sn(OH)2 + 2H+ + Acetate- = Sn(Acetate)+ + 2H2O
log_k 10.0213
delta_h 0 kJ
-gamma 0 0
Id: 7909921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 3.00 25.0
Sn(OH)2 + 2H+ + 2Acetate- = Sn(Acetate)2 + 2H2O
log_k 12.32
delta_h 0 kJ
-gamma 0 0
Id: 7909922
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 3.00 25.0
Sn(OH)2 + 2H+ + 3Acetate- = Sn(Acetate)3- + 2H2O
log_k 13.55
delta_h 0 kJ
-gamma 0 0
Id: 7909923
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 3.00 25.0
Pb+2 + Acetate- = Pb(Acetate)+
log_k 2.68

delta_h -0.4 kJ
-gamma 0 0
Id: 6009921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Pb+2 + 2Acetate- = Pb(Acetate)2
log_k 4.08
delta_h -0.8 kJ
-gamma 0 0
Id: 6009922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Tl+ + Acetate- = Tl(Acetate)
log_k -0.11
delta_h 0 kJ
-gamma 0 0
Id: 8709921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Zn+2 + Acetate- = Zn(Acetate)+
log_k 1.58
delta_h 8.3 kJ
-gamma 0 0
Id: 9509921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Zn+2 + 2Acetate- = Zn(Acetate)2
log_k 2.6434
delta_h 22 kJ
-gamma 0 0
Id: 9509922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Cd+2 + Acetate- = Cd(Acetate)+
log_k 1.93
delta_h 9.6 kJ
-gamma 0 0
Id: 1609921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cd+2 + 2Acetate- = Cd(Acetate)2
log_k 2.86
delta_h 15 kJ
-gamma 0 0
Id: 1609922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0

Hg(OH)2 + 2H+ + Acetate- = Hg(Acetate)+ + 2H2O
log_k 10.494
delta_h 0 kJ
-gamma 0 0
Id: 3619920
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Hg(OH)2 + 2H+ + 2Acetate- = Hg(Acetate)2 + 2H2O
log_k 13.83
delta_h 0 kJ
-gamma 0 0
Id: 3619921
log K source: NIST46.4
Delta H source: SCD2.62
#T and ionic strength: 3.00 25.0
Cu+2 + Acetate- = Cu(Acetate)+
log_k 2.21
delta_h 7.1 kJ
-gamma 0 0
Id: 2319921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+2 + 2Acetate- = Cu(Acetate)2
log_k 3.4
delta_h 12 kJ
-gamma 0 0
Id: 2319922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Cu+2 + 3Acetate- = Cu(Acetate)3-
log_k 3.9434
delta_h 6.2 kJ
-gamma 0 0
Id: 2319923
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Ag+ + Acetate- = Ag(Acetate)
log_k 0.73
delta_h 3 kJ
-gamma 0 0
Id: 209921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ag+ + 2Acetate- = Ag(Acetate)2-
log_k 0.64
delta_h 3 kJ
-gamma 0 0
Id: 209922
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ni+2 + Acetate- = Ni(Acetate)+
log_k 1.37
delta_h 8.7 kJ
-gamma 0 0
Id: 5409921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Ni+2 + 2Acetate- = Ni(Acetate)2
log_k 2.1
delta_h 10 kJ
-gamma 0 0
Id: 5409922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + Acetate- = Co(Acetate)+
log_k 1.38
delta_h 0 kJ
-gamma 0 0
Id: 2009921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Co+2 + 2Acetate- = Co(Acetate)2
log_k 0.7565
delta_h 0 kJ
-gamma 0 0
Id: 2009922
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 2.00 25.0
Fe+2 + Acetate- = Fe(Acetate)+
log_k 1.4
delta_h 0 kJ
-gamma 0 0
Id: 2809920
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Fe+3 + Acetate- = Fe(Acetate)+2
log_k 4.0234
delta_h 0 kJ
-gamma 0 0
Id: 2819920
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Fe+3 + 2Acetate- = Fe(Acetate)2+
log_k 7.5723
delta_h 0 kJ
-gamma 0 0

Id: 2819921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Fe+3 + 3Acetate- = Fe(Acetate)3
log_k 9.5867
delta_h 0 kJ
-gamma 0 0
Id: 2819922
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Mn+2 + Acetate- = Mn(Acetate)+
log_k 1.4
delta_h 0 kJ
-gamma 0 0
Id: 4709920
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Cr+2 + Acetate- = Cr(Acetate)+
log_k 1.8
delta_h 0 kJ
-gamma 0 0
Id: 2109921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Cr+2 + 2Acetate- = Cr(Acetate)2
log_k 2.92
delta_h 0 kJ
-gamma 0 0
Id: 2109922
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Cr(OH)2+ + 2H+ + Acetate- = Cr(Acetate)+2 + 2H2O
log_k 15.0073
delta_h -125.62 kJ
-gamma 0 0
Id: 2119921
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Cr(OH)2+ + 2H+ + 2Acetate- = Cr(Acetate)2+ + 2H2O
log_k 17.9963
delta_h -117.62 kJ
-gamma 0 0
Id: 2119922
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Cr(OH)2+ + 2H+ + 3Acetate- = Cr(Acetate)3 + 2H2O
log_k 20.7858

delta_h -96.62 kJ
-gamma 0 0
Id: 2119923
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.50 25.0
Be+2 + Acetate- = Be(Acetate)+
log_k 2.0489
delta_h 0 kJ
-gamma 0 0
Id: 1109921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Be+2 + 2Acetate- = Be(Acetate)2
log_k 3.0034
delta_h 0 kJ
-gamma 0 0
Id: 1109922
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Mg+2 + Acetate- = Mg(Acetate)+
log_k 1.27
delta_h 0 kJ
-gamma 0 0
Id: 4609920
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Ca+2 + Acetate- = Ca(Acetate)+
log_k 1.18
delta_h 4 kJ
-gamma 0 0
Id: 1509920
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Sr+2 + Acetate- = Sr(Acetate)+
log_k 1.14
delta_h 0 kJ
-gamma 0 0
Id: 8009921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Ba+2 + Acetate- = Ba(Acetate)+
log_k 1.07
delta_h 0 kJ
-gamma 0 0
Id: 1009921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0

Na+ + Acetate- = Na(Acetate)
log_k -0.18
delta_h 12 kJ
-gamma 0 0
Id: 5009920
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
K+ + Acetate- = K(Acetate)
log_k -0.1955
delta_h 4.184 kJ
-gamma 0 0
Id: 4109921
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
H+ + Tartarate-2 = H(Tartarate)-
log_k 4.366
delta_h -0.7531 kJ
-gamma 0 0
Id: 3309931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Tartarate-2 = H2(Tartarate)
log_k 7.402
delta_h -3.6819 kJ
-gamma 0 0
Id: 3309932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sn(OH)2 + 2H+ + Tartarate-2 = Sn(Tartarate) + 2H2O
log_k 13.1518
delta_h 0 kJ
-gamma 0 0
Id: 7909931
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Pb+2 + Tartarate-2 = Pb(Tartarate)
log_k 3.98
delta_h 0 kJ
-gamma 0 0
Id: 6009931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + 2Tartarate-2 = Al(Tartarate)2-
log_k 9.37
delta_h 0 kJ
-gamma 0 0
Id: 309931
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Tartarate-2 = Tl(Tartarate)-
log_k 1.4
delta_h 0 kJ
-gamma 0 0
Id: 8709931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Tl+ + Tartarate-2 + H+ = TlH(Tartarate)
log_k 4.8
delta_h 0 kJ
-gamma 0 0
Id: 8709932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Tartarate-2 = Zn(Tartarate)
log_k 3.43
delta_h 0 kJ
-gamma 0 0
Id: 9509931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Tartarate-2 = Zn(Tartarate)2-2
log_k 5.5
delta_h 0 kJ
-gamma 0 0
Id: 9509932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Tartarate-2 + H+ = ZnH(Tartarate)+
log_k 5.9
delta_h 0 kJ
-gamma 0 0
Id: 9509933
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Tartarate-2 = Cd(Tartarate)
log_k 2.7
delta_h 0 kJ
-gamma 0 0
Id: 1609931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Tartarate-2 = Cd(Tartarate)2-2
log_k 4.1
delta_h 0 kJ
-gamma 0 0

Id: 1609932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Tartarate-2 + 2H+ = Hg(Tartarate) + 2H2O
log_k 14
delta_h 0 kJ
-gamma 0 0
Id: 3619931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Tartarate-2 = Cu(Tartarate)
log_k 3.97
delta_h 0 kJ
-gamma 0 0
Id: 2319931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Tartarate-2 + H+ = CuH(Tartarate)+
log_k 6.7
delta_h 0 kJ
-gamma 0 0
Id: 2319932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Tartarate-2 = Ni(Tartarate)
log_k 3.46
delta_h 0 kJ
-gamma 0 0
Id: 5409931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Tartarate-2 + H+ = NiH(Tartarate)+
log_k 5.89
delta_h 0 kJ
-gamma 0 0
Id: 5409932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Tartarate-2 = Co(Tartarate)
log_k 3.05
delta_h 0 kJ
-gamma 0 0
Id: 2009931
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Co+2 + 2Tartarate-2 = Co(Tartarate)2-2
log_k 4

delta_h 0 kJ
-gamma 0 0
Id: 2009932
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Co+2 + H+ + Tartarate-2 = CoH(Tartarate)+
log_k 5.754
delta_h 0 kJ
-gamma 0 0
Id: 2009933
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 1.00 20.0
Fe+2 + Tartarate-2 = Fe(Tartarate)
log_k 3.1
delta_h 0 kJ
-gamma 0 0
Id: 2809931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Tartarate-2 = Fe(Tartarate)+
log_k 7.78
delta_h 0 kJ
-gamma 0 0
Id: 2819931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Tartarate-2 = Mn(Tartarate)
log_k 3.38
delta_h 0 kJ
-gamma 0 0
Id: 4709931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Tartarate-2 + H+ = MnH(Tartarate)+
log_k 6
delta_h 0 kJ
-gamma 0 0
Id: 4709932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Tartarate-2 = Mg(Tartarate)
log_k 2.3
delta_h 0 kJ
-gamma 0 0
Id: 4609931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Mg+2 + Tartarate-2 + H+ = MgH(Tartarate)+
log_k 5.75
delta_h 0 kJ
-gamma 0 0
Id: 4609932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Be+2 + Tartarate-2 = Be(Tartarate)
log_k 2.768
delta_h 0 kJ
-gamma 0 0
Id: 1109931
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Be+2 + 2Tartarate-2 = Be(Tartarate)2-2
log_k 4.008
delta_h 0 kJ
-gamma 0 0
Id: 1109932
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Ca+2 + Tartarate-2 = Ca(Tartarate)
log_k 2.8
delta_h -8.368 kJ
-gamma 0 0
Id: 1509931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Tartarate-2 + H+ = CaH(Tartarate)+
log_k 5.86
delta_h -9.1211 kJ
-gamma 0 0
Id: 1509932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Tartarate-2 = Sr(Tartarate)
log_k 2.55
delta_h 0 kJ
-gamma 0 0
Id: 8009931
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 20.0
Sr+2 + H+ + Tartarate-2 = SrH(Tartarate)+
log_k 5.8949
delta_h 0 kJ
-gamma 0 0
Id: 8009932
log K source: NIST46.4

Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Ba+2 + Tartarate-2 = Ba(Tartarate)
log_k 2.54
delta_h 0 kJ
-gamma 0 0
Id: 1009931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ba+2 + Tartarate-2 + H+ = BaH(Tartarate)+
log_k 5.77
delta_h 0 kJ
-gamma 0 0
Id: 1009932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Na+ + Tartarate-2 = Na(Tartarate)-
log_k 0.9
delta_h -0.8368 kJ
-gamma 0 0
Id: 5009931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Na+ + Tartarate-2 + H+ = NaH(Tartarate)
log_k 4.58
delta_h -2.8451 kJ
-gamma 0 0
Id: 5009932
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
K+ + Tartarate-2 = K(Tartarate)-
log_k 0.8
delta_h 0 kJ
-gamma 0 0
Id: 4109931
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Glycine- = H(Glycine)
log_k 9.778
delta_h -44.3504 kJ
-gamma 0 0
Id: 3309941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Glycine- = H2(Glycine)+
log_k 12.128
delta_h -48.4507 kJ
-gamma 0 0

Id: 3309942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Glycine- = Pb(Glycine)+
log_k 5.47
delta_h 0 kJ
-gamma 0 0
Id: 6009941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + 2Glycine- = Pb(Glycine)2
log_k 8.86
delta_h 0 kJ
-gamma 0 0
Id: 6009942
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Tl+ + Glycine- = Tl(Glycine)
log_k 1.72
delta_h 0 kJ
-gamma 0 0
Id: 8709941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Glycine- = Zn(Glycine)+
log_k 5.38
delta_h -11.7152 kJ
-gamma 0 0
Id: 9509941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Glycine- = Zn(Glycine)2
log_k 9.81
delta_h -24.2672 kJ
-gamma 0 0
Id: 9509942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 3Glycine- = Zn(Glycine)3-
log_k 12.3
delta_h -39.748 kJ
-gamma 0 0
Id: 9509943
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Glycine- = Cd(Glycine)+
log_k 4.69

delta_h -8.7864 kJ
-gamma 0 0
Id: 1609941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Glycine- = Cd(Glycine)2
log_k 8.4
delta_h -22.5936 kJ
-gamma 0 0
Id: 1609942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 3Glycine- = Cd(Glycine)3-
log_k 10.7
delta_h -35.9824 kJ
-gamma 0 0
Id: 1609943
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Glycine- + 2H+ = Hg(Glycine)+ + 2H2O
log_k 17
delta_h 0 kJ
-gamma 0 0
Id: 3619941
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Hg(OH)2 + 2Glycine- + 2H+ = Hg(Glycine)2 + 2H2O
log_k 25.8
delta_h 0 kJ
-gamma 0 0
Id: 3619942
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cu+ + 2Glycine- = Cu(Glycine)2-
log_k 10.3
delta_h 0 kJ
-gamma 0 0
Id: 2309941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Glycine- = Cu(Glycine)+
log_k 8.57
delta_h -25.104 kJ
-gamma 0 0
Id: 2319941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Cu+2 + 2Glycine- = Cu(Glycine)2
log_k 15.7
delta_h -54.8104 kJ
-gamma 0 0
Id: 2319942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Glycine- = Ag(Glycine)
log_k 3.51
delta_h -19.2464 kJ
-gamma 0 0
Id: 209941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Glycine- = Ag(Glycine)2-
log_k 6.89
delta_h -48.116 kJ
-gamma 0 0
Id: 209942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Glycine- = Ni(Glycine)+
log_k 6.15
delta_h -18.828 kJ
-gamma 0 0
Id: 5409941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Glycine- = Ni(Glycine)2
log_k 11.12
delta_h -38.0744 kJ
-gamma 0 0
Id: 5409942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 3Glycine- = Ni(Glycine)3-
log_k 14.63
delta_h -62.3416 kJ
-gamma 0 0
Id: 5409943
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Co+2 + Glycine- = Co(Glycine)+
log_k 5.07
delta_h -12 kJ
-gamma 0 0
Id: 2009941
log K source: NIST46.4

Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + 2Glycine- = Co(Glycine)2
log_k 9.07
delta_h -26 kJ
-gamma 0 0
Id: 2009942
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + 3Glycine- = Co(Glycine)3-
log_k 11.6
delta_h -41 kJ
-gamma 0 0
Id: 2009943
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + Glycine- + H2O = CoOH(Glycine) + H+
log_k -5.02
delta_h 0 kJ
-gamma 0 0
Id: 2009944
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Fe+2 + Glycine- = Fe(Glycine)+
log_k 4.31
delta_h -15.0624 kJ
-gamma 0 0
Id: 2809941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + 2Glycine- = Fe(Glycine)2
log_k 8.29
delta_h 0 kJ
-gamma 0 0
Id: 2809942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Glycine- = Fe(Glycine)+2
log_k 9.38
delta_h 0 kJ
-gamma 0 0
Id: 2819941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Glycine- + H+ = FeH(Glycine)+3
log_k 11.55
delta_h 0 kJ
-gamma 0 0

Id: 2819942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Glycine- = Mn(Glycine)+
log_k 3.19
delta_h -1.2552 kJ
-gamma 0 0
Id: 4709941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + 2Glycine- = Mn(Glycine)2
log_k 5.4
delta_h 0 kJ
-gamma 0 0
Id: 4709942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + Glycine- + 2H+ = Cr(Glycine)+2 + 2H2O
log_k 18.7
delta_h 0 kJ
-gamma 0 0
Id: 2119941
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 2Glycine- + 2H+ = Cr(Glycine)2+ + 2H2O
log_k 25.6
delta_h 0 kJ
-gamma 0 0
Id: 2119942
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 3Glycine- + 2H+ = Cr(Glycine)3 + 2H2O
log_k 31.6
delta_h 0 kJ
-gamma 0 0
Id: 2119943
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mg+2 + Glycine- = Mg(Glycine)+
log_k 2.08
delta_h 4.184 kJ
-gamma 0 0
Id: 4609941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Glycine- = Ca(Glycine)+
log_k 1.39

delta_h -4.184 kJ
-gamma 0 0
Id: 1509941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Glycine- + H+ = CaH(Glycine)+2
log_k 10.1
delta_h -35.9824 kJ
-gamma 0 0
Id: 1509942
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Glycine- = Sr(Glycine)+
log_k 0.91
delta_h 0 kJ
-gamma 0 0
Id: 8009941
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.00 25.0
Ba+2 + Glycine- = Ba(Glycine)+
log_k 0.77
delta_h 0 kJ
-gamma 0 0
Id: 1009941
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Salicylate-2 = H(Salicylate)-
log_k 13.7
delta_h -35.7732 kJ
-gamma 0 0
Id: 3309951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Salicylate-2 = H2(Salicylate)
log_k 16.8
delta_h -38.7857 kJ
-gamma 0 0
Id: 3309952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Salicylate-2 = Zn(Salicylate)
log_k 7.71
delta_h 0 kJ
-gamma 0 0
Id: 9509951
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Zn+2 + Salicylate-2 + H+ = ZnH(Salicylate)+
log_k 15.5
delta_h 0 kJ
-gamma 0 0
Id: 9509952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Salicylate-2 = Cd(Salicylate)
log_k 6.2
delta_h 0 kJ
-gamma 0 0
Id: 1609951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Salicylate-2 + H+ = CdH(Salicylate)+
log_k 16
delta_h 0 kJ
-gamma 0 0
Id: 1609952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Salicylate-2 = Cu(Salicylate)
log_k 11.3
delta_h -17.9912 kJ
-gamma 0 0
Id: 2319951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Salicylate-2 = Cu(Salicylate)2-2
log_k 19.3
delta_h 0 kJ
-gamma 0 0
Id: 2319952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Salicylate-2 + H+ = CuH(Salicylate)+
log_k 14.8
delta_h 0 kJ
-gamma 0 0
Id: 2319953
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Salicylate-2 = Ni(Salicylate)
log_k 8.2
delta_h 0 kJ
-gamma 0 0
Id: 5409951
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Salicylate-2 = Ni(Salicylate)2-2
log_k 12.64
delta_h 0 kJ
-gamma 0 0
Id: 5409952
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Co+2 + Salicylate-2 = Co(Salicylate)
log_k 7.4289
delta_h 0 kJ
-gamma 0 0
Id: 2009951
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Co+2 + 2Salicylate-2 = Co(Salicylate)2-2
log_k 11.8
delta_h 0 kJ
-gamma 0 0
Id: 2009952
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 20.0
Fe+2 + Salicylate-2 = Fe(Salicylate)
log_k 7.2
delta_h 0 kJ
-gamma 0 0
Id: 2809951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+2 + 2Salicylate-2 = Fe(Salicylate)2-2
log_k 11.6
delta_h 0 kJ
-gamma 0 0
Id: 2809952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + Salicylate-2 = Fe(Salicylate)+
log_k 17.6
delta_h 0 kJ
-gamma 0 0
Id: 2819951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Fe+3 + 2Salicylate-2 = Fe(Salicylate)2-
log_k 29.3
delta_h 0 kJ
-gamma 0 0

Id: 2819952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + Salicylate-2 = Mn(Salicylate)
log_k 6.5
delta_h 0 kJ
-gamma 0 0
Id: 4709951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mn+2 + 2Salicylate-2 = Mn(Salicylate)2-2
log_k 10.1
delta_h 0 kJ
-gamma 0 0
Id: 4709952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Be+2 + Salicylate-2 = Be(Salicylate)
log_k 13.3889
delta_h -31.7732 kJ
-gamma 0 0
Id: 1109951
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.10 25.0
Be+2 + 2Salicylate-2 = Be(Salicylate)2-2
log_k 23.25
delta_h 0 kJ
-gamma 0 0
Id: 1109952
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Mg+2 + Salicylate-2 = Mg(Salicylate)
log_k 5.76
delta_h 0 kJ
-gamma 0 0
Id: 4609951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Mg+2 + Salicylate-2 + H+ = MgH(Salicylate)+
log_k 15.3
delta_h 0 kJ
-gamma 0 0
Id: 4609952
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ca+2 + Salicylate-2 = Ca(Salicylate)
log_k 4.05

delta_h 0 kJ
-gamma 0 0
Id: 1509951
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Salicylate-2 + H+ = CaH(Salicylate)+
log_k 14.3
delta_h 0 kJ
-gamma 0 0
Id: 1509952
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ba+2 + Salicylate-2 + H+ = BaH(Salicylate)+
log_k 13.9
delta_h 0 kJ
-gamma 0 0
Id: 1009951
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
H+ + Glutamate-2 = H(Glutamate)-
log_k 9.96
delta_h -41.0032 kJ
-gamma 0 0
Id: 3309961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Glutamate-2 = H2(Glutamate)
log_k 14.26
delta_h -43.5136 kJ
-gamma 0 0
Id: 3309962
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
3H+ + Glutamate-2 = H3(Glutamate)+
log_k 16.42
delta_h -46.8608 kJ
-gamma 0 0
Id: 3309963
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Glutamate-2 = Pb(Glutamate)
log_k 6.43
delta_h 0 kJ
-gamma 0 0
Id: 6009961
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:

Pb+2 + 2Glutamate-2 = Pb(Glutamate)2-2
log_k 8.61
delta_h 0 kJ
-gamma 0 0
Id: 6009962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Pb+2 + Glutamate-2 + H+ = PbH(Glutamate)+
log_k 14.08
delta_h 0 kJ
-gamma 0 0
Id: 6009963
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Al+3 + Glutamate-2 + H+ = AlH(Glutamate)+2
log_k 13.07
delta_h 0 kJ
-gamma 0 0
Id: 309961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Glutamate-2 = Zn(Glutamate)
log_k 6.2
delta_h 0 kJ
-gamma 0 0
Id: 9509961
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 2Glutamate-2 = Zn(Glutamate)2-2
log_k 9.13
delta_h 0 kJ
-gamma 0 0
Id: 9509962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Zn+2 + 3Glutamate-2 = Zn(Glutamate)3-4
log_k 9.8
delta_h 0 kJ
-gamma 0 0
Id: 9509963
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cd+2 + Glutamate-2 = Cd(Glutamate)
log_k 4.7
delta_h 0 kJ
-gamma 0 0
Id: 1609961
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Glutamate-2 = Cd(Glutamate)2-2
log_k 7.59
delta_h 0 kJ
-gamma 0 0
Id: 1609962
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Hg(OH)2 + Glutamate-2 + 2H+ = Hg(Glutamate) + 2H2O
log_k 19.8
delta_h 0 kJ
-gamma 0 0
Id: 3619961
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Hg(OH)2 + 2Glutamate-2 + 2H+ = Hg(Glutamate)2-2 + 2H2O
log_k 26.2
delta_h 0 kJ
-gamma 0 0
Id: 3619962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cu+2 + Glutamate-2 = Cu(Glutamate)
log_k 9.17
delta_h -20.92 kJ
-gamma 0 0
Id: 2319961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Glutamate-2 = Cu(Glutamate)2-2
log_k 15.78
delta_h -48.116 kJ
-gamma 0 0
Id: 2319962
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Glutamate-2 + H+ = CuH(Glutamate)+
log_k 13.3
delta_h -28.0328 kJ
-gamma 0 0
Id: 2319963
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + Glutamate-2 = Ag(Glutamate)-
log_k 4.22
delta_h 0 kJ
-gamma 0 0

Id: 209961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ag+ + 2Glutamate-2 = Ag(Glutamate)2-3
log_k 7.36
delta_h 0 kJ
-gamma 0 0
Id: 209962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
2Ag+ + Glutamate-2 = Ag2(Glutamate)
log_k 3.4
delta_h 0 kJ
-gamma 0 0
Id: 209963
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Glutamate-2 = Ni(Glutamate)
log_k 6.47
delta_h 0 kJ
-gamma 0 0
Id: 5409961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + 2Glutamate-2 = Ni(Glutamate)2-2
log_k 10.7
delta_h -30.9616 kJ
-gamma 0 0
Id: 5409962
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Glutamate-2 = Co(Glutamate)
log_k 5.4178
delta_h 0 kJ
-gamma 0 0
Id: 2009961
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Co+2 + 2Glutamate-2 = Co(Glutamate)2-2
log_k 8.7178
delta_h 0 kJ
-gamma 0 0
Id: 2009962
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Mn+2 + Glutamate-2 = Mn(Glutamate)
log_k 4.95

delta_h 0 kJ
-gamma 0 0
Id: 4709961
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mn+2 + 2Glutamate-2 = Mn(Glutamate)2-2
log_k 8.48
delta_h 0 kJ
-gamma 0 0
Id: 4709962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + Glutamate-2 + 2H+ = Cr(Glutamate)+ + 2H2O
log_k 22.6
delta_h 0 kJ
-gamma 0 0
Id: 2119961
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 2Glutamate-2 + 2H+ = Cr(Glutamate)2- + 2H2O
log_k 30.7
delta_h 0 kJ
-gamma 0 0
Id: 2119962
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + Glutamate-2 + 3H+ = CrH(Glutamate)+2 + 2H2O
log_k 25.2
delta_h 0 kJ
-gamma 0 0
Id: 2119963
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Mg+2 + Glutamate-2 = Mg(Glutamate)
log_k 2.8
delta_h 0 kJ
-gamma 0 0
Id: 4609961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Glutamate-2 = Ca(Glutamate)
log_k 2.06
delta_h 0 kJ
-gamma 0 0
Id: 1509961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:

Ca+2 + Glutamate-2 + H+ = CaH(Glutamate)+
log_k 11.13
delta_h 0 kJ
-gamma 0 0
Id: 1509962
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Sr+2 + Glutamate-2 = Sr(Glutamate)
log_k 2.2278
delta_h 0 kJ
-gamma 0 0
Id: 8009961
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Ba+2 + Glutamate-2 = Ba(Glutamate)
log_k 2.14
delta_h 0 kJ
-gamma 0 0
Id: 1009961
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
H+ + Phthalate-2 = H(Phthalate)-
log_k 5.408
delta_h 2.1757 kJ
-gamma 0 0
Id: 3309971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
2H+ + Phthalate-2 = H2(Phthalate)
log_k 8.358
delta_h 4.8534 kJ
-gamma 0 0
Id: 3309972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Phthalate-2 = Pb(Phthalate)
log_k 4.26
delta_h 0 kJ
-gamma 0 0
Id: 6009971
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Pb+2 + 2Phthalate-2 = Pb(Phthalate)2-2
log_k 4.83
delta_h 0 kJ
-gamma 0 0
Id: 6009972
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
Pb+2 + Phthalate-2 + H+ = PbH(Phthalate)+
log_k 6.98
delta_h 0 kJ
-gamma 0 0
Id: 6009973
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + Phthalate-2 = Al(Phthalate)+
log_k 4.56
delta_h 0 kJ
-gamma 0 0
Id: 309971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Al+3 + 2Phthalate-2 = Al(Phthalate)2-
log_k 7.2
delta_h 0 kJ
-gamma 0 0
Id: 309972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + Phthalate-2 = Zn(Phthalate)
log_k 2.91
delta_h 13.3888 kJ
-gamma 0 0
Id: 9509971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Zn+2 + 2Phthalate-2 = Zn(Phthalate)2-2
log_k 4.2
delta_h 0 kJ
-gamma 0 0
Id: 9509972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Phthalate-2 = Cd(Phthalate)
log_k 3.43
delta_h 0 kJ
-gamma 0 0
Id: 1609971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + Phthalate-2 + H+ = CdH(Phthalate)+
log_k 6.3
delta_h 0 kJ
-gamma 0 0

Id: 1609973
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cd+2 + 2Phthalate-2 = Cd(Phthalate)2-2
log_k 3.7
delta_h 0 kJ
-gamma 0 0
Id: 1609972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Phthalate-2 = Cu(Phthalate)
log_k 4.02
delta_h 8.368 kJ
-gamma 0 0
Id: 2319971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + Phthalate-2 + H+ = CuH(Phthalate)+
log_k 7.1
delta_h 3.8493 kJ
-gamma 0 0
Id: 2319970
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cu+2 + 2Phthalate-2 = Cu(Phthalate)2-2
log_k 5.3
delta_h 15.8992 kJ
-gamma 0 0
Id: 2319972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Phthalate-2 = Ni(Phthalate)
log_k 2.95
delta_h 7.5312 kJ
-gamma 0 0
Id: 5409971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ni+2 + Phthalate-2 + H+ = NiH(Phthalate)+
log_k 6.6
delta_h 0 kJ
-gamma 0 0
Id: 5409972
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Co+2 + Phthalate-2 = Co(Phthalate)
log_k 2.83

delta_h 7.9 kJ
-gamma 0 0
Id: 2009971
log K source: NIST46.4
Delta H source: NIST46.4
#T and ionic strength: 0.00 25.0
Co+2 + H+ + Phthalate-2 = CoH(Phthalate)+
log_k 7.227
delta_h 0 kJ
-gamma 0 0
Id: 2009972
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.50 25.0
Mn+2 + Phthalate-2 = Mn(Phthalate)
log_k 2.74
delta_h 10.0416 kJ
-gamma 0 0
Id: 4709971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Cr(OH)2+ + Phthalate-2 + 2H+ = Cr(Phthalate)+ + 2H2O
log_k 16.3
delta_h 0 kJ
-gamma 0 0
Id: 2119971
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 2Phthalate-2 + 2H+ = Cr(Phthalate)2- + 2H2O
log_k 21.2
delta_h 0 kJ
-gamma 0 0
Id: 2119972
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Cr(OH)2+ + 3Phthalate-2 + 2H+ = Cr(Phthalate)3-3 + 2H2O
log_k 23.3
delta_h 0 kJ
-gamma 0 0
Id: 2119973
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Be+2 + Phthalate-2 = Be(Phthalate)
log_k 4.8278
delta_h 0 kJ
-gamma 0 0
Id: 1109971
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0

Be+2 + 2Phthalate-2 = Be(Phthalate)2-2
log_k 6.5478
delta_h 0 kJ
-gamma 0 0
Id: 1109972
log K source: NIST46.4
Delta H source: NIST46.2
#T and ionic strength: 0.10 25.0
Mg+2 + Phthalate-2 = Mg(Phthalate)
log_k 2.49
delta_h 0 kJ
-gamma 0 0
Id: 4609971
log K source: SCD2.62
Delta H source: SCD2.62
#T and ionic strength:
Ca+2 + Phthalate-2 = Ca(Phthalate)
log_k 2.45
delta_h 0 kJ
-gamma 0 0
Id: 1509970
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ca+2 + Phthalate-2 + H+ = CaH(Phthalate)+
log_k 6.43
delta_h 0 kJ
-gamma 0 0
Id: 1509971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Ba+2 + Phthalate-2 = Ba(Phthalate)
log_k 2.33
delta_h 0 kJ
-gamma 0 0
Id: 1009971
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
Na+ + Phthalate-2 = Na(Phthalate)-
log_k 0.8
delta_h 4.184 kJ
-gamma 0 0
Id: 5009970
log K source: NIST46.2
Delta H source: NIST46.2
#T and ionic strength:
K+ + Phthalate-2 = K(Phthalate)-
log_k 0.7
delta_h 3.7656 kJ
-gamma 0 0
Id: 4109971
log K source: NIST46.2

Delta H source: NIST46.2
#T and ionic strength:
PHASES
Sulfur
S + H+ + 2e- = HS-
log_k -2.1449
delta_h -16.3 kJ
Semetal(hex
Se + H+ + 2e- = HSe-
log_k -7.7084
delta_h 15.9 kJ
Semetal(am)
Se + H+ + 2e- = HSe-
log_k -7.1099
delta_h 10.8784 kJ
Sbmetal
Sb + 3H2O = Sb(OH)3 + 3H+ + 3e-
log_k -11.6889
delta_h 83.89 kJ
Snmetal(wht)
Sn + 2H2O = Sn(OH)2 + 2H+ + 2e-
log_k -2.3266
delta_h -0 kJ
Pbmetal
Pb = Pb+2 + 2e-
log_k 4.2462
delta_h 0.92 kJ
Tlmetal
Tl = Tl+ + e-
log_k 5.6762
delta_h 5.36 kJ
Znmetal
Zn = Zn+2 + 2e-
log_k 25.7886
delta_h -153.39 kJ
Cdmetal(alpha)
Cd = Cd+2 + 2e-
log_k 13.5147
delta_h -75.33 kJ
Cdmetal(gamma)
Cd = Cd+2 + 2e-
log_k 13.618
delta_h -75.92 kJ
Hgmetal(l)
Hg = 0.5Hg2+2 + e-
log_k -13.4517
delta_h 83.435 kJ
Cumetal
Cu = Cu+ + e-
log_k -8.756
delta_h 71.67 kJ
Agmetal
Ag = Ag+ + e-
log_k -13.5065

delta_h 105.79 kJ
Crmetal
Cr = Cr+2 + 2e-
log_k 30.4831
delta_h -172 kJ
Vmetal
V = V+3 + 3e-
log_k 44.0253
delta_h -259 kJ
Stibnite
Sb2S3 + 6H2O = 2Sb(OH)3 + 3H+ + 3HS-
log_k -50.46
delta_h 293.78 kJ
Orpiment
As2S3 + 6H2O = 2H3AsO3 + 3HS- + 3H+
log_k -61.0663
delta_h 350.68 kJ
Realgar
AsS + 3H2O = H3AsO3 + HS- + 2H+ + e-
log_k -19.747
delta_h 127.8 kJ
SnS
SnS + 2H2O = Sn(OH)2 + H+ + HS-
log_k -19.114
delta_h -0 kJ
SnS2
SnS2 + 6H2O = Sn(OH)6-2 + 4H+ + 2HS-
log_k -57.4538
delta_h -0 kJ
Galena
PbS + H+ = Pb+2 + HS-
log_k -13.97
delta_h 80 kJ
Tl2S
Tl2S + H+ = 2Tl+ + HS-
log_k -7.19
delta_h 91.52 kJ
ZnS(am)
ZnS + H+ = Zn+2 + HS-
log_k -9.052
delta_h 15.3553 kJ
Sphalerite
ZnS + H+ = Zn+2 + HS-
log_k -11.45
delta_h 30 kJ
Wurtzite
ZnS + H+ = Zn+2 + HS-
log_k -8.95
delta_h 21.171 kJ
Greenockite
CdS + H+ = Cd+2 + HS-
log_k -14.36
delta_h 55 kJ
Hg2S

Hg2S + H+ = Hg2+2 + HS-
log_k -11.6765
delta_h 69.7473 kJ
Cinnabar
HgS + 2H2O = Hg(OH)2 + H+ + HS-
log_k -45.694
delta_h 253.76 kJ
Metacinnabar
HgS + 2H2O = Hg(OH)2 + H+ + HS-
log_k -45.094
delta_h 253.72 kJ
Chalcocite
Cu2S + H+ = 2Cu+ + HS-
log_k -34.92
delta_h 168 kJ
Djurleite
Cu0.066Cu1.868S + H+ = 0.066Cu+2 + 1.868Cu+ + HS-
log_k -33.92
delta_h 200.334 kJ
Anilite
Cu0.25Cu1.5S + H+ = 0.25Cu+2 + 1.5Cu+ + HS-
log_k -31.878
delta_h 182.15 kJ
BlaubleiII
Cu0.6Cu0.8S + H+ = 0.6Cu+2 + 0.8Cu+ + HS-
log_k -27.279
delta_h -0 kJ
BlaubleiI
Cu0.9Cu0.2S + H+ = 0.9Cu+2 + 0.2Cu+ + HS-
log_k -24.162
delta_h -0 kJ
Covellite
CuS + H+ = Cu+2 + HS-
log_k -22.3
delta_h 97 kJ
Chalcopyrite
CuFeS2 + 2H+ = Cu+2 + Fe+2 + 2HS-
log_k -35.27
delta_h 148.448 kJ
Acanthite
Ag2S + H+ = 2Ag+ + HS-
log_k -36.22
delta_h 227 kJ
NiS(alpha)
NiS + H+ = Ni+2 + HS-
log_k -5.6
delta_h -0 kJ
NiS(beta)
NiS + H+ = Ni+2 + HS-
log_k -11.1
delta_h -0 kJ
NiS(gamma)
NiS + H+ = Ni+2 + HS-
log_k -12.8

delta_h -0 kJ
CoS(alpha)
CoS + H+ = Co+2 + HS-
log_k -7.44
delta_h -0 kJ
CoS(beta)
CoS + H+ = Co+2 + HS-
log_k -11.07
delta_h -0 kJ
FeS(ppt)
FeS + H+ = Fe+2 + HS-
log_k -2.95
delta_h -11 kJ
Greigite
Fe3S4 + 4H+ = 2Fe+3 + Fe+2 + 4HS-
log_k -45.035
delta_h -0 kJ
Mackinawite
FeS + H+ = Fe+2 + HS-
log_k -3.6
delta_h -0 kJ
Pyrite
FeS2 + 2H+ + 2e- = Fe+2 + 2HS-
log_k -18.5082
delta_h 49.844 kJ
MnS(grn)
MnS + H+ = Mn+2 + HS-
log_k 0.17
delta_h -32 kJ
MnS(pnk)
MnS + H+ = Mn+2 + HS-
log_k 3.34
delta_h -0 kJ
MoS2
MoS2 + 4H2O = MoO4-2 + 6H+ + 2HS- + 2e-
log_k -70.2596
delta_h 389.02 kJ
BeS
BeS + H+ = Be+2 + HS-
log_k 19.38
delta_h -0 kJ
BaS
BaS + H+ = Ba+2 + HS-
log_k 16.18
delta_h -0 kJ
Hg2(Cyanide)2
Hg2(Cyanide)2 = Hg2+2 + 2Cyanide-
log_k -39.3
delta_h -0 kJ
CuCyanide
CuCyanide = Cu+ + Cyanide-
log_k -19.5
delta_h -19 kJ
AgCyanide

AgCyanide = Ag+ + Cyanide-
log_k -15.74
delta_h 110.395 kJ
Ag2(Cyanide)2
Ag2(Cyanide)2 = 2Ag+ + 2Cyanide-
log_k -11.3289
delta_h -0 kJ
NaCyanide(cubic)
NaCyanide = Cyanide- + Na+
log_k 1.6012
delta_h 0.969 kJ
KCyanide(cubic)
KCyanide = Cyanide- + K+
log_k 1.4188
delta_h 11.93 kJ
Pb2Fe(Cyanide)6
Pb2Fe(Cyanide)6 = 2Pb+2 + Fe+2 + 6Cyanide-
log_k -53.42
delta_h -0 kJ
Zn2Fe(Cyanide)6
Zn2Fe(Cyanide)6 = 2Zn+2 + Fe+2 + 6Cyanide-
log_k -51.08
delta_h -0 kJ
Cd2Fe(Cyanide)6
Cd2Fe(Cyanide)6 = 2Cd+2 + Fe+2 + 6Cyanide-
log_k -52.78
delta_h -0 kJ
Ag4Fe(Cyanide)6
Ag4Fe(Cyanide)6 = 4Ag+ + Fe+2 + 6Cyanide-
log_k -79.47
delta_h -0 kJ
Ag3Fe(Cyanide)6
Ag3Fe(Cyanide)6 = 3Ag+ + Fe+3 + 6Cyanide-
log_k -72.7867
delta_h -0 kJ
Mn3(Fe(Cyanide)6)2
Mn3(Fe(Cyanide)6)2 = 3Mn+2 + 2Fe+3 + 12Cyanide-
log_k -105.4
delta_h -0 kJ
Sb2Se3
Sb2Se3 + 6H2O = 2Sb(OH)3 + 3HSe- + 3H+
log_k -67.7571
delta_h 343.046 kJ
SnSe
SnSe + 2H2O = Sn(OH)2 + H+ + HSe-
log_k -30.494
delta_h -0 kJ
SnSe2
SnSe2 + 6H2O = Sn(OH)6-2 + 4H+ + 2HSe-
log_k -65.1189
delta_h -0 kJ
Clausthalite
PbSe + H+ = Pb+2 + HSe-
log_k -27.1

delta_h 119.72 kJ
Tl2Se
Tl2Se + H+ = 2Tl+ + HSe-
log_k -18.1
delta_h 85.62 kJ
ZnSe
ZnSe + H+ = Zn+2 + HSe-
log_k -14.4
delta_h 25.51 kJ
CdSe
CdSe + H+ = Cd+2 + HSe-
log_k -20.2
delta_h 75.9814 kJ
HgSe
HgSe + 2H2O = Hg(OH)2 + H+ + HSe-
log_k -55.694
delta_h -0 kJ
Cu2Se(alpha)
Cu2Se + H+ = 2Cu+ + HSe-
log_k -45.8
delta_h 214.263 kJ
Cu3Se2
Cu3Se2 + 2H+ = 2HSe- + 2Cu+ + Cu+2
log_k -63.4911
delta_h 340.327 kJ
CuSe
CuSe + H+ = Cu+2 + HSe-
log_k -33.1
delta_h 121.127 kJ
CuSe2
CuSe2 + 2H+ + 2e- = 2HSe- + Cu+2
log_k -33.3655
delta_h 140.582 kJ
Ag2Se
Ag2Se + H+ = 2Ag+ + HSe-
log_k -48.7
delta_h 265.48 kJ
NiSe
NiSe + H+ = Ni+2 + HSe-
log_k -17.7
delta_h -0 kJ
CoSe
CoSe + H+ = Co+2 + HSe-
log_k -16.2
delta_h -0 kJ
FeSe
FeSe + H+ = Fe+2 + HSe-
log_k -11
delta_h 2.092 kJ
Ferroselite
FeSe2 + 2H+ + 2e- = 2HSe- + Fe+2
log_k -18.5959
delta_h 47.2792 kJ
MnSe

MnSe + H+ = Mn+2 + HSe-
log_k 3.5
delta_h -98.15 kJ
AlSb
AlSb + 3H2O = Sb(OH)3 + 6e- + Al+3 + 3H+
log_k 65.6241
delta_h -0 kJ
ZnSb
ZnSb + 3H2O = Sb(OH)3 + 5e- + Zn+2 + 3H+
log_k 11.0138
delta_h -54.8773 kJ
CdSb
CdSb + 3H2O = Sb(OH)3 + 5e- + 3H+ + Cd+2
log_k -0.3501
delta_h 22.36 kJ
Cu2Sb:3H2O
Cu2Sb:3H2O = Sb(OH)3 + 6e- + 3H+ + Cu+ + Cu+2
log_k -34.8827
delta_h 233.237 kJ
Cu3Sb
Cu3Sb + 3H2O = Sb(OH)3 + 6e- + 3H+ + 3Cu+
log_k -42.5937
delta_h 308.131 kJ
#Ag4Sb
Ag4Sb + 3H2O = Sb(OH)3 + 6e- + 3Ag+ + 3H+
log_k -56.1818
delta_h -0 kJ
Breithauptite
NiSb + 3H2O = Sb(OH)3 + 5e- + 3H+ + Ni+2
log_k -18.5225
delta_h 96.0019 kJ
MnSb
MnSb + 3H2O = Mn+3 + Sb(OH)3 + 6e- + 3H+
log_k -2.9099
delta_h 21.1083 kJ
Mn2Sb
Mn2Sb + 3H2O = 2Mn+2 + Sb(OH)3 + 7e- + 3H+
log_k 61.0796
delta_h -0 kJ
USb2
USb2 + 8H2O = UO2+2 + 2Sb(OH)3 + 12e- + 10H+
log_k 29.5771
delta_h -103.56 kJ
U3Sb4
U3Sb4 + 12H2O = 3U+4 + 4Sb(OH)3 + 24e- + 12H+
log_k 152.383
delta_h -986.04 kJ
Mg2Sb3
Mg2Sb3 + 9H2O = 2Mg+2 + 3Sb(OH)3 + 9H+ + 13e-
log_k 74.6838
delta_h -0 kJ
Ca3Sb2
Ca3Sb2 + 6H2O = 3Ca+2 + 2Sb(OH)3 + 6H+ + 12e-
log_k 142.974

delta_h -732.744 kJ
NaSb
NaSb + 3H2O = Na+ + Sb(OH)3 + 3H+ + 4e-
log_k 23.1658
delta_h -93.45 kJ
Na3Sb
Na3Sb + 3H2O = 3Na+ + Sb(OH)3 + 3H+ + 6e-
log_k 94.4517
delta_h -432.13 kJ
SeO2
SeO2 + H2O = HSeO3- + H+
log_k 0.1246
delta_h 1.4016 kJ
SeO3
SeO3 + H2O = SeO4-2 + 2H+
log_k 21.044
delta_h -146.377 kJ
Sb2O5
Sb2O5 + 7H2O = 2Sb(OH)6- + 2H+
log_k -9.6674
delta_h -0 kJ
SbO2
SbO2 + 4H2O = Sb(OH)6- + e- + 2H+
log_k -27.8241
delta_h -0 kJ
Sb2O4
Sb2O4 + 2H2O + 2H+ + 2e- = 2Sb(OH)3
log_k 3.4021
delta_h -68.04 kJ
Sb4O6(cubic)
Sb4O6 + 6H2O = 4Sb(OH)3
log_k -18.2612
delta_h 61.1801 kJ
Sb4O6(orth)
Sb4O6 + 6H2O = 4Sb(OH)3
log_k -17.9012
delta_h 37.6801 kJ
Sb(OH)3
Sb(OH)3 = Sb(OH)3
log_k -7.1099
delta_h 30.1248 kJ
Senarmontite
Sb2O3 + 3H2O = 2Sb(OH)3
log_k -12.3654
delta_h 30.6478 kJ
Valentinite
Sb2O3 + 3H2O = 2Sb(OH)3
log_k -8.4806
delta_h 19.0163 kJ
Chalcedony
SiO2 + 2H2O = H4SiO4
log_k -3.55
delta_h 19.7 kJ
Cristobalite

SiO2 + 2H2O = H4SiO4
log_k -3.35
delta_h 20.006 kJ
Quartz
SiO2 + 2H2O = H4SiO4
log_k -4
delta_h 22.36 kJ
SiO2(am-gel)
SiO2 + 2H2O = H4SiO4
log_k -2.71
delta_h 14 kJ
SiO2(am-ppt)
SiO2 + 2H2O = H4SiO4
log_k -2.74
delta_h 15.15 kJ
SnO
SnO + H2O = Sn(OH)2
log_k -4.9141
delta_h -0 kJ
SnO2
SnO2 + 4H2O = Sn(OH)6-2 + 2H+
log_k -28.9749
delta_h -0 kJ
Sn(OH)2
Sn(OH)2 = Sn(OH)2
log_k -5.4309
delta_h -0 kJ
Sn(OH)4
Sn(OH)4 + 2H2O = Sn(OH)6-2 + 2H+
log_k -22.2808
delta_h -0 kJ
H2Sn(OH)6
H2Sn(OH)6 = Sn(OH)6-2 + 2H+
log_k -23.5281
delta_h -0 kJ
Massicot
PbO + 2H+ = Pb+2 + H2O
log_k 12.894
delta_h -66.848 kJ
Litharge
PbO + 2H+ = Pb+2 + H2O
log_k 12.694
delta_h -65.501 kJ
PbO:0.3H2O
PbO:0.33H2O + 2H+ = Pb+2 + 1.33H2O
log_k 12.98
delta_h -0 kJ
Plattnerite
PbO2 + 4H+ + 2e- = Pb+2 + 2H2O
log_k 49.6001
delta_h -296.27 kJ
Pb(OH)2
Pb(OH)2 + 2H+ = Pb+2 + 2H2O
log_k 8.15

delta_h -58.5342 kJ
Pb2O(OH)2
Pb2O(OH)2 + 4H+ = 2Pb+2 + 3H2O
log_k 26.188
delta_h -0 kJ
Al(OH)3(am)
Al(OH)3 + 3H+ = Al+3 + 3H2O
log_k 10.8
delta_h -111 kJ
Boehmite
AlOOH + 3H+ = Al+3 + 2H2O
log_k 8.578
delta_h -117.696 kJ
Diaspore
AlOOH + 3H+ = Al+3 + 2H2O
log_k 6.873
delta_h -103.052 kJ
Gibbsite
Al(OH)3 + 3H+ = Al+3 + 3H2O
log_k 8.291
delta_h -95.3952 kJ
Tl2O
Tl2O + 2H+ = 2Tl+ + H2O
log_k 27.0915
delta_h -96.41 kJ
TlOH
TlOH + H+ = Tl+ + H2O
log_k 12.9186
delta_h -41.57 kJ
Avicennite
Tl2O3 + 3H2O = 2Tl(OH)3
log_k -13
delta_h -0 kJ
Tl(OH)3
Tl(OH)3 = Tl(OH)3
log_k -5.441
delta_h -0 kJ
Zn(OH)2(am)
Zn(OH)2 + 2H+ = Zn+2 + 2H2O
log_k 12.474
delta_h -80.62 kJ
Zn(OH)2
Zn(OH)2 + 2H+ = Zn+2 + 2H2O
log_k 12.2
delta_h -0 kJ
Zn(OH)2(beta)
Zn(OH)2 + 2H+ = Zn+2 + 2H2O
log_k 11.754
delta_h -83.14 kJ
Zn(OH)2(gamma)
Zn(OH)2 + 2H+ = Zn+2 + 2H2O
log_k 11.734
delta_h -0 kJ
Zn(OH)2(epsilon)

Zn(OH)2 + 2H+ = Zn+2 + 2H2O
log_k 11.534
delta_h -81.8 kJ
ZnO(active)
ZnO + 2H+ = Zn+2 + H2O
log_k 11.1884
delta_h -88.76 kJ
Zincite
ZnO + 2H+ = Zn+2 + H2O
log_k 11.334
delta_h -89.62 kJ
Cd(OH)2(am)
Cd(OH)2 + 2H+ = Cd+2 + 2H2O
log_k 13.73
delta_h -86.9017 kJ
Cd(OH)2
Cd(OH)2 + 2H+ = Cd+2 + 2H2O
log_k 13.644
delta_h -94.62 kJ
Monteponite
CdO + 2H+ = Cd+2 + H2O
log_k 15.1034
delta_h -103.4 kJ
Hg2(OH)2
Hg2(OH)2 + 2H+ = Hg2+2 + 2H2O
log_k 5.2603
delta_h -0 kJ
Montroydite
HgO + H2O = Hg(OH)2
log_k -3.64
delta_h -38.9 kJ
Hg(OH)2
Hg(OH)2 = Hg(OH)2
log_k -3.4963
delta_h -0 kJ
Cuprite
Cu2O + 2H+ = 2Cu+ + H2O
log_k -1.406
delta_h -124.02 kJ
Cu(OH)2
Cu(OH)2 + 2H+ = Cu+2 + 2H2O
log_k 8.674
delta_h -56.42 kJ
Tenorite
CuO + 2H+ = Cu+2 + H2O
log_k 7.644
delta_h -64.867 kJ
Ag2O
Ag2O + 2H+ = 2Ag+ + H2O
log_k 12.574
delta_h -45.62 kJ
Ni(OH)2
Ni(OH)2 + 2H+ = Ni+2 + 2H2O
log_k 12.794

delta_h -95.96 kJ
Bunsenite
NiO + 2H+ = Ni+2 + H2O
log_k 12.4456
delta_h -100.13 kJ
CoO
CoO + 2H+ = Co+2 + H2O
log_k 13.5864
delta_h -106.295 kJ
Co(OH)2
Co(OH)2 + 2H+ = Co+2 + 2H2O
log_k 13.094
delta_h -0 kJ
Co(OH)3
Co(OH)3 + 3H+ = Co+3 + 3H2O
log_k -2.309
delta_h -92.43 kJ
#Wustite-0.11
WUSTITE-0.11 + 2H+ = 0.947Fe+2 + H2O
log_k 11.6879
delta_h -103.938 kJ
Fe(OH)2
Fe(OH)2 + 2H+ = Fe+2 + 2H2O
log_k 13.564
delta_h -0 kJ
Ferrihydrite
Fe(OH)3 + 3H+ = Fe+3 + 3H2O
log_k 3.191
delta_h -73.374 kJ
Fe3(OH)8
Fe3(OH)8 + 8H+ = 2Fe+3 + Fe+2 + 8H2O
log_k 20.222
delta_h -0 kJ
Goethite
FeOOH + 3H+ = Fe+3 + 2H2O
log_k 0.491
delta_h -60.5843 kJ
Pyrolusite
MnO2 + 4H+ + 2e- = Mn+2 + 2H2O
log_k 41.38
delta_h -272 kJ
Birnessite
MnO2 + 4H+ + e- = Mn+3 + 2H2O
log_k 18.091
delta_h -0 kJ
Nsutite
MnO2 + 4H+ + e- = Mn+3 + 2H2O
log_k 17.504
delta_h -0 kJ
Pyrochroite
Mn(OH)2 + 2H+ = Mn+2 + 2H2O
log_k 15.194
delta_h -97.0099 kJ
Manganite

MnOOH + 3H+ + e- = Mn+2 + 2H2O
log_k 25.34
delta_h -0 kJ
Cr(OH)2
Cr(OH)2 + 2H+ = Cr+2 + 2H2O
log_k 10.8189
delta_h -35.6058 kJ
Cr(OH)3(am)
Cr(OH)3 + H+ = Cr(OH)2+ + H2O
log_k -0.75
delta_h -0 kJ
Cr(OH)3
Cr(OH)3 + H+ = Cr(OH)2+ + H2O
log_k 1.3355
delta_h -29.7692 kJ
CrO3
CrO3 + H2O = CrO4-2 + 2H+
log_k -3.2105
delta_h -5.2091 kJ
MoO3
MoO3 + H2O = MoO4-2 + 2H+
log_k -8
delta_h -0 kJ
VO
VO + 2H+ = V+3 + H2O + e-
log_k 14.7563
delta_h -113.041 kJ
V(OH)3
V(OH)3 + 3H+ = V+3 + 3H2O
log_k 7.591
delta_h -0 kJ
VO(OH)2
VO(OH)2 + 2H+ = VO+2 + 2H2O
log_k 5.1506
delta_h -0 kJ
Uraninite
UO2 + 4H+ = U+4 + 2H2O
log_k -4.6693
delta_h -77.86 kJ
UO2(am)
UO2 + 4H+ = U+4 + 2H2O
log_k 0.934
delta_h -109.746 kJ
UO3
UO3 + 2H+ = UO2+2 + H2O
log_k 7.7
delta_h -81.0299 kJ
Gummite
UO3 + 2H+ = UO2+2 + H2O
log_k 7.6718
delta_h -81.0299 kJ
UO2(OH)2(beta)
UO2(OH)2 + 2H+ = UO2+2 + 2H2O
log_k 5.6116

delta_h -56.7599 kJ
Schoepite
UO2(OH)2:H2O + 2H+ = UO2+2 + 3H2O
log_k 5.994
delta_h -49.79 kJ
Be(OH)2(am)
Be(OH)2 + 2H+ = Be+2 + 2H2O
log_k 7.194
delta_h -0 kJ
Be(OH)2(alpha)
Be(OH)2 + 2H+ = Be+2 + 2H2O
log_k 6.894
delta_h -0 kJ
Be(OH)2(beta)
Be(OH)2 + 2H+ = Be+2 + 2H2O
log_k 6.494
delta_h -0 kJ
Brucite
Mg(OH)2 + 2H+ = Mg+2 + 2H2O
log_k 16.844
delta_h -113.996 kJ
Periclase
MgO + 2H+ = Mg+2 + H2O
log_k 21.5841
delta_h -151.23 kJ
Mg(OH)2(active)
Mg(OH)2 + 2H+ = Mg+2 + 2H2O
log_k 18.794
delta_h -0 kJ
Lime
CaO + 2H+ = Ca+2 + H2O
log_k 32.6993
delta_h -193.91 kJ
Portlandite
Ca(OH)2 + 2H+ = Ca+2 + 2H2O
log_k 22.804
delta_h -128.62 kJ
Ba(OH)2:8H2O
Ba(OH)2:8H2O + 2H+ = Ba+2 + 10H2O
log_k 24.394
delta_h -54.32 kJ
Cu(SbO3)2
Cu(SbO3)2 + 6H+ + 4e- = 2Sb(OH)3 + Cu+2
log_k 45.2105
delta_h -0 kJ
Arsenolite
As4O6 + 6H2O = 4H3AsO3
log_k -2.76
delta_h 59.9567 kJ
Claudetite
As4O6 + 6H2O = 4H3AsO3
log_k -3.065
delta_h 55.6054 kJ
As2O5

As2O5 + 3H2O = 2H3AsO4
log_k 6.7061
delta_h -22.64 kJ
Pb2O3
Pb2O3 + 6H+ + 2e- = 2Pb+2 + 3H2O
log_k 61.04
delta_h -0 kJ
Minium
Pb3O4 + 8H+ + 2e- = 3Pb+2 + 4H2O
log_k 73.5219
delta_h -421.874 kJ
Al2O3
Al2O3 + 6H+ = 2Al+3 + 3H2O
log_k 19.6524
delta_h -258.59 kJ
Co3O4
Co3O4 + 8H+ = Co+2 + 2Co+3 + 4H2O
log_k -10.4956
delta_h -107.5 kJ
CoFe2O4
CoFe2O4 + 8H+ = Co+2 + 2Fe+3 + 4H2O
log_k -3.5281
delta_h -158.82 kJ
Magnetite
Fe3O4 + 8H+ = 2Fe+3 + Fe+2 + 4H2O
log_k 3.4028
delta_h -208.526 kJ
Hercynite
FeAl2O4 + 8H+ = Fe+2 + 2Al+3 + 4H2O
log_k 22.893
delta_h -313.92 kJ
Hematite
Fe2O3 + 6H+ = 2Fe+3 + 3H2O
log_k -1.418
delta_h -128.987 kJ
Maghemite
Fe2O3 + 6H+ = 2Fe+3 + 3H2O
log_k 6.386
delta_h -0 kJ
Lepidocrocite
FeOOH + 3H+ = Fe+3 + 2H2O
log_k 1.371
delta_h -0 kJ
Hausmannite
Mn3O4 + 8H+ + 2e- = 3Mn+2 + 4H2O
log_k 61.03
delta_h -421 kJ
Bixbyite
Mn2O3 + 6H+ = 2Mn+3 + 3H2O
log_k -0.6445
delta_h -124.49 kJ
Cr2O3
Cr2O3 + H2O + 2H+ = 2Cr(OH)2+
log_k -2.3576

delta_h -50.731 kJ
#V2O3
V2O3 + 3H+ = V+3 + 1.5H2O
log_k 4.9
delta_h -82.5085 kJ
V3O5
V3O5 + 4H+ = 3VO+2 + 2H2O + 2e-
log_k 1.8361
delta_h -98.46 kJ
#V2O4
V2O4 + 2H+ = VO+2 + H2O
log_k 4.27
delta_h -58.8689 kJ
V4O7
V4O7 + 6H+ = 4VO+2 + 3H2O + 2e-
log_k 7.1865
delta_h -163.89 kJ
V6O13
V6O13 + 2H+ = 6VO2+ + H2O + 4e-
log_k -60.86
delta_h 271.5 kJ
V2O5
V2O5 + 2H+ = 2VO2+ + H2O
log_k -1.36
delta_h 34 kJ
U4O9
U4O9 + 18H+ + 2e- = 4U+4 + 9H2O
log_k -3.0198
delta_h -426.87 kJ
U3O8
U3O8 + 16H+ + 4e- = 3U+4 + 8H2O
log_k 21.0834
delta_h -485.44 kJ
Spinel
MgAl2O4 + 8H+ = Mg+2 + 2Al+3 + 4H2O
log_k 36.8476
delta_h -388.012 kJ
Magnesioferrite
Fe2MgO4 + 8H+ = Mg+2 + 2Fe+3 + 4H2O
log_k 16.8597
delta_h -278.92 kJ
Natron
Na2CO3:10H2O = 2Na+ + CO3-2 + 10H2O
log_k -1.311
delta_h 65.8771 kJ
Cuprousferrite
CuFeO2 + 4H+ = Cu+ + Fe+3 + 2H2O
log_k -8.9171
delta_h -15.89 kJ
Cupricferrite
CuFe2O4 + 8H+ = Cu+2 + 2Fe+3 + 4H2O
log_k 5.9882
delta_h -210.21 kJ
FeCr2O4

FeCr2O4 + 4H+ = 2Cr(OH)2+ + Fe+2
log_k 7.2003
delta_h -140.4 kJ
MgCr2O4
MgCr2O4 + 4H+ = 2Cr(OH)2+ + Mg+2
log_k 16.2007
delta_h -179.4 kJ
SbF3
SbF3 + 3H2O = Sb(OH)3 + 3H+ + 3F-
log_k -10.2251
delta_h -6.7279 kJ
PbF2
PbF2 = Pb+2 + 2F-
log_k -7.44
delta_h 20 kJ
ZnF2
ZnF2 = Zn+2 + 2F-
log_k -0.5343
delta_h -59.69 kJ
CdF2
CdF2 = Cd+2 + 2F-
log_k -1.2124
delta_h -46.22 kJ
Hg2F2
Hg2F2 = Hg2+2 + 2F-
log_k -10.3623
delta_h -18.486 kJ
CuF
CuF = Cu+ + F-
log_k -4.9056
delta_h 16.648 kJ
CuF2
CuF2 = Cu+2 + 2F-
log_k 1.115
delta_h -66.901 kJ
CuF2:2H2O
CuF2:2H2O = Cu+2 + 2F- + 2H2O
log_k -4.55
delta_h -15.2716 kJ
AgF:4H2O
AgF:4H2O = Ag+ + F- + 4H2O
log_k 1.0491
delta_h 15.4202 kJ
CoF2
CoF2 = Co+2 + 2F-
log_k -1.5969
delta_h -57.368 kJ
CoF3
CoF3 = Co+3 + 3F-
log_k -1.4581
delta_h -123.692 kJ
CrF3
CrF3 + 2H2O = Cr(OH)2+ + 3F- + 2H+
log_k -11.3367

delta_h -23.3901 kJ
VF4
VF4 + H2O = VO+2 + 4F- + 2H+
log_k 14.93
delta_h -199.117 kJ
UF4
UF4 = U+4 + 4F-
log_k -29.5371
delta_h -79.0776 kJ
UF4:2.5H2O
UF4:2.5H2O = U+4 + 4F- + 2.5H2O
log_k -32.7179
delta_h 24.325 kJ
MgF2
MgF2 = Mg+2 + 2F-
log_k -8.13
delta_h -8 kJ
Fluorite
CaF2 = Ca+2 + 2F-
log_k -10.5
delta_h 8 kJ
SrF2
SrF2 = Sr+2 + 2F-
log_k -8.58
delta_h 4 kJ
BaF2
BaF2 = Ba+2 + 2F-
log_k -5.82
delta_h 4 kJ
Cryolite
Na3AlF6 = 3Na+ + Al+3 + 6F-
log_k -33.84
delta_h 38 kJ
SbCl3
SbCl3 + 3H2O = Sb(OH)3 + 3Cl- + 3H+
log_k 0.5719
delta_h -35.18 kJ
SnCl2
SnCl2 + 2H2O = Sn(OH)2 + 2H+ + 2Cl-
log_k -9.2752
delta_h -0 kJ
Cotunnite
PbCl2 = Pb+2 + 2Cl-
log_k -4.78
delta_h 26.166 kJ
Matlockite
PbClF = Pb+2 + Cl- + F-
log_k -8.9733
delta_h 33.19 kJ
Phosgenite
PbCl2:PbCO3 = 2Pb+2 + 2Cl- + CO3-2
log_k -19.81
delta_h -0 kJ
Laurionite

PbOHCl + H+ = Pb+2 + Cl- + H2O
log_k 0.623
delta_h -0 kJ
Pb2(OH)3Cl
Pb2(OH)3Cl + 3H+ = 2Pb+2 + 3H2O + Cl-
log_k 8.793
delta_h -0 kJ
TlCl
TlCl = Tl+ + Cl-
log_k -3.74
delta_h 41 kJ
ZnCl2
ZnCl2 = Zn+2 + 2Cl-
log_k 7.05
delta_h -72.5 kJ
Zn2(OH)3Cl
Zn2(OH)3Cl + 3H+ = 2Zn+2 + 3H2O + Cl-
log_k 15.191
delta_h -0 kJ
Zn5(OH)8Cl2
Zn5(OH)8Cl2 + 8H+ = 5Zn+2 + 8H2O + 2Cl-
log_k 38.5
delta_h -0 kJ
CdCl2
CdCl2 = Cd+2 + 2Cl-
log_k -0.6588
delta_h -18.58 kJ
CdCl2:1H2O
CdCl2:1H2O = Cd+2 + 2Cl- + H2O
log_k -1.6932
delta_h -7.47 kJ
CdCl2:2.5H2O
CdCl2:2.5H2O = Cd+2 + 2Cl- + 2.5H2O
log_k -1.913
delta_h 7.2849 kJ
CdOHCl
CdOHCl + H+ = Cd+2 + H2O + Cl-
log_k 3.5373
delta_h -30.93 kJ
Calomel
Hg2Cl2 = Hg2+2 + 2Cl-
log_k -17.91
delta_h 92 kJ
HgCl2
HgCl2 + 2H2O = Hg(OH)2 + 2Cl- + 2H+
log_k -21.2621
delta_h 107.82 kJ
Nantokite
CuCl = Cu+ + Cl-
log_k -6.73
delta_h 42.662 kJ
Melanothallite
CuCl2 = Cu+2 + 2Cl-
log_k 6.2572

delta_h -63.407 kJ
Atacamite
Cu2(OH)3Cl + 3H+ = 2Cu+2 + 3H2O + Cl-
log_k 7.391
delta_h -93.43 kJ
Cerargyrite
AgCl = Ag+ + Cl-
log_k -9.75
delta_h 65.2 kJ
CoCl2
CoCl2 = Co+2 + 2Cl-
log_k 8.2672
delta_h -79.815 kJ
CoCl2:6H2O
CoCl2:6H2O = Co+2 + 2Cl- + 6H2O
log_k 2.5365
delta_h 8.0598 kJ
(Co(NH3)6)Cl3
(Co(NH3)6)Cl3 + 6H+ = Co+3 + 6NH4+ + 3Cl-
log_k 20.0317
delta_h -33.1 kJ
(Co(NH3)5OH2)Cl3
(Co(NH3)5OH2)Cl3 + 5H+ = Co+3 + 5NH4+ + 3Cl- + H2O
log_k 11.7351
delta_h -25.37 kJ
(Co(NH3)5Cl)Cl2
(Co(NH3)5Cl)Cl2 + 5H+ = Co+3 + 5NH4+ + 3Cl-
log_k 4.5102
delta_h -10.74 kJ
Fe(OH)2.7Cl.3
Fe(OH)2.7Cl.3 + 2.7H+ = Fe+3 + 2.7H2O + 0.3Cl-
log_k -3.04
delta_h -0 kJ
MnCl2:4H2O
MnCl2:4H2O = Mn+2 + 2Cl- + 4H2O
log_k 2.7151
delta_h -10.83 kJ
CrCl2
CrCl2 = Cr+2 + 2Cl-
log_k 14.0917
delta_h -110.76 kJ
CrCl3
CrCl3 + 2H2O = Cr(OH)2+ + 3Cl- + 2H+
log_k 15.1145
delta_h -121.08 kJ
VCl2
VCl2 = V+3 + 2Cl- + e-
log_k 18.8744
delta_h -141.16 kJ
VCl3
VCl3 = V+3 + 3Cl-
log_k 23.4326
delta_h -179.54 kJ
VOCl

VOCl + 2H+ = V+3 + Cl- + H2O
log_k 11.1524
delta_h -104.91 kJ
VOCl2
VOCl2 = VO+2 + 2Cl-
log_k 12.7603
delta_h -117.76 kJ
VO2Cl
VO2Cl = VO2+ + Cl-
log_k 2.8413
delta_h -40.28 kJ
Halite
NaCl = Na+ + Cl-
log_k 1.6025
delta_h 3.7 kJ
SbBr3
SbBr3 + 3H2O = Sb(OH)3 + 3Br- + 3H+
log_k 0.9689
delta_h -20.94 kJ
SnBr2
SnBr2 + 2H2O = Sn(OH)2 + 2H+ + 2Br-
log_k -9.5443
delta_h -0 kJ
SnBr4
SnBr4 + 6H2O = Sn(OH)6-2 + 6H+ + 4Br-
log_k -28.8468
delta_h -0 kJ
PbBr2
PbBr2 = Pb+2 + 2Br-
log_k -5.3
delta_h 35.499 kJ
PbBrF
PbBrF = Pb+2 + Br- + F-
log_k -8.49
delta_h -0 kJ
TlBr
TlBr = Tl+ + Br-
log_k -5.44
delta_h 54 kJ
ZnBr2:2H2O
ZnBr2:2H2O = Zn+2 + 2Br- + 2H2O
log_k 5.2005
delta_h -30.67 kJ
CdBr2:4H2O
CdBr2:4H2O = Cd+2 + 2Br- + 4H2O
log_k -2.425
delta_h 30.5001 kJ
Hg2Br2
Hg2Br2 = Hg2+2 + 2Br-
log_k -22.25
delta_h 133 kJ
HgBr2
HgBr2 + 2H2O = Hg(OH)2 + 2Br- + 2H+
log_k -25.2734

delta_h 138.492 kJ
CuBr
CuBr = Cu+ + Br-
log_k -8.3
delta_h 54.86 kJ
Cu2(OH)3Br
Cu2(OH)3Br + 3H+ = 2Cu+2 + 3H2O + Br-
log_k 7.9085
delta_h -93.43 kJ
Bromyrite
AgBr = Ag+ + Br-
log_k -12.3
delta_h 84.5 kJ
(Co(NH3)6)Br3
(Co(NH3)6)Br3 + 6H+ = Co+3 + 6NH4+ + 3Br-
log_k 18.3142
delta_h -21.1899 kJ
(Co(NH3)5Cl)Br2
(Co(NH3)5Cl)Br2 + 5H+ = Co+3 + 5NH4+ + Cl- + 2Br-
log_k 5.0295
delta_h -6.4 kJ
CrBr3
CrBr3 + 2H2O = Cr(OH)2+ + 3Br- + 2H+
log_k 19.9086
delta_h -141.323 kJ
AsI3
AsI3 + 3H2O = H3AsO3 + 3I- + 3H+
log_k 4.2307
delta_h 3.15 kJ
SbI3
SbI3 + 3H2O = Sb(OH)3 + 3H+ + 3I-
log_k -0.538
delta_h 13.5896 kJ
PbI2
PbI2 = Pb+2 + 2I-
log_k -8.1
delta_h 62 kJ
TlI
TlI = Tl+ + I-
log_k -7.23
delta_h 75 kJ
ZnI2
ZnI2 = Zn+2 + 2I-
log_k 7.3055
delta_h -58.92 kJ
CdI2
CdI2 = Cd+2 + 2I-
log_k -3.5389
delta_h 13.82 kJ
Hg2I2
Hg2I2 = Hg2+2 + 2I-
log_k -28.34
delta_h 163 kJ
Coccinite

HgI2 + 2H2O = Hg(OH)2 + 2H+ + 2I-
log_k -34.9525
delta_h 210.72 kJ
HgI2:2NH3
HgI2:2NH3 + 2H2O = Hg(OH)2 + 2I- + 2NH4+
log_k -16.2293
delta_h 132.18 kJ
HgI2:6NH3
HgI2:6NH3 + 2H2O + 4H+ = Hg(OH)2 + 2I- + 6NH4+
log_k 33.7335
delta_h -90.3599 kJ
CuI
CuI = Cu+ + I-
log_k -12
delta_h 82.69 kJ
Iodyrite
AgI = Ag+ + I-
log_k -16.08
delta_h 110 kJ
(Co(NH3)6)I3
(Co(NH3)6)I3 + 6H+ = Co+3 + 6NH4+ + 3I-
log_k 16.5831
delta_h -9.6999 kJ
(Co(NH3)5Cl)I2
(Co(NH3)5Cl)I2 + 5H+ = Co+3 + 5NH4+ + Cl- + 2I-
log_k 5.5981
delta_h 0.66 kJ
CrI3
CrI3 + 2H2O = Cr(OH)2+ + 3I- + 2H+
log_k 20.4767
delta_h -134.419 kJ
Cerussite
PbCO3 = Pb+2 + CO3-2
log_k -13.13
delta_h 24.79 kJ
Pb2OCO3
Pb2OCO3 + 2H+ = 2Pb+2 + H2O + CO3-2
log_k -0.5578
delta_h -40.8199 kJ
Pb3O2CO3
Pb3O2CO3 + 4H+ = 3Pb+2 + CO3-2 + 2H2O
log_k 11.02
delta_h -110.583 kJ
Hydrocerussite
Pb3(OH)2(CO3)2 + 2H+ = 3Pb+2 + 2H2O + 2CO3-2
log_k -18.7705
delta_h -0 kJ
Pb10(OH)6O(CO3)6
Pb10(OH)6O(CO3)6 + 8H+ = 10Pb+2 + 6CO3-2 + 7H2O
log_k -8.76
delta_h -0 kJ
Tl2CO3
Tl2CO3 = 2Tl+ + CO3-2
log_k -3.8367

delta_h 35.49 kJ
Smithsonite
ZnCO3 = Zn+2 + CO3-2
log_k -10
delta_h -15.84 kJ
ZnCO3:1H2O
ZnCO3:1H2O = Zn+2 + CO3-2 + H2O
log_k -10.26
delta_h -0 kJ
Otavite
CdCO3 = Cd+2 + CO3-2
log_k -12
delta_h -0.55 kJ
Hg2CO3
Hg2CO3 = Hg2+2 + CO3-2
log_k -16.05
delta_h 45.14 kJ
Hg3O2CO3
Hg3O2CO3 + 4H2O = 3Hg(OH)2 + 2H+ + CO3-2
log_k -29.682
delta_h -0 kJ
CuCO3
CuCO3 = Cu+2 + CO3-2
log_k -11.5
delta_h -0 kJ
Malachite
Cu2(OH)2CO3 + 2H+ = 2Cu+2 + 2H2O + CO3-2
log_k -5.306
delta_h 76.38 kJ
Azurite
Cu3(OH)2(CO3)2 + 2H+ = 3Cu+2 + 2H2O + 2CO3-2
log_k -16.906
delta_h -95.22 kJ
Ag2CO3
Ag2CO3 = 2Ag+ + CO3-2
log_k -11.09
delta_h 42.15 kJ
NiCO3
NiCO3 = Ni+2 + CO3-2
log_k -6.87
delta_h -41.589 kJ
CoCO3
CoCO3 = Co+2 + CO3-2
log_k -9.98
delta_h -12.7612 kJ
Siderite
FeCO3 = Fe+2 + CO3-2
log_k -10.24
delta_h -16 kJ
Rhodochrosite
MnCO3 = Mn+2 + CO3-2
log_k -10.58
delta_h -1.88 kJ
Rutherfordine

UO2CO3 = UO2+2 + CO3-2
log_k -14.5
delta_h -3.03 kJ
Artinite
MgCO3:Mg(OH)2:3H2O + 2H+ = 2Mg+2 + CO3-2 + 5H2O
log_k 9.6
delta_h -120.257 kJ
Hydromagnesite
Mg5(CO3)4(OH)2:4H2O + 2H+ = 5Mg+2 + 4CO3-2 + 6H2O
log_k -8.766
delta_h -218.447 kJ
Magnesite
MgCO3 = Mg+2 + CO3-2
log_k -7.46
delta_h 20 kJ
Nesquehonite
MgCO3:3H2O = Mg+2 + CO3-2 + 3H2O
log_k -4.67
delta_h -24.2212 kJ
Aragonite
CaCO3 = Ca+2 + CO3-2
log_k -8.3
delta_h -12 kJ
Calcite
CaCO3 = Ca+2 + CO3-2
log_k -8.48
delta_h -8 kJ
Dolomite(ordered)
CaMg(CO3)2 = Ca+2 + Mg+2 + 2CO3-2
log_k -17.09
delta_h -39.5 kJ
Dolomite(disordered)
CaMg(CO3)2 = Ca+2 + Mg+2 + 2CO3-2
log_k -16.54
delta_h -46.4 kJ
Huntite
CaMg3(CO3)4 = 3Mg+2 + Ca+2 + 4CO3-2
log_k -29.968
delta_h -107.78 kJ
Strontianite
SrCO3 = Sr+2 + CO3-2
log_k -9.27
delta_h -0 kJ
Witherite
BaCO3 = Ba+2 + CO3-2
log_k -8.57
delta_h 4 kJ
Thermonatrite
Na2CO3:H2O = 2Na+ + CO3-2 + H2O
log_k 0.637
delta_h -10.4799 kJ
TlNO3
TlNO3 = Tl+ + NO3-
log_k -1.6127

delta_h 42.44 kJ
Zn(NO3)2:6H2O
Zn(NO3)2:6H2O = Zn+2 + 2NO3- + 6H2O
log_k 3.3153
delta_h 24.5698 kJ
Cu2(OH)3NO3
Cu2(OH)3NO3 + 3H+ = 2Cu+2 + 3H2O + NO3-
log_k 9.251
delta_h -72.5924 kJ
(Co(NH3)6)(NO3)3
(Co(NH3)6)(NO3)3 + 6H+ = Co+3 + 6NH4+ + 3NO3-
log_k 17.9343
delta_h 1.59 kJ
(Co(NH3)5Cl)(NO3)2
(Co(NH3)5Cl)(NO3)2 + 5H+ = Co+3 + 5NH4+ + Cl- + 2NO3-
log_k 6.2887
delta_h 6.4199 kJ
UO2(NO3)2
UO2(NO3)2 = UO2+2 + 2NO3-
log_k 12.1476
delta_h -83.3999 kJ
UO2(NO3)2:2H2O
UO2(NO3)2:2H2O = UO2+2 + 2NO3- + 2H2O
log_k 4.851
delta_h -25.355 kJ
UO2(NO3)2:3H2O
UO2(NO3)2:3H2O = UO2+2 + 2NO3- + 3H2O
log_k 3.39
delta_h -9.1599 kJ
UO2(NO3)2:6H2O
UO2(NO3)2:6H2O = UO2+2 + 2NO3- + 6H2O
log_k 2.0464
delta_h 20.8201 kJ
Pb(BO2)2
Pb(BO2)2 + 2H2O + 2H+ = Pb+2 + 2H3BO3
log_k 6.5192
delta_h -15.6119 kJ
Zn(BO2)2
Zn(BO2)2 + 2H2O + 2H+ = Zn+2 + 2H3BO3
log_k 8.29
delta_h -0 kJ
Cd(BO2)2
Cd(BO2)2 + 2H2O + 2H+ = Cd+2 + 2H3BO3
log_k 9.84
delta_h -0 kJ
Co(BO2)2
Co(BO2)2 + 2H2O + 2H+ = Co+2 + 2H3BO3
log_k 27.0703
delta_h -0 kJ
SnSO4
SnSO4 + 2H2O = Sn(OH)2 + 2H+ + SO4-2
log_k -56.9747
delta_h -0 kJ
Sn(SO4)2

Sn(SO4)2 + 6H2O = Sn(OH)6-2 + 6H+ + 2SO4-2
log_k -15.2123
delta_h -0 kJ
Larnakite
PbO:PbSO4 + 2H+ = 2Pb+2 + SO4-2 + H2O
log_k -0.4344
delta_h -21.83 kJ
Pb3O2SO4
Pb3O2SO4 + 4H+ = 3Pb+2 + SO4-2 + 2H2O
log_k 10.6864
delta_h -79.14 kJ
Pb4O3SO4
Pb4O3SO4 + 6H+ = 4Pb+2 + SO4-2 + 3H2O
log_k 21.8772
delta_h -136.45 kJ
Anglesite
PbSO4 = Pb+2 + SO4-2
log_k -7.79
delta_h 12 kJ
Pb4(OH)6SO4
Pb4(OH)6SO4 + 6H+ = 4Pb+2 + SO4-2 + 6H2O
log_k 21.1
delta_h -0 kJ
AlOHSO4
AlOHSO4 + H+ = Al+3 + SO4-2 + H2O
log_k -3.23
delta_h -0 kJ
Al4(OH)10SO4
Al4(OH)10SO4 + 10H+ = 4Al+3 + SO4-2 + 10H2O
log_k 22.7
delta_h -0 kJ
Tl2SO4
Tl2SO4 = 2Tl+ + SO4-2
log_k -3.7868
delta_h 33.1799 kJ
Zn2(OH)2SO4
Zn2(OH)2SO4 + 2H+ = 2Zn+2 + 2H2O + SO4-2
log_k 7.5
delta_h -0 kJ
Zn4(OH)6SO4
Zn4(OH)6SO4 + 6H+ = 4Zn+2 + 6H2O + SO4-2
log_k 28.4
delta_h -0 kJ
Zn3O(SO4)2
Zn3O(SO4)2 + 2H+ = 3Zn+2 + 2SO4-2 + H2O
log_k 18.9135
delta_h -258.08 kJ
Zincosite
ZnSO4 = Zn+2 + SO4-2
log_k 3.9297
delta_h -82.586 kJ
ZnSO4:1H2O
ZnSO4:1H2O = Zn+2 + SO4-2 + H2O
log_k -0.638

delta_h -44.0699 kJ
Bianchite
ZnSO4:6H2O = Zn+2 + SO4-2 + 6H2O
log_k -1.765
delta_h -0.6694 kJ
Goslarite
ZnSO4:7H2O = Zn+2 + SO4-2 + 7H2O
log_k -2.0112
delta_h 14.21 kJ
Cd3(OH)4SO4
Cd3(OH)4SO4 + 4H+ = 3Cd+2 + 4H2O + SO4-2
log_k 22.56
delta_h -0 kJ
Cd3(OH)2(SO4)2
Cd3(OH)2(SO4)2 + 2H+ = 3Cd+2 + 2H2O + 2SO4-2
log_k 6.71
delta_h -0 kJ
Cd4(OH)6SO4
Cd4(OH)6SO4 + 6H+ = 4Cd+2 + 6H2O + SO4-2
log_k 28.4
delta_h -0 kJ
CdSO4
CdSO4 = Cd+2 + SO4-2
log_k -0.1722
delta_h -51.98 kJ
CdSO4:1H2O
CdSO4:1H2O = Cd+2 + SO4-2 + H2O
log_k -1.7261
delta_h -31.5399 kJ
CdSO4:2.67H2O
CdSO4:2.67H2O = Cd+2 + SO4-2 + 2.67H2O
log_k -1.873
delta_h -17.9912 kJ
Hg2SO4
Hg2SO4 = Hg2+2 + SO4-2
log_k -6.13
delta_h 5.4 kJ
HgSO4
HgSO4 + 2H2O = Hg(OH)2 + SO4-2 + 2H+
log_k -9.4189
delta_h 14.6858 kJ
Cu2SO4
Cu2SO4 = 2Cu+ + SO4-2
log_k -1.95
delta_h -19.079 kJ
Antlerite
Cu3(OH)4SO4 + 4H+ = 3Cu+2 + 4H2O + SO4-2
log_k 8.788
delta_h -0 kJ
Brochantite
Cu4(OH)6SO4 + 6H+ = 4Cu+2 + 6H2O + SO4-2
log_k 15.222
delta_h -202.86 kJ
Langite

Cu4(OH)6SO4:H2O + 6H+ = 4Cu+2 + 7H2O + SO4-2
log_k 17.4886
delta_h -165.55 kJ
CuOCuSO4
CuOCuSO4 + 2H+ = 2Cu+2 + H2O + SO4-2
log_k 10.3032
delta_h -137.777 kJ
CuSO4
CuSO4 = Cu+2 + SO4-2
log_k 2.9395
delta_h -73.04 kJ
Chalcanthite
CuSO4:5H2O = Cu+2 + SO4-2 + 5H2O
log_k -2.64
delta_h 6.025 kJ
Ag2SO4
Ag2SO4 = 2Ag+ + SO4-2
log_k -4.82
delta_h 17 kJ
Ni4(OH)6SO4
Ni4(OH)6SO4 + 6H+ = 4Ni+2 + SO4-2 + 6H2O
log_k 32
delta_h -0 kJ
Retgersite
NiSO4:6H2O = Ni+2 + SO4-2 + 6H2O
log_k -2.04
delta_h 4.6024 kJ
Morenosite
NiSO4:7H2O = Ni+2 + SO4-2 + 7H2O
log_k -2.1449
delta_h 12.1802 kJ
CoSO4
CoSO4 = Co+2 + SO4-2
log_k 2.8024
delta_h -79.277 kJ
CoSO4:6H2O
CoSO4:6H2O = Co+2 + SO4-2 + 6H2O
log_k -2.4726
delta_h 1.0801 kJ
Melanterite
FeSO4:7H2O = Fe+2 + SO4-2 + 7H2O
log_k -2.209
delta_h 20.5 kJ
Fe2(SO4)3
Fe2(SO4)3 = 2Fe+3 + 3SO4-2
log_k -3.7343
delta_h -242.028 kJ
H-Jarosite
(H3O)Fe3(SO4)2(OH)6 + 5H+ = 3Fe+3 + 2SO4-2 + 7H2O
log_k -12.1
delta_h -230.748 kJ
Na-Jarosite
NaFe3(SO4)2(OH)6 + 6H+ = Na+ + 3Fe+3 + 2SO4-2 + 6H2O
log_k -11.2

delta_h -151.377 kJ
K-Jarosite
KFe3(SO4)2(OH)6 + 6H+ = K+ + 3Fe+3 + 2SO4-2 + 6H2O
log_k -14.8
delta_h -130.875 kJ
MnSO4
MnSO4 = Mn+2 + SO4-2
log_k 2.5831
delta_h -64.8401 kJ
Mn2(SO4)3
Mn2(SO4)3 = 2Mn+3 + 3SO4-2
log_k -5.711
delta_h -163.427 kJ
VOSO4
VOSO4 = VO+2 + SO4-2
log_k 3.6097
delta_h -86.7401 kJ
Epsomite
MgSO4:7H2O = Mg+2 + SO4-2 + 7H2O
log_k -2.1265
delta_h 11.5601 kJ
Anhydrite
CaSO4 = Ca+2 + SO4-2
log_k -4.36
delta_h -7.2 kJ
Gypsum
CaSO4:2H2O = Ca+2 + SO4-2 + 2H2O
log_k -4.61
delta_h 1 kJ
Celestite
SrSO4 = Sr+2 + SO4-2
log_k -6.62
delta_h 2 kJ
Barite
BaSO4 = Ba+2 + SO4-2
log_k -9.98
delta_h 23 kJ
Mirabilite
Na2SO4:10H2O = 2Na+ + SO4-2 + 10H2O
log_k -1.114
delta_h 79.4416 kJ
Thenardite
Na2SO4 = 2Na+ + SO4-2
log_k 0.3217
delta_h -9.121 kJ
K-Alum
KAl(SO4)2:12H2O = K+ + Al+3 + 2SO4-2 + 12H2O
log_k -5.17
delta_h 30.2085 kJ
Alunite
KAl3(SO4)2(OH)6 + 6H+ = K+ + 3Al+3 + 2SO4-2 + 6H2O
log_k -1.4
delta_h -210 kJ
(NH4)2CrO4

(NH4)2CrO4 = CrO4-2 + 2NH4+
log_k 0.4046
delta_h 9.163 kJ
PbCrO4
PbCrO4 = Pb+2 + CrO4-2
log_k -12.6
delta_h 44.18 kJ
Tl2CrO4
Tl2CrO4 = 2Tl+ + CrO4-2
log_k -12.01
delta_h 74.27 kJ
Hg2CrO4
Hg2CrO4 = Hg2+2 + CrO4-2
log_k -8.7
delta_h -0 kJ
CuCrO4
CuCrO4 = Cu+2 + CrO4-2
log_k -5.44
delta_h -0 kJ
Ag2CrO4
Ag2CrO4 = 2Ag+ + CrO4-2
log_k -11.59
delta_h 62 kJ
MgCrO4
MgCrO4 = CrO4-2 + Mg+2
log_k 5.3801
delta_h -88.9518 kJ
CaCrO4
CaCrO4 = Ca+2 + CrO4-2
log_k -2.2657
delta_h -26.945 kJ
SrCrO4
SrCrO4 = Sr+2 + CrO4-2
log_k -4.65
delta_h -10.1253 kJ
BaCrO4
BaCrO4 = Ba+2 + CrO4-2
log_k -9.67
delta_h 33 kJ
Li2CrO4
Li2CrO4 = CrO4-2 + 2Li+
log_k 4.8568
delta_h -45.2792 kJ
Na2CrO4
Na2CrO4 = CrO4-2 + 2Na+
log_k 2.9302
delta_h -19.6301 kJ
Na2Cr2O7
Na2Cr2O7 + H2O = 2CrO4-2 + 2Na+ + 2H+
log_k -9.8953
delta_h 22.1961 kJ
K2CrO4
K2CrO4 = CrO4-2 + 2K+
log_k -0.5134

delta_h 18.2699 kJ
K2Cr2O7
K2Cr2O7 + H2O = 2CrO4-2 + 2K+ + 2H+
log_k -17.2424
delta_h 80.7499 kJ
Hg2SeO3
Hg2SeO3 + H+ = Hg2+2 + HSeO3-
log_k -4.657
delta_h -0 kJ
HgSeO3
HgSeO3 + 2H2O = Hg(OH)2 + H+ + HSeO3-
log_k -12.43
delta_h -0 kJ
Ag2SeO3
Ag2SeO3 + H+ = 2Ag+ + HSeO3-
log_k -7.15
delta_h 39.68 kJ
CuSeO3:2H2O
CuSeO3:2H2O + H+ = Cu+2 + HSeO3- + 2H2O
log_k 0.5116
delta_h -36.861 kJ
NiSeO3:2H2O
NiSeO3:2H2O + H+ = HSeO3- + Ni+2 + 2H2O
log_k 2.8147
delta_h -31.0034 kJ
CoSeO3
CoSeO3 + H+ = Co+2 + HSeO3-
log_k 1.32
delta_h -0 kJ
Fe2(SeO3)3:2H2O
Fe2(SeO3)3:2H2O + 3H+ = 3HSeO3- + 2Fe+3 + 2H2O
log_k -20.6262
delta_h -0 kJ
Fe2(OH)4SeO3
Fe2(OH)4SeO3 + 5H+ = HSeO3- + 2Fe+3 + 4H2O
log_k 1.5539
delta_h -0 kJ
MnSeO3
MnSeO3 + H+ = Mn+2 + HSeO3-
log_k 1.13
delta_h -0 kJ
MnSeO3:2H2O
MnSeO3:2H2O + H+ = HSeO3- + Mn+2 + 2H2O
log_k 0.9822
delta_h 8.4935 kJ
MgSeO3:6H2O
MgSeO3:6H2O + H+ = Mg+2 + HSeO3- + 6H2O
log_k 3.0554
delta_h 5.23 kJ
CaSeO3:2H2O
CaSeO3:2H2O + H+ = HSeO3- + Ca+2 + 2H2O
log_k 2.8139
delta_h -19.4556 kJ
SrSeO3

SrSeO3 + H+ = Sr+2 + HSeO3-
log_k 2.3
delta_h -0 kJ
BaSeO3
BaSeO3 + H+ = Ba+2 + HSeO3-
log_k 1.83
delta_h 11.98 kJ
Na2SeO3:5H2O
Na2SeO3:5H2O + H+ = 2Na+ + HSeO3- + 5H2O
log_k 10.3
delta_h -0 kJ
PbSeO4
PbSeO4 = Pb+2 + SeO4-2
log_k -6.84
delta_h 15 kJ
Tl2SeO4
Tl2SeO4 = 2Tl+ + SeO4-2
log_k -4.1
delta_h 43 kJ
ZnSeO4:6H2O
ZnSeO4:6H2O = Zn+2 + SeO4-2 + 6H2O
log_k -1.52
delta_h -0 kJ
CdSeO4:2H2O
CdSeO4:2H2O = Cd+2 + SeO4-2 + 2H2O
log_k -1.85
delta_h -0 kJ
Ag2SeO4
Ag2SeO4 = 2Ag+ + SeO4-2
log_k -8.91
delta_h -43.5 kJ
CuSeO4:5H2O
CuSeO4:5H2O = Cu+2 + SeO4-2 + 5H2O
log_k -2.44
delta_h -0 kJ
NiSeO4:6H2O
NiSeO4:6H2O = Ni+2 + SeO4-2 + 6H2O
log_k -1.52
delta_h -0 kJ
CoSeO4:6H2O
CoSeO4:6H2O = Co+2 + SeO4-2 + 6H2O
log_k -1.53
delta_h -0 kJ
MnSeO4:5H2O
MnSeO4:5H2O = Mn+2 + SeO4-2 + 5H2O
log_k -2.05
delta_h -0 kJ
UO2SeO4:4H2O
UO2SeO4:4H2O = UO2+2 + SeO4-2 + 4H2O
log_k -2.25
delta_h -0 kJ
MgSeO4:6H2O
MgSeO4:6H2O = Mg+2 + SeO4-2 + 6H2O
log_k -1.2

delta_h -0 kJ
CaSeO4:2H2O
CaSeO4:2H2O = Ca+2 + SeO4-2 + 2H2O
log_k -3.02
delta_h -8.3 kJ
SrSeO4
SrSeO4 = Sr+2 + SeO4-2
log_k -4.4
delta_h 0.4 kJ
BaSeO4
BaSeO4 = Ba+2 + SeO4-2
log_k -7.46
delta_h 22 kJ
BeSeO4:4H2O
BeSeO4:4H2O = Be+2 + SeO4-2 + 4H2O
log_k -2.94
delta_h -0 kJ
Na2SeO4
Na2SeO4 = 2Na+ + SeO4-2
log_k 1.28
delta_h -0 kJ
K2SeO4
K2SeO4 = 2K+ + SeO4-2
log_k -0.73
delta_h -0 kJ
(NH4)2SeO4
(NH4)2SeO4 = 2NH4+ + SeO4-2
log_k 0.45
delta_h -0 kJ
H2MoO4
H2MoO4 = MoO4-2 + 2H+
log_k -12.8765
delta_h 49 kJ
PbMoO4
PbMoO4 = Pb+2 + MoO4-2
log_k -15.62
delta_h 53.93 kJ
Al2(MoO4)3
Al2(MoO4)3 = 3MoO4-2 + 2Al+3
log_k 2.3675
delta_h -260.8 kJ
Tl2MoO4
Tl2MoO4 = MoO4-2 + 2Tl+
log_k -7.9887
delta_h -0 kJ
ZnMoO4
ZnMoO4 = MoO4-2 + Zn+2
log_k -10.1254
delta_h -10.6901 kJ
CdMoO4
CdMoO4 = MoO4-2 + Cd+2
log_k -14.1497
delta_h 19.48 kJ
CuMoO4

CuMoO4 = MoO4-2 + Cu+2
log_k -13.0762
delta_h 12.2 kJ
Ag2MoO4
Ag2MoO4 = 2Ag+ + MoO4-2
log_k -11.55
delta_h 52.7 kJ
NiMoO4
NiMoO4 = MoO4-2 + Ni+2
log_k -11.1421
delta_h 1.3 kJ
CoMoO4
CoMoO4 = MoO4-2 + Co+2
log_k -7.7609
delta_h -23.3999 kJ
FeMoO4
FeMoO4 = MoO4-2 + Fe+2
log_k -10.091
delta_h -11.1 kJ
BeMoO4
BeMoO4 = MoO4-2 + Be+2
log_k -1.7817
delta_h -56.4 kJ
MgMoO4
MgMoO4 = Mg+2 + MoO4-2
log_k -1.85
delta_h -0 kJ
CaMoO4
CaMoO4 = Ca+2 + MoO4-2
log_k -7.95
delta_h -2 kJ
BaMoO4
BaMoO4 = MoO4-2 + Ba+2
log_k -6.9603
delta_h 10.96 kJ
Li2MoO4
Li2MoO4 = MoO4-2 + 2Li+
log_k 2.4416
delta_h -33.9399 kJ
Na2MoO4
Na2MoO4 = MoO4-2 + 2Na+
log_k 1.4901
delta_h -9.98 kJ
Na2MoO4:2H2O
Na2MoO4:2H2O = MoO4-2 + 2Na+ + 2H2O
log_k 1.224
delta_h -0 kJ
Na2Mo2O7
Na2Mo2O7 + H2O = 2MoO4-2 + 2Na+ + 2H+
log_k -16.5966
delta_h 56.2502 kJ
K2MoO4
K2MoO4 = MoO4-2 + 2K+
log_k 3.2619

delta_h -3.38 kJ
PbHPO4
PbHPO4 = Pb+2 + H+ + PO4-3
log_k -23.805
delta_h -0 kJ
Pb3(PO4)2
Pb3(PO4)2 = 3Pb+2 + 2PO4-3
log_k -43.53
delta_h -0 kJ
Pyromorphite
Pb5(PO4)3Cl = 5Pb+2 + 3PO4-3 + Cl-
log_k -84.43
delta_h -0 kJ
Hydroxylpyromorphite
Pb5(PO4)3OH + H+ = 5Pb+2 + 3PO4-3 + H2O
log_k -62.79
delta_h -0 kJ
Plumbgummite
PbAl3(PO4)2(OH)5:H2O + 5H+ = Pb+2 + 3Al+3 + 2PO4-3 + 6H2O
log_k -32.79
delta_h -0 kJ
Hinsdalite
PbAl3PO4SO4(OH)6 + 6H+ = Pb+2 + 3Al+3 + PO4-3 + SO4-2 + 6H2O
log_k -2.5
delta_h -0 kJ
Tsumebite
Pb2CuPO4(OH)3:3H2O + 3H+ = 2Pb+2 + Cu+2 + PO4-3 + 6H2O
log_k -9.79
delta_h -0 kJ
Zn3(PO4)2:4H2O
Zn3(PO4)2:4H2O = 3Zn+2 + 2PO4-3 + 4H2O
log_k -35.42
delta_h -0 kJ
Cd3(PO4)2
Cd3(PO4)2 = 3Cd+2 + 2PO4-3
log_k -32.6
delta_h -0 kJ
Hg2HPO4
Hg2HPO4 = Hg2+2 + H+ + PO4-3
log_k -24.775
delta_h -0 kJ
Cu3(PO4)2
Cu3(PO4)2 = 3Cu+2 + 2PO4-3
log_k -36.85
delta_h -0 kJ
Cu3(PO4)2:3H2O
Cu3(PO4)2:3H2O = 3Cu+2 + 2PO4-3 + 3H2O
log_k -35.12
delta_h -0 kJ
Ag3PO4
Ag3PO4 = 3Ag+ + PO4-3
log_k -17.59
delta_h -0 kJ
Ni3(PO4)2

Ni3(PO4)2 = 3Ni+2 + 2PO4-3
log_k -31.3
delta_h -0 kJ
CoHPO4
CoHPO4 = Co+2 + PO4-3 + H+
log_k -19.0607
delta_h -0 kJ
Co3(PO4)2
Co3(PO4)2 = 3Co+2 + 2PO4-3
log_k -34.6877
delta_h -0 kJ
Vivianite
Fe3(PO4)2:8H2O = 3Fe+2 + 2PO4-3 + 8H2O
log_k -36
delta_h -0 kJ
Strengite
FePO4:2H2O = Fe+3 + PO4-3 + 2H2O
log_k -26.4
delta_h -9.3601 kJ
Mn3(PO4)2
Mn3(PO4)2 = 3Mn+2 + 2PO4-3
log_k -23.827
delta_h 8.8701 kJ
MnHPO4
MnHPO4 = Mn+2 + PO4-3 + H+
log_k -25.4
delta_h -0 kJ
(VO)3(PO4)2
(VO)3(PO4)2 = 3VO+2 + 2PO4-3
log_k -25.1
delta_h -0 kJ
Mg3(PO4)2
Mg3(PO4)2 = 3Mg+2 + 2PO4-3
log_k -23.28
delta_h -0 kJ
MgHPO4:3H2O
MgHPO4:3H2O = Mg+2 + H+ + PO4-3 + 3H2O
log_k -18.175
delta_h -0 kJ
FCO3Apatite
Ca9.316Na0.36Mg0.144(PO4)4.8(CO3)1.2F2.48 = 9.316Ca+2 + 0.36Na+ + 0.144Mg+2 + 4.8PO4-3 + 1.2CO3-2 + 2.48F-
log_k -114.4
delta_h 164.808 kJ
Hydroxylapatite
Ca5(PO4)3OH + H+ = 5Ca+2 + 3PO4-3 + H2O
log_k -44.333
delta_h -0 kJ
CaHPO4:2H2O
CaHPO4:2H2O = Ca+2 + H+ + PO4-3 + 2H2O
log_k -18.995
delta_h 23 kJ
CaHPO4
CaHPO4 = Ca+2 + H+ + PO4-3

log_k -19.275
delta_h 31 kJ
Ca3(PO4)2(beta)
Ca3(PO4)2 = 3Ca+2 + 2PO4-3
log_k -28.92
delta_h 54 kJ
Ca4H(PO4)3:3H2O
Ca4H(PO4)3:3H2O = 4Ca+2 + H+ + 3PO4-3 + 3H2O
log_k -47.08
delta_h -0 kJ
SrHPO4
SrHPO4 = Sr+2 + H+ + PO4-3
log_k -19.295
delta_h -0 kJ
BaHPO4
BaHPO4 = Ba+2 + H+ + PO4-3
log_k -19.775
delta_h -0 kJ
U(HPO4)2:4H2O
U(HPO4)2:4H2O = U+4 + 2PO4-3 + 2H+ + 4H2O
log_k -51.584
delta_h 16.0666 kJ
(UO2)3(PO4)2
(UO2)3(PO4)2 = 3UO2+2 + 2PO4-3
log_k -49.4
delta_h 397.062 kJ
UO2HPO4
UO2HPO4 = UO2+2 + H+ + PO4-3
log_k -24.225
delta_h -0 kJ
Uramphite
(NH4)2(UO2)2(PO4)2 = 2UO2+2 + 2NH4+ + 2PO4-3
log_k -51.749
delta_h 40.5848 kJ
Przhevalskite
Pb(UO2)2(PO4)2 = 2UO2+2 + Pb+2 + 2PO4-3
log_k -44.365
delta_h -46.024 kJ
Torbernite
Cu(UO2)2(PO4)2 = 2UO2+2 + Cu+2 + 2PO4-3
log_k -45.279
delta_h -66.5256 kJ
Bassetite
Fe(UO2)2(PO4)2 = 2UO2+2 + Fe+2 + 2PO4-3
log_k -44.485
delta_h -83.2616 kJ
Saleeite
Mg(UO2)2(PO4)2 = 2UO2+2 + Mg+2 + 2PO4-3
log_k -43.646
delta_h -84.4331 kJ
Ningyoite
CaU(PO4)2:2H2O = U+4 + Ca+2 + 2PO4-3 + 2H2O
log_k -53.906
delta_h -9.4977 kJ

H-Autunite
H2(UO2)2(PO4)2 = 2UO2+2 + 2H+ + 2PO4-3
log_k -47.931
delta_h -15.0624 kJ
Autunite
Ca(UO2)2(PO4)2 = 2UO2+2 + Ca+2 + 2PO4-3
log_k -43.927
delta_h -59.9986 kJ
Sr-Autunite
Sr(UO2)2(PO4)2 = 2UO2+2 + Sr+2 + 2PO4-3
log_k -44.457
delta_h -54.6012 kJ
Na-Autunite
Na2(UO2)2(PO4)2 = 2UO2+2 + 2Na+ + 2PO4-3
log_k -47.409
delta_h -1.9246 kJ
K-Autunite
K2(UO2)2(PO4)2 = 2UO2+2 + 2K+ + 2PO4-3
log_k -48.244
delta_h 24.5182 kJ
Uranocircite
Ba(UO2)2(PO4)2 = 2UO2+2 + Ba+2 + 2PO4-3
log_k -44.631
delta_h -42.2584 kJ
Pb3(AsO4)2
Pb3(AsO4)2 + 6H+ = 3Pb+2 + 2H3AsO4
log_k 5.8
delta_h -0 kJ
AlAsO4:2H2O
AlAsO4:2H2O + 3H+ = Al+3 + H3AsO4 + 2H2O
log_k 4.8
delta_h -0 kJ
Zn3(AsO4)2:2.5H2O
Zn3(AsO4)2:2.5H2O + 6H+ = 3Zn+2 + 2H3AsO4 + 2.5H2O
log_k 13.65
delta_h -0 kJ
Cu3(AsO4)2:2H2O
Cu3(AsO4)2:2H2O + 6H+ = 3Cu+2 + 2H3AsO4 + 2H2O
log_k 6.1
delta_h -0 kJ
Ag3AsO3
Ag3AsO3 + 3H+ = 3Ag+ + H3AsO3
log_k 2.1573
delta_h -0 kJ
Ag3AsO4
Ag3AsO4 + 3H+ = 3Ag+ + H3AsO4
log_k -2.7867
delta_h -0 kJ
Ni3(AsO4)2:8H2O
Ni3(AsO4)2:8H2O + 6H+ = 3Ni+2 + 2H3AsO4 + 8H2O
log_k 15.7
delta_h -0 kJ
Co3(AsO4)2
Co3(AsO4)2 + 6H+ = 3Co+2 + 2H3AsO4

log_k 13.0341
delta_h -0 kJ
FeAsO4:2H2O
FeAsO4:2H2O + 3H+ = Fe+3 + H3AsO4 + 2H2O
log_k 0.4
delta_h -0 kJ
Mn3(AsO4)2:8H2O
Mn3(AsO4)2:8H2O + 6H+ = 3Mn+2 + 2H3AsO4 + 8H2O
log_k 12.5
delta_h -0 kJ
Ca3(AsO4)2:4H2O
Ca3(AsO4)2:4H2O + 6H+ = 3Ca+2 + 2H3AsO4 + 4H2O
log_k 22.3
delta_h -0 kJ
Ba3(AsO4)2
Ba3(AsO4)2 + 6H+ = 3Ba+2 + 2H3AsO4
log_k -8.91
delta_h 11.0458 kJ
#NH4VO3
NH4VO3 + 2H+ = 2VO2+ + H2O
log_k 3.8
delta_h 30 kJ
Pb3(VO4)2
Pb3(VO4)2 + 8H+ = 3Pb+2 + 2VO2+ + 4H2O
log_k 6.14
delta_h -72.6342 kJ
Pb2V2O7
Pb2V2O7 + 6H+ = 2Pb+2 + 2VO2+ + 3H2O
log_k -1.9
delta_h -26.945 kJ
AgVO3
AgVO3 + 2H+ = Ag+ + VO2+ + H2O
log_k 0.77
delta_h -0 kJ
Ag2HVO4
Ag2HVO4 + 3H+ = 2Ag+ + VO2+ + 2H2O
log_k 1.48
delta_h -0 kJ
Ag3H2VO5
Ag3H2VO5 + 4H+ = 3Ag+ + VO2+ + 3H2O
log_k 5.18
delta_h -0 kJ
Fe(VO3)2
Fe(VO3)2 + 4H+ = Fe+2 + 2VO2+ + 2H2O
log_k -3.72
delta_h -61.6722 kJ
Mn(VO3)2
Mn(VO3)2 + 4H+ = Mn+2 + 2VO2+ + 2H2O
log_k 4.9
delta_h -92.4664 kJ
Mg(VO3)2
Mg(VO3)2 + 4H+ = Mg+2 + 2VO2+ + 2H2O
log_k 11.28
delta_h -136.649 kJ

Mg2V2O7
Mg2V2O7 + 6H+ = 2Mg+2 + 2VO2+ + 3H2O
log_k 26.36
delta_h -255.224 kJ
Carnotite
KUO2VO4 + 4H+ = K+ + UO2+2 + VO2+ + 2H2O
log_k 0.23
delta_h -36.4008 kJ
Tyuyamunite
Ca(UO2)2(VO4)2 + 8H+ = Ca+2 + 2UO2+2 + 2VO2+ + 4H2O
log_k 4.08
delta_h -153.134 kJ
Ca(VO3)2
Ca(VO3)2 + 4H+ = Ca+2 + 2VO2+ + 2H2O
log_k 5.66
delta_h -84.7678 kJ
Ca3(VO4)2
Ca3(VO4)2 + 8H+ = 3Ca+2 + 2VO2+ + 4H2O
log_k 38.96
delta_h -293.466 kJ
Ca2V2O7
Ca2V2O7 + 6H+ = 2Ca+2 + 2VO2+ + 3H2O
log_k 17.5
delta_h -159.494 kJ
Ca3(VO4)2:4H2O
Ca3(VO4)2:4H2O + 8H+ = 3Ca+2 + 2VO2+ + 8H2O
log_k 39.86
delta_h -0 kJ
Ca2V2O7:2H2O
Ca2V2O7:2H2O + 6H+ = 2Ca+2 + 2VO2+ + 5H2O
log_k 21.552
delta_h -0 kJ
Ba3(VO4)2:4H2O
Ba3(VO4)2:4H2O + 8H+ = 3Ba+2 + 2VO2+ + 8H2O
log_k 32.94
delta_h -0 kJ
Ba2V2O7:2H2O
Ba2V2O7:2H2O + 6H+ = 2Ba+2 + 2VO2+ + 5H2O
log_k 15.872
delta_h -0 kJ
NaVO3
NaVO3 + 2H+ = Na+ + VO2+ + H2O
log_k 3.8582
delta_h -30.1799 kJ
Na3VO4
Na3VO4 + 4H+ = 3Na+ + VO2+ + 2H2O
log_k 36.6812
delta_h -184.61 kJ
Na4V2O7
Na4V2O7 + 6H+ = 4Na+ + 2VO2+ + 3H2O
log_k 37.4
delta_h -201.083 kJ
Halloysite
Al2Si2O5(OH)4 + 6H+ = 2Al+3 + 2H4SiO4 + H2O

log_k 9.5749
delta_h -181.43 kJ
Kaolinite
Al2Si2O5(OH)4 + 6H+ = 2Al+3 + 2H4SiO4 + H2O
log_k 7.435
delta_h -148 kJ
Greenalite
Fe3Si2O5(OH)4 + 6H+ = 3Fe+2 + 2H4SiO4 + H2O
log_k 20.81
delta_h -0 kJ
Chrysotile
Mg3Si2O5(OH)4 + 6H+ = 3Mg+2 + 2H4SiO4 + H2O
log_k 32.2
delta_h -196 kJ
Sepiolite
Mg2Si3O7.5OH:3H2O + 4H+ + 0.5H2O = 2Mg+2 + 3H4SiO4
log_k 15.76
delta_h -114.089 kJ
Sepiolite(A)
Mg2Si3O7.5OH:3H2O + 0.5H2O + 4H+ = 2Mg+2 + 3H4SiO4
log_k 18.78
delta_h -0 kJ
PHASES
O2(g)
O2 + 4H+ + 4e- = 2H2O
log_k 83.0894
delta_h -571.66 kJ
CH4(g)
CH4 + 3H2O = CO3-2 + 8e- + 10H+
log_k -41.0452
delta_h 257.133 kJ
CO2(g)
CO2 + H2O = 2H+ + CO3-2
log_k -18.147
delta_h 4.06 kJ
H2S(g)
H2S = H+ + HS-
log_k -8.01
delta_h -0 kJ
H2Se(g)
H2Se = HSe- + H+
log_k -4.96
delta_h -15.3 kJ
Hg(g)
Hg = 0.5Hg2+2 + e-
log_k -7.8733
delta_h 22.055 kJ
Hg2(g)
Hg2 = Hg2+2 + 2e-
log_k -14.9554
delta_h 58.07 kJ
Hg(CH3)2(g)
Hg(CH3)2 + 8H2O = Hg(OH)2 + 2CO3-2 + 16e- + 20H+
log_k -73.7066

delta_h 481.99 kJ
HgF(g)
HgF = 0.5Hg2+2 + F-
log_k 32.6756
delta_h -254.844 kJ
HgF2(g)
HgF2 + 2H2O = Hg(OH)2 + 2F- + 2H+
log_k 12.5652
delta_h -165.186 kJ
HgCl(g)
HgCl = 0.5Hg2+2 + Cl-
log_k 19.4966
delta_h -162.095 kJ
HgBr(g)
HgBr = 0.5Hg2+2 + Br-
log_k 16.7566
delta_h -142.157 kJ
HgBr2(g)
HgBr2 + 2H2O = Hg(OH)2 + 2Br- + 2H+
log_k -18.3881
delta_h 54.494 kJ
HgI(g)
HgI = 0.5Hg2+2 + I-
log_k 11.3322
delta_h -106.815 kJ
HgI2(g)
HgI2 + 2H2O = Hg(OH)2 + 2I- + 2H+
log_k -27.2259
delta_h 114.429 kJ
SURFACE_MASTER_SPECIES
Hfo_s Hfo_sOH
Hfo_w Hfo_wOH
Hao_ Hao_OH #hydrous aluminum oxides - gibbsite
SURFACE_SPECIES
Hfo_wOH = Hfo_wOH
log_k 0.0
Hfo_sOH = Hfo_sOH
log_k 0.0
Hao_OH = Hao_OH
log_k 0.0

Hfo_sOH + H+ = Hfo_sOH2+
log_k 7.29
delta_h 0 kJ
Id: 8113302
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH = Hfo_sO- + H+
log_k -8.93
delta_h 0 kJ
Id: 8113301
log K source:
Delta H source:

#T and ionic strength:
Hfo_wOH + H+ = Hfo_wOH2+
log_k 7.29
delta_h 0 kJ
Id: 8123302
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH = Hfo_wO- + H+
log_k -8.93
delta_h 0 kJ
Id: 8123301
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Ba+2 = Hfo_sOHBa+2
log_k 5.46
delta_h 0 kJ
Id: 8111000
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Ba+2 = Hfo_wOBa+ + H+
log_k -7.2
delta_h 0 kJ
Id: 8121000
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Ca+2 = Hfo_sOHCa+2
log_k 4.97
delta_h 0 kJ
Id: 8111500
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Ca+2 = Hfo_wOCa+ + H+
log_k -5.85
delta_h 0 kJ
Id: 8121500
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Mg+2 = Hfo_wOMg+ + H+
log_k -4.6
delta_h 0 kJ
Id: 8124600
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Ag+ = Hfo_sOAg + H+
log_k -1.72
delta_h 0 kJ
Id: 8110200

log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Ag+ = Hfo_wOAg + H+
log_k -5.3
delta_h 0 kJ
Id: 8120200
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Ni+2 = Hfo_sONi+ + H+
log_k 0.37
delta_h 0 kJ
Id: 8115400
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Ni+2 = Hfo_wONi+ + H+
log_k -2.5
delta_h 0 kJ
Id: 8125400
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Cd+2 = Hfo_sOCd+ + H+
log_k 0.47
delta_h 0 kJ
Id: 8111600
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Cd+2 = Hfo_wOCd+ + H+
log_k -2.9
delta_h 0 kJ
Id: 8121600
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Co+2 = Hfo_sOCo+ + H+
log_k -0.46
delta_h 0 kJ
Id: 8112000
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Co+2 = Hfo_wOCo+ + H+
log_k -3.01
delta_h 0 kJ
Id: 8122000
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Zn+2 = Hfo_sOZn+ + H+
log_k 0.99

delta_h 0 kJ
Id: 8119500
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Zn+2 = Hfo_wOZn+ + H+
log_k -1.99
delta_h 0 kJ
Id: 8129500
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Cu+2 = Hfo_sOCu+ + H+
log_k 2.89
delta_h 0 kJ
Id: 8112310
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Cu+2 = Hfo_wOCu+ + H+
log_k 0.6
delta_h 0 kJ
Id: 8123100
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Pb+2 = Hfo_sOPb+ + H+
log_k 4.65
delta_h 0 kJ
Id: 8116000
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Pb+2 = Hfo_wOPb+ + H+
log_k 0.3
delta_h 0 kJ
Id: 8126000
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Be+2 = Hfo_sOBe+ + H+
log_k 5.7
delta_h 0 kJ
Id: 8111100
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Be+2 = Hfo_wOBe+ + H+
log_k 3.3
delta_h 0 kJ
Id: 8121100
log K source:
Delta H source:
#T and ionic strength:

Hfo_sOH + Hg(OH)2 + H+ = Hfo_sOHg+ + 2H2O
log_k 13.95
delta_h 0 kJ
Id: 8113610
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Hg(OH)2 + H+ = Hfo_wOHg+ + 2H2O
log_k 12.64
delta_h 0 kJ
Id: 8123610
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Sn(OH)2 + H+ = Hfo_sOSn+ + 2H2O
log_k 15.1
delta_h 0 kJ
Id: 8117900
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Sn(OH)2 + H+ = Hfo_wOSn+ + 2H2O
log_k 13
delta_h 0 kJ
Id: 8127900
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Cr(OH)2+ = Hfo_sOCrOH+ + H2O
log_k 11.63
delta_h 0 kJ
Id: 8112110
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + H3AsO3 = Hfo_sH2AsO3 + H2O
log_k 5.41
delta_h 0 kJ
Id: 8110600
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + H3AsO3 = Hfo_wH2AsO3 + H2O
log_k 5.41
delta_h 0 kJ
Id: 8120600
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + H3BO3 = Hfo_sH2BO3 + H2O
log_k 0.62
delta_h 0 kJ
Id: 8110900
log K source:

Delta H source:
#T and ionic strength:
Hfo_wOH + H3BO3 = Hfo_wH2BO3 + H2O
log_k 0.62
delta_h 0 kJ
Id: 8120900
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + PO4-3 + 3H+ = Hfo_sH2PO4 + H2O
log_k 31.29
delta_h 0 kJ
Id: 8115800
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + PO4-3 + 3H+ = Hfo_wH2PO4 + H2O
log_k 31.29
delta_h 0 kJ
Id: 8125800
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + PO4-3 + 2H+ = Hfo_sHPO4- + H2O
log_k 25.39
delta_h 0 kJ
Id: 8115801
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + PO4-3 + 2H+ = Hfo_wHPO4- + H2O
log_k 25.39
delta_h 0 kJ
Id: 8125801
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + PO4-3 + H+ = Hfo_sPO4-2 + H2O
log_k 17.72
delta_h 0 kJ
Id: 8115802
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + PO4-3 + H+ = Hfo_wPO4-2 + H2O
log_k 17.72
delta_h 0 kJ
Id: 8125802
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + H3AsO4 = Hfo_sH2AsO4 + H2O
log_k 8.61
delta_h 0 kJ

Id: 8110610
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + H3AsO4 = Hfo_wH2AsO4 + H2O
log_k 8.61
delta_h 0 kJ
Id: 8120610
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + H3AsO4 = Hfo_sHAsO4- + H2O + H+
log_k 2.81
delta_h 0 kJ
Id: 8110611
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + H3AsO4 = Hfo_wHAsO4- + H2O + H+
log_k 2.81
delta_h 0 kJ
Id: 8120611
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + H3AsO4 = Hfo_sOHAsO4-3 + 3H+
log_k -10.12
delta_h 0 kJ
Id: 8110613
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + H3AsO4 = Hfo_wOHAsO4-3 + 3H+
log_k -10.12
delta_h 0 kJ
Id: 8120613
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + VO2+ + 2H2O = Hfo_sOHVO4-3 + 4H+
log_k -16.63
delta_h 0 kJ
Id: 8119031
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + VO2+ + 2H2O = Hfo_wOHVO4-3 + 4H+
log_k -16.63
delta_h 0 kJ
Id: 8129031
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + SO4-2 + H+ = Hfo_sSO4- + H2O

log_k 7.78
delta_h 0 kJ
Id: 8117320
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + SO4-2 + H+ = Hfo_wSO4- + H2O
log_k 7.78
delta_h 0 kJ
Id: 8127320
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + SO4-2 = Hfo_sOHSO4-2
log_k 0.79
delta_h 0 kJ
Id: 8117321
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + SO4-2 = Hfo_wOHSO4-2
log_k 0.79
delta_h 0 kJ
Id: 8127321
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + HSeO3- = Hfo_sSeO3- + H2O
log_k 4.29
delta_h 0 kJ
Id: 8117610
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + HSeO3- = Hfo_wSeO3- + H2O
log_k 4.29
delta_h 0 kJ
Id: 8127610
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + HSeO3- = Hfo_sOHSeO3-2 + H+
log_k -3.23
delta_h 0 kJ
Id: 8117611
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + HSeO3- = Hfo_wOHSeO3-2 + H+
log_k -3.23
delta_h 0 kJ
Id: 8127611
log K source:
Delta H source:

#T and ionic strength:
Hfo_sOH + SeO4-2 + H+ = Hfo_sSeO4- + H2O
log_k 7.73
delta_h 0 kJ
Id: 8117620
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + SeO4-2 + H+ = Hfo_wSeO4- + H2O
log_k 7.73
delta_h 0 kJ
Id: 8127620
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + SeO4-2 = Hfo_sOHSeO4-2
log_k 0.8
delta_h 0 kJ
Id: 8117621
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + SeO4-2 = Hfo_wOHSeO4-2
log_k 0.8
delta_h 0 kJ
Id: 8127621
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + CrO4-2 + H+ = Hfo_sCrO4- + H2O
log_k 10.85
delta_h 0 kJ
Id: 8112120
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + CrO4-2 + H+ = Hfo_wCrO4- + H2O
log_k 10.85
delta_h 0 kJ
Id: 8122120
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + CrO4-2 = Hfo_sOHCrO4-2
log_k 3.9
delta_h 0 kJ
Id: 8112121
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + CrO4-2 = Hfo_wOHCrO4-2
log_k 3.9
delta_h 0 kJ
Id: 8122121

log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + MoO4-2 + H+ = Hfo_sMoO4- + H2O
log_k 9.5
delta_h 0 kJ
Id: 8114800
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + MoO4-2 + H+ = Hfo_wMoO4- + H2O
log_k 9.5
delta_h 0 kJ
Id: 8124800
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + MoO4-2 = Hfo_sOHMoO4-2
log_k 2.4
delta_h 0 kJ
Id: 8114801
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + MoO4-2 = Hfo_wOHMoO4-2
log_k 2.4
delta_h 0 kJ
Id: 8124801
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Sb(OH)6- + H+ = Hfo_sSbO(OH)4 + 2H2O
log_k 8.4
delta_h 0 kJ
Id: 8117410
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Sb(OH)6- + H+ = Hfo_wSbO(OH)4 + 2H2O
log_k 8.4
delta_h 0 kJ
Id: 8127410
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Sb(OH)6- = Hfo_sOHSbO(OH)4- + H2O
log_k 1.3
delta_h 0 kJ
Id: 8117411
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Sb(OH)6- = Hfo_wOHSbO(OH)4- + H2O
log_k 1.3

delta_h 0 kJ
Id: 8127411
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Cyanide- + H+ = Hfo_sCyanide + H2O
log_k 13
delta_h 0 kJ
Id: 8111430
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Cyanide- + H+ = Hfo_wCyanide + H2O
log_k 13
delta_h 0 kJ
Id: 8121430
log K source:
Delta H source:
#T and ionic strength:
Hfo_sOH + Cyanide- = Hfo_sOHCyanide-
log_k 5.7
delta_h 0 kJ
Id: 8111431
log K source:
Delta H source:
#T and ionic strength:
Hfo_wOH + Cyanide- = Hfo_wOHCyanide-
log_k 5.7
delta_h 0 kJ
Id: 8121431
log K source:
Delta H source:
#T and ionic strength:
#Additions from GWB Minteq
Hfo_wOH + H4SiO4 = Hfo_wOSi(OH)3 + H2O
log_k 4.28
delta_h 0 kJ
Hfo_wOH + H4SiO4 = Hfo_wOSiO(OH)2- + H+ + H2O
log_k -3.22
delta_h 0 kJ
Hfo_sOH + H4SiO4 = Hfo_sOSi(OH)3 + H2O
log_k 4.28
delta_h 0
Hfo_sOH + H4SiO4 = Hfo_sOSiO(OH)2- + H+ + H2O
log_k -3.22
delta_h 0
Hfo_wOH + CO3-2 + H+ = Hfo_wCO3- + H2O
log_k 12.56
delta_h 0
Hfo_wOH + CO3-2 + 2H+= Hfo_wHCO3 + H2O
log_k 20.62
delta_h 0
Hfo_sOH + CO3-2 + H+ = Hfo_sCO3- + H2O
log_k 12.56

delta_h 0
Hfo_sOH + CO3-2 + 2H+= Hfo_sHCO3 + H2O
log_k 20.62
delta_h 0

#Karamalidis and Dzombak sorption to gibbsite (hao) as compiled in Cravotta 2021 (https://doi.org/10.1016/j.apgeochem.2020.104845) Table S4 unless otherwise noted
Hao_OH + Cu+2 = Hao_OCu+ + H+
log_k 0.25
Hao_OH + Pb+2 = Hao_OPb+ + H+
log_k 0.37
Hao_OH + Co+2 = Hao_OCo+ + H+
log_k -2.52
Hao_OH + Cd+2 = Hao_OCd+ + H+
log_k -2.73
Hao_OH + Mn+2 = Hao_OMn+ + H+
log_k -5.49
Hao_OH + Fe+2 = Hao_OFe+ + H+
log_k -3.77
Hao_OH + Ca+2 = Hao_OCa+ + H+
log_k -10.49
Hao_OH + Mg+2 = Hao_OMg+ + H+
log_k -5.93
Hao_OH + Ba+2 = Hao_OBa+ + H+
log_k -8.5
Hao_OH + Sr+2 = Hao_OSr+ + H+
log_k -8.26
Hao_OH + Zn+2 = Hao_OZn+ + H+
log_k -0.96
Hao_OH + PO4-3 + 3 H+ = Hao_H2PO4 + H2O
log_k 26.89
Hao_OH + PO4-3 + 2H+ = Hao_HPO4- + H2O
log_k 19.37
Hao_OH + PO4-3 + H+ = Hao_PO4-2 + H2O
log_k 13.57
#Hao_OH + SO4-2 + H+ = Hao_SO4- + H2O
log_k -0.45
#Hao_OH + SO4-2 = Hao_OHSO4-2
log_k 1.19
Hao_OH + F- + H+ = Hao_F + H2O
log_k 8.78
Hao_OH + F- = Hao_OHF-
log_k 2.88
Hao_OH + 2 F- + H+ = Hao_F2- + H2O
log_k 11.94
Hao_OH + H4SiO4 = Hao_OH4SiO4- + H+
log_k -4.16

#Modified value from Goldberg and Glaubig (1985)
Hao_OH + H3BO3 = Hao_H2BO3 + H2O
Log_k 4.83
Hao_OH + H3BO3 = Hao_H3BO4- + H+
Log_k -7.40

#Modified value from Kitadai et al. (2018)
Hao_OH + SO4-2 + H+ = Hao_SO4- + H2O

log_k 2.4
#Modified value from Kitadai et al. (2018)
Hao_OH + SO4-2 = Hao_OHSO4-2
log_k 7.5

END

ATTACHMENT C

ATTACHMENT C. DETAILS OF GEOCHEMICAL MODEL PARAMETERIZATION

INTRODUCTION

This appendix to the Groundwater Polishing Report for the Kincaid Power Plant (KPP), Kincaid Ash Pond (KIN AP) provides detailed information regarding geochemical model parameterization. The information provided includes sources of thermodynamic data, sources of data used in model parameterization, summarized values, and calculation methods. All data is fully documented in the Nature and Extent Report[1].

SOLID PHASE INPUTS

The solid phase inputs to the model included iron (hydr)oxides and aluminum (hydr)oxides. These phases tend to have relatively rapid precipitation kinetics and form an outer layer on the surfaces of aquifer solids, creating surface area for sorption and attenuation of boron and sulfate. Input concentrations for iron and aluminum (hydr)oxides were derived using sequential extraction procedure (SEP) data. SEP methods are described in the Geochemical Conceptual Site Model (GCSM)[2] Section 4 and employ chemical extractants to dissolve metals from specific solid-associated phases. SEP methods use progressively stronger reagents to solubilize metals from increasingly recalcitrant phases. Although these procedures do not identify the discrete solid phases in a soil/aquifer matrix, they provide a means to evaluate and characterize the metal binding mechanisms and relative stability of metals in each phase, and to estimate the available mass of the respective attenuating phase(s) (i.e., aluminum and iron [hydr]oxide).

Sorption of inorganic constituents to iron (hydr)oxides in the MINTEQ v4 database[3] is represented by the hydrous ferric oxide (HFO) thermodynamic data set presented in Dzombak and Morel (1990). HFO is a non-crystalline iron hydroxide phase with high surface area. Therefore, the mass of iron extracted in the non-crystalline SEP fraction is used in the HFO model input. Crystalline metal oxides are also capable of sorbing inorganic constituents although they typically have a lower surface area available for sorption. Because magnetite was observed in X-ray diffraction (XRD) results from site, 10% of the iron concentration (which represents the lower surface area, consistent with Appelo and Postma, 2005) from the metal hydroxide fraction was included in the HFO model input.

Sorption of inorganic constituents to aluminum (hydr)oxides is represented by the hydrous aluminum oxide (HAO) thermodynamic data presented in Karamalidis and Dzombak (2010), Goldberg and Glaubig (1985) (boron), and Kitadai et al. (2018) (sulfate). These sorption data are based on gibbsite, a nearly ubiquitous crystalline aluminum hydroxide mineral (Karamalidis and Dzombak 2010). Because gibbsite is a more crystalline hydroxide, the mass of aluminum extracted in the crystalline SEP fraction is used in the HAO input in the model.

SEP data were available from nine solid phase samples for the Uppermost Aquifer (UA) and two solid phase samples were available from the Upper Semi Confining Unit (USCU). In thermodynamic modeling,

---

[1] The Nature and Extent Report was previously submitted to IEPA (Ramboll 2024) and provided with relevant updates as Appendix D of the CAAA to which this report is attached.

[2] Ibid.; the GCSM is an appendix of the Nature and Extent Report.

[3] The default MINTEQ v4 database for PHREEQC does not include sorption data for carbonate and silicate to HFO. Thermodynamic constants for sorption of carbonate and silicate to HFO were added from the MINTEQ database associated with the Geochemist's Workbench software program.

the amount of sorbing phase present is one of the dominant controls on the concentration of constituents sorbed. Therefore, different amounts of metal oxides were used to test the sensitivity of the model to the amount of sorbing phase present. The amount of metal oxides used were based on the 25th percentile, median (i.e., 50th percentile), and 75th percentile of the SEP results for iron and aluminum.

The quantities of HFO and HAO in the model are represented by ferrihydrite and gibbsite, respectively. Ferrihydrite is the most similar naturally occurring iron oxide to HFO (Dzombak and Morel, 1990), and sorption data for HAO was determined using gibbsite (Karamalidis and Dzombak 2010). SEP results were used to calculate the quantities of HFO and HAO because there are often environmentally relevant masses of iron and aluminum (hydr)oxides within solids that are not sufficiently crystalline to be characterized by other methods (e.g. X-ray diffraction [XRD]). Additionally, the SEP analysis can detect a much lower constituent concentration than is typically attainable by XRD. SEP metal concentrations are presented in milligrams per kilogram of dry weight (mg/kg dw), whereas ferrihydrite and gibbsite inputs to the model represent moles of solid phase associated with one liter of aqueous phase. The concentrations of iron and aluminum reported in SEP results (**Table C-1**) were converted to moles of ferrihydrite and gibbsite (respectively) according to the following:

The mass in kilograms (kg) of solid in the model (i.e., per 1 liter [L] of water) was calculated by:

$$Solid\ Mass\ In\ Model\ (kg) = \frac{(1-\phi)}{\phi} \times \frac{1000\ cm^3\ water}{L\ water} \times 1\ L\ water\ \times \rho\ (\frac{g}{cm^3})\ \times \frac{1\ kg\ solid}{1000\ g\ solid}$$

Where:

ϕ = porosity (water volume in cubic centimeters (cm^3) / total volume in cm^3)

ρ = Density of the solid (grams (g)/cm^3)

Porosity and density (**Table C-1**) represent the median of measurements each hydrostratigraphic unit as reported in the Hydrogeologic Characterization Report (Attachment H of Burns and McDonnell, 2021).

Moles of ferrihydrite and gibbsite were determined using the SEP concentration as described above, the molar mass of iron or aluminum, and the mass of solid phase in the model:

AQUEOUS INPUTS

In addition to the COCs, the following parameters are included in the model and are anticipated to capture the expected attenuation and mobilization mechanisms for reasons detailed below:

- Temperature, pH and pe: pH and pe (a measure of redox potential) are major controls on chemical attenuation and mobility.
- Chloride, potassium, and sodium: Major ions in groundwater typically required for the model to reach charge balance.
- Carbonate, calcium, magnesium, sulfate: Major ions in groundwater that may also form common minerals, including carbonates. Carbonate mineral formation and dissolution is often a major control on groundwater pH. Bicarbonate and carbonate ions, a major component of groundwater alkalinity, may also compete with sulfate/boron for sorbing sites.
- Silicon and phosphate: Silicate (silicon oxide) and phosphate are oxyanions that compete with sulfate/boron for sorbing sites.
- Aluminum, iron, and manganese: As discussed above, iron and aluminum form reactive metal (hydr)oxide minerals which have high capacities for sorbing other ions on their surfaces. Although sorption to manganese oxides was not considered in this model, manganese behaves similarly to iron and is included for completeness.

729 Main Street, Longmont, CO 80501 720.550.0745 contact@lifecyclegeo.com www.lifecyclegeo.com

- Remaining constituents regulated under 35 IAC § 845.600[4]: Although these parameters are not subject to corrective action at KIN AP, they are included in the model for completeness to assess reactions such as competition for available adsorption sites.

Values for pe (derived from ORP) and carbonate ion concentrations were calculated from values previously reported in the analytical data according to the following methods.

Groundwater ORP is used to calculate pe, a non-dimension scale of redox potential. First, the field-measured ORP was converted to Eh, the redox potential normalized to the standard hydrogen electrode. The following equation provided in the Horiba water quality meter instruction manual[5] was used:

$$Eh = ORP + 206 - 0.7*(T - 25)$$

Where both Eh and ORP are in volts (V) and T is temperature in degrees Celsius. Eh is then converted to pe:

$$pe = (Eh * F) / (2.303 * R * T)$$

Where:

F = Faraday constant (96,500 Joules (J) / V-equivalent)

R = Molar gas constant (8.31 J / Kelvin (K)-mole)

T = temperature in Kelvin

Data reported for groundwater at the site include carbonate and bicarbonate alkalinity in units of mg of calcium carbonate per liter (mg $CaCO_3$/L). For use in modeling, it is convenient to convert these values to a single carbonate (CO_3^{2-}) ion concentration. Because carbonate and bicarbonate alkalinity are reported in the same units (i.e., standardized to mg $CaCO_3$) and represent different protonation states of the same inorganic carbon oxyanion, they were summed to represent total alkalinity due to carbonate. This summed alkalinity was converted to concentration of carbonate ion according to the following equation:

$$\frac{mg\ CO_3^{2-}}{L} = \frac{mg\ CaCO_3}{L} \times \frac{mole\ CaCO_3}{100.1\ mg\ CaCO_3} \times \frac{1\ mole\ CO_3^{2-}}{1\ mole\ CaCO_3} \times \frac{60\ mg\ CO_3^{2-}}{mole\ CO_3^{2-}}$$

The full suite of geochemical parameters for this model was measured in Quarter 2 and Quarter 3, 2023. The median values of these results were used in the model to represent average groundwater interacting with the solid phase. For downgradient wells the median for each parameter was calculated for each location individually. For background wells, a single median for each parameter was calculated using data from both background locations.

The charge imbalance of the initial solution was less than 30% for all samples. The results presented in the Groundwater Polishing Report represent the model results using charge balancing on chloride.

[4] Mercury, thallium, total dissolved solids, and radium were not included in the model. Mercury reactions within the environment are highly complex and would require a separate modeling effort. Thallium forms a non-reactive monovalent cation and is rarely detected in the groundwater and is therefore not expected to contribute to model outcomes. Total dissolved solids are not a chemical parameter, but rather the result of other chemical abundances taken together. Radium is not included in most thermodynamic databases.

[5] https://static.horiba.com/fileadmin/Horiba/Products/Process_and_Environmental/Water_Pollution/Instruction_Manuals/U-50/U-50_Manual.pdf

729 Main Street, Longmont, CO 80501 720.550.0745 contact@lifecyclegeo.com www.lifecyclegeo.com

REFERENCES

Appelo C.A.J. and Postma D. 2010. Geochemistry, Groundwater, and Pollution. 2nd Edition. A.A. Balkema Publishers, member of Taylor & Francis Group. The Netherlands.

Burns and McDonnel. 2021. Initial Operating Permit, Kincaid Power Plant Ash Pond. October 25. https://www.luminant.com/documents/ccr/il-ccr/Kincaid/2021/2021%2010%2030%20Kincaid%20AP%20Op%20Permit%20App%20W0218140002-01.pdf

Dzombak D.A. and Morel F.M.M. 1990. Surface Complexation Modeling: Hydrous Ferric Oxide. John Wiley & Sons, New York.

Goldberg S. and Glaubig R.A. 1985. Boron Adsorption on Aluminum and Iron Oxide Minerals. *Soil Science Society of America Journal* **49**(6):1374-1379.

Karamalidis A.K. and Dzombak D.A. 2010. Surface Complexation Modeling: Gibbsite. John Wiley & Sons, New York.

Kitadai N., Nishiuchi K, and Tanaka M. 2018. A comprehensive predictive model for sulfate adsorption on oxide minerals. *Geochimica et Cosmochimica Acta* **238**:150-168.

ATTACHMENT D

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	Charge Balance	Solids Summary	pH	pe	charge	pct_err	S(6)	B	Li
MW-12	C - UA	Initial Soln	TRUE	25p	6.59	2.91	6.87e-17	1.94e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	TRUE	25p	6.79	4.84	-2.16e-17	-4.55e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	TRUE	25p	6.58	4.42	1.77e-17	5.45e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	TRUE	25p	6.74	2.79	-1.68e-17	-5.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	TRUE	25p	6.59	2.91	7.13e-17	2.01e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	TRUE	25p	6.79	4.84	-1.81e-17	-3.82e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	TRUE	25p	6.58	4.42	1.34e-17	4.11e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	TRUE	25p	6.74	2.79	-2.63e-17	-8.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	TRUE	25p	7.28	0.514	8.96e-05	0.453	0.00110	0.000167	8.14e-07
MW-12	C - UA	Second Reaction	TRUE	25p	7.39	0.381	1.28e-07	0.000704	0.00108	0.000117	8.14e-07
MW-28	C - UA	First Reaction	TRUE	25p	7.31	2.15	6.58e-05	0.341	0.00114	0.000207	8.14e-07
MW-28	C - UA	Second Reaction	TRUE	25p	7.42	1.78	1.51e-06	0.00846	0.00107	0.000136	8.14e-07
MW-32	C - UA	First Reaction	TRUE	25p	7.27	1.83	8.70e-05	0.437	0.00112	0.000130	8.14e-07
MW-32	C - UA	Second Reaction	TRUE	25p	7.39	1.54	2.86e-07	0.00157	0.00108	0.000101	8.14e-07
MW-20S	C - USCU	First Reaction	TRUE	25p	7.24	1.47	-8.37e-05	-4.09e-01	0.00119	0.000195	8.14e-07
MW-20S	C - USCU	Second Reaction	TRUE	25p	7.34	1.25	-1.88e-05	-1.01e-01	0.00106	0.000183	8.14e-07
MW-12	C - UA	Initial Soln	TRUE	75p	6.59	2.91	6.87e-17	1.94e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	TRUE	75p	6.79	4.84	-2.16e-17	-4.55e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	TRUE	75p	6.58	4.42	1.77e-17	5.45e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	TRUE	75p	6.74	2.79	-1.68e-17	-5.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	TRUE	75p	6.59	2.91	7.13e-17	2.01e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	TRUE	75p	6.79	4.84	-1.81e-17	-3.82e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	TRUE	75p	6.58	4.42	1.34e-17	4.11e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	TRUE	75p	6.74	2.79	-2.63e-17	-8.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	TRUE	75p	7.21	0.366	-8.81e-05	-4.23e-01	0.00116	0.000312	8.14e-07
MW-12	C - UA	Second Reaction	TRUE	75p	7.33	0.173	-2.13e-05	-1.13e-01	0.00104	0.000272	8.14e-07
MW-28	C - UA	First Reaction	TRUE	75p	7.26	2.56	-2.65e-04	-1.31e+00	0.00127	0.000431	8.14e-07
MW-28	C - UA	Second Reaction	TRUE	75p	7.36	2.27	-2.73e-05	-1.48e-01	0.00103	0.000343	8.14e-07
MW-32	C - UA	First Reaction	TRUE	75p	7.21	1.91	-1.20e-04	-5.75e-01	0.00119	0.000196	8.14e-07
MW-32	C - UA	Second Reaction	TRUE	75p	7.33	1.64	-2.90e-05	-1.53e-01	0.00106	0.000190	8.14e-07
MW-20S	C - USCU	First Reaction	TRUE	75p	7.18	1.60	-1.88e-06	-8.75e-03	0.00125	0.000192	8.14e-07
MW-20S	C - USCU	Second Reaction	TRUE	75p	7.29	1.39	-1.92e-05	-9.83e-02	0.00107	0.000180	8.14e-07
MW-12	C - UA	Initial Soln	TRUE	median	6.59	2.91	6.87e-17	1.94e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	TRUE	median	6.79	4.84	-2.16e-17	-4.55e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	TRUE	median	6.58	4.42	1.77e-17	5.45e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	TRUE	median	6.74	2.79	-1.68e-17	-5.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	TRUE	median	6.59	2.91	7.13e-17	2.01e-13	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	TRUE	median	6.79	4.84	-1.81e-17	-3.82e-14	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	TRUE	median	6.58	4.42	1.34e-17	4.11e-14	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	TRUE	median	6.74	2.79	-2.63e-17	-8.29e-14	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	TRUE	median	7.24	0.478	9.21e-05	0.452	0.00111	0.000219	8.14e-07
MW-12	C - UA	Second Reaction	TRUE	median	7.36	0.327	-1.79e-06	-9.65e-03	0.00106	0.000169	8.14e-07
MW-28	C - UA	First Reaction	TRUE	median	7.28	2.37	4.05e-05	0.204	0.00116	0.000283	8.14e-07
MW-28	C - UA	Second Reaction	TRUE	median	7.38	2.02	-6.98e-07	-3.84e-03	0.00106	0.000202	8.14e-07
MW-32	C - UA	First Reaction	TRUE	median	7.23	1.90	8.40e-05	0.410	0.00114	0.000158	8.14e-07
MW-32	C - UA	Second Reaction	TRUE	median	7.35	1.63	-2.66e-06	-1.43e-02	0.00107	0.000136	8.14e-07
MW-20S	C - USCU	First Reaction	TRUE	median	7.21	1.54	-4.39e-05	-2.09e-01	0.00122	0.000193	8.14e-07
MW-20S	C - USCU	Second Reaction	TRUE	median	7.31	1.32	-1.94e-05	-1.01e-01	0.00107	0.000181	8.14e-07
MW-12	C - UA	Initial Soln	FALSE	25p	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	FALSE	25p	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	FALSE	25p	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	FALSE	25p	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	FALSE	25p	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	FALSE	25p	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	FALSE	25p	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	FALSE	25p	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	FALSE	25p	7.28	0.489	8.50e-05	0.429	0.00110	0.000166	8.14e-07
MW-12	C - UA	Second Reaction	FALSE	25p	7.39	0.358	1.37e-07	0.000757	0.00108	0.000116	8.14e-07
MW-28	C - UA	First Reaction	FALSE	25p	7.31	2.15	6.33e-05	0.328	0.00114	0.000207	8.14e-07
MW-28	C - UA	Second Reaction	FALSE	25p	7.42	1.77	1.50e-06	0.00842	0.00107	0.000136	8.14e-07
MW-32	C - UA	First Reaction	FALSE	25p	7.27	1.82	8.18e-05	0.411	0.00112	0.000128	8.14e-07
MW-32	C - UA	Second Reaction	FALSE	25p	7.39	1.53	2.60e-07	0.00143	0.00108	9.98e-05	8.14e-07
MW-20S	C - USCU	First Reaction	FALSE	25p	7.24	1.46	-6.39e-05	-3.12e-01	0.00119	0.000193	8.14e-07
MW-20S	C - USCU	Second Reaction	FALSE	25p	7.34	1.23	-1.82e-05	-9.72e-02	0.00106	0.000181	8.14e-07
MW-12	C - UA	Initial Soln	FALSE	75p	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	FALSE	75p	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	FALSE	75p	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	FALSE	75p	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	FALSE	75p	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	FALSE	75p	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	FALSE	75p	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	FALSE	75p	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	FALSE	75p	7.21	0.337	-5.63e-05	-2.70e-01	0.00114	0.000310	8.14e-07
MW-12	C - UA	Second Reaction	FALSE	75p	7.33	0.146	-1.97e-05	-1.04e-01	0.00104	0.000271	8.14e-07
MW-28	C - UA	First Reaction	FALSE	75p	7.26	2.55	-2.43e-04	-1.20e+00	0.00126	0.000431	8.14e-07
MW-28	C - UA	Second Reaction	FALSE	75p	7.36	2.26	-2.64e-05	-1.43e-01	0.00103	0.000343	8.14e-07
MW-32	C - UA	First Reaction	FALSE	75p	7.21	1.89	-8.65e-05	-4.14e-01	0.00118	0.000194	8.14e-07
MW-32	C - UA	Second Reaction	FALSE	75p	7.33	1.62	-2.77e-05	-1.46e-01	0.00106	0.000188	8.14e-07
MW-20S	C - USCU	First Reaction	FALSE	75p	7.18	1.59	1.43e-05	0.0665	0.00124	0.000190	8.14e-07
MW-20S	C - USCU	Second Reaction	FALSE	75p	7.29	1.37	-1.84e-05	-9.45e-02	0.00107	0.000178	8.14e-07
MW-12	C - UA	Initial Soln	FALSE	median	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Initial Soln	FALSE	median	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Initial Soln	FALSE	median	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Initial Soln	FALSE	median	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	Speciation Model	FALSE	median	6.59	2.91	0.00801	29.4	0.00395	0.000339	1.38e-06
MW-28	C - UA	Speciation Model	FALSE	median	6.79	4.84	0.00627	15.4	0.00976	0.000875	8.95e-07
MW-32	C - UA	Speciation Model	FALSE	median	6.58	4.42	0.00711	28.2	0.00393	0.000161	1.62e-07
MW-20S	C - USCU	Speciation Model	FALSE	median	6.74	2.79	0.00574	22.2	0.00454	0.000200	1.08e-07
MW-12	C - UA	First Reaction	FALSE	median	7.24	0.452	9.10e-05	0.447	0.00111	0.000218	8.14e-07
MW-12	C - UA	Second Reaction	FALSE	median	7.36	0.303	-1.67e-06	-8.99e-03	0.00106	0.000168	8.14e-07
MW-28	C - UA	First Reaction	FALSE	median	7.28	2.36	4.06e-05	0.205	0.00116	0.000283	8.14e-07
MW-28	C - UA	Second Reaction	FALSE	median	7.38	2.01	-6.55e-07	-3.60e-03	0.00106	0.000202	8.14e-07
MW-32	C - UA	First Reaction	FALSE	median	7.23	1.88	8.25e-05	0.403	0.00114	0.000157	8.14e-07
MW-32	C - UA	Second Reaction	FALSE	median	7.35	1.62	-2.63e-06	-1.41e-02	0.00107	0.000135	8.14e-07
MW-20S	C - USCU	First Reaction	FALSE	median	7.21	1.53	-2.57e-05	-1.23e-01	0.00121	0.000191	8.14e-07
MW-20S	C - USCU	Second Reaction	FALSE	median	7.31	1.31	-1.87e-05	-9.78e-02	0.00107	0.000180	8.14e-07

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	As	C(4)	Cl	F	Ca	Mg	Na	K	Ba	Si
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	9.95e-09	0.00505	0.00378	1.95e-05	0.00240	0.00245	0.000866	3.28e-05	2.41e-07	5.72e-05
MW-12	C - UA	Second Reaction	5.74e-09	0.00404	0.00378	1.95e-05	0.00217	0.00221	0.000866	3.28e-05	2.34e-07	4.30e-05
MW-28	C - UA	First Reaction	1.22e-08	0.00466	0.00378	1.95e-05	0.00234	0.00238	0.000866	3.28e-05	2.31e-07	7.59e-05
MW-28	C - UA	Second Reaction	8.12e-09	0.00386	0.00378	1.95e-05	0.00213	0.00217	0.000866	3.28e-05	2.33e-07	5.91e-05
MW-32	C - UA	First Reaction	1.05e-08	0.00507	0.00378	1.95e-05	0.00242	0.00246	0.000866	3.28e-05	2.38e-07	4.73e-05
MW-32	C - UA	Second Reaction	6.10e-09	0.00407	0.00378	1.95e-05	0.00218	0.00222	0.000866	3.28e-05	2.34e-07	3.55e-05
MW-20S	C - USCU	First Reaction	1.80e-08	0.00543	0.00378	1.96e-05	0.00249	0.00253	0.000866	3.28e-05	2.27e-07	6.26e-05
MW-20S	C - USCU	Second Reaction	1.09e-08	0.00445	0.00378	1.95e-05	0.00224	0.00229	0.000866	3.28e-05	2.42e-07	4.62e-05
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	1.43e-08	0.00575	0.00378	1.96e-05	0.00252	0.00256	0.000866	3.28e-05	2.36e-07	6.85e-05
MW-12	C - UA	Second Reaction	7.94e-09	0.00461	0.00378	1.95e-05	0.00226	0.00230	0.000866	3.28e-05	2.48e-07	4.89e-05
MW-28	C - UA	First Reaction	1.58e-08	0.00525	0.00378	1.94e-05	0.00244	0.00248	0.000866	3.28e-05	2.12e-07	8.94e-05
MW-28	C - UA	Second Reaction	1.01e-08	0.00435	0.00378	1.95e-05	0.00220	0.00225	0.000866	3.28e-05	2.48e-07	6.71e-05
MW-32	C - UA	First Reaction	1.46e-08	0.00579	0.00378	1.98e-05	0.00254	0.00258	0.000866	3.28e-05	2.31e-07	5.68e-05
MW-32	C - UA	Second Reaction	8.03e-09	0.00463	0.00378	1.95e-05	0.00227	0.00232	0.000866	3.28e-05	2.44e-07	4.02e-05
MW-20S	C - USCU	First Reaction	2.30e-08	0.00599	0.00378	1.95e-05	0.00264	0.00268	0.000866	3.28e-05	2.24e-07	7.34e-05
MW-20S	C - USCU	Second Reaction	1.43e-08	0.00499	0.00378	1.95e-05	0.00235	0.00240	0.000866	3.28e-05	2.47e-07	5.39e-05
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.00885	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.00667	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.00740	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.00619	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	1.21e-08	0.00543	0.00378	1.95e-05	0.00248	0.00253	0.000866	3.28e-05	2.43e-07	6.32e-05
MW-12	C - UA	Second Reaction	6.73e-09	0.00435	0.00378	1.95e-05	0.00222	0.00227	0.000866	3.28e-05	2.41e-07	4.58e-05
MW-28	C - UA	First Reaction	1.40e-08	0.00497	0.00378	1.94e-05	0.00241	0.00245	0.000866	3.28e-05	2.29e-07	8.30e-05
MW-28	C - UA	Second Reaction	9.11e-09	0.00412	0.00378	1.95e-05	0.00218	0.00222	0.000866	3.28e-05	2.40e-07	6.29e-05
MW-32	C - UA	First Reaction	1.26e-08	0.00546	0.00378	1.96e-05	0.00250	0.00255	0.000866	3.28e-05	2.38e-07	5.23e-05
MW-32	C - UA	Second Reaction	7.08e-09	0.00437	0.00378	1.95e-05	0.00223	0.00228	0.000866	3.28e-05	2.39e-07	3.78e-05
MW-20S	C - USCU	First Reaction	2.06e-08	0.00574	0.00378	1.96e-05	0.00257	0.00261	0.000866	3.28e-05	2.26e-07	6.83e-05
MW-20S	C - USCU	Second Reaction	1.26e-08	0.00474	0.00378	1.95e-05	0.00230	0.00235	0.000866	3.28e-05	2.44e-07	5.01e-05
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	1.05e-08	0.00505	0.00378	1.95e-05	0.00240	0.00245	0.000866	3.28e-05	2.41e-07	5.70e-05
MW-12	C - UA	Second Reaction	6.04e-09	0.00404	0.00378	1.95e-05	0.00217	0.00221	0.000866	3.28e-05	2.34e-07	4.29e-05
MW-28	C - UA	First Reaction	1.26e-08	0.00466	0.00378	1.95e-05	0.00234	0.00238	0.000866	3.28e-05	2.31e-07	7.57e-05
MW-28	C - UA	Second Reaction	8.40e-09	0.00386	0.00378	1.95e-05	0.00213	0.00217	0.000866	3.28e-05	2.33e-07	5.90e-05
MW-32	C - UA	First Reaction	1.11e-08	0.00507	0.00378	1.95e-05	0.00242	0.00246	0.000866	3.28e-05	2.38e-07	4.71e-05
MW-32	C - UA	Second Reaction	6.40e-09	0.00407	0.00378	1.95e-05	0.00218	0.00222	0.000866	3.28e-05	2.34e-07	3.54e-05
MW-20S	C - USCU	First Reaction	1.87e-08	0.00543	0.00378	1.96e-05	0.00249	0.00253	0.000866	3.28e-05	2.29e-07	6.23e-05
MW-20S	C - USCU	Second Reaction	1.13e-08	0.00445	0.00378	1.95e-05	0.00224	0.00229	0.000866	3.28e-05	2.42e-07	4.61e-05
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	1.52e-08	0.00575	0.00378	1.96e-05	0.00252	0.00256	0.000866	3.28e-05	2.39e-07	6.82e-05
MW-12	C - UA	Second Reaction	8.41e-09	0.00461	0.00378	1.95e-05	0.00226	0.00230	0.000866	3.28e-05	2.49e-07	4.87e-05
MW-28	C - UA	First Reaction	1.64e-08	0.00524	0.00378	1.94e-05	0.00244	0.00248	0.000866	3.28e-05	2.14e-07	8.91e-05
MW-28	C - UA	Second Reaction	1.05e-08	0.00435	0.00378	1.95e-05	0.00220	0.00225	0.000866	3.28e-05	2.48e-07	6.69e-05
MW-32	C - UA	First Reaction	1.52e-08	0.00578	0.00378	1.98e-05	0.00254	0.00258	0.000866	3.28e-05	2.33e-07	5.66e-05
MW-32	C - UA	Second Reaction	8.42e-09	0.00462	0.00378	1.95e-05	0.00227	0.00232	0.000866	3.28e-05	2.44e-07	4.01e-05
MW-20S	C - USCU	First Reaction	2.39e-08	0.00598	0.00378	1.95e-05	0.00264	0.00268	0.000866	3.28e-05	2.25e-07	7.31e-05
MW-20S	C - USCU	Second Reaction	1.49e-08	0.00499	0.00378	1.95e-05	0.00235	0.00240	0.000866	3.28e-05	2.47e-07	5.37e-05
MW-12	C - UA	Initial Soln	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Initial Soln	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Initial Soln	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Initial Soln	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	Speciation Model	3.04e-08	0.00533	0.000847	1.05e-05	0.00517	0.00362	0.00244	6.09e-05	6.60e-07	0.000178
MW-28	C - UA	Speciation Model	3.18e-08	0.00461	0.000410	7.38e-06	0.00687	0.00519	0.00545	2.53e-05	1.84e-07	0.000180
MW-32	C - UA	Speciation Model	3.24e-08	0.00522	0.000296	9.48e-06	0.00431	0.00361	0.00265	1.02e-05	3.97e-07	0.000151
MW-20S	C - USCU	Speciation Model	3.31e-08	0.00473	0.000452	1.08e-05	0.00480	0.00396	0.00120	5.26e-06	2.61e-07	0.000134
MW-12	C - UA	First Reaction	1.27e-08	0.00543	0.00378	1.95e-05	0.00248	0.00252	0.000866	3.28e-05	2.44e-07	6.30e-05
MW-12	C - UA	Second Reaction	7.10e-09	0.00435	0.00378	1.95e-05	0.00222	0.00227	0.000866	3.28e-05	2.41e-07	4.57e-05
MW-28	C - UA	First Reaction	1.45e-08	0.00497	0.00378	1.94e-05	0.00241	0.00245	0.000866	3.28e-05	2.29e-07	8.28e-05
MW-28	C - UA	Second Reaction	9.42e-09	0.00412	0.00378	1.95e-05	0.00218	0.00222	0.000866	3.28e-05	2.40e-07	6.28e-05
MW-32	C - UA	First Reaction	1.32e-08	0.00546	0.00378	1.96e-05	0.00250	0.00254	0.000866	3.28e-05	2.39e-07	5.21e-05
MW-32	C - UA	Second Reaction	7.43e-09	0.00437	0.00378	1.95e-05	0.00223	0.00228	0.000866	3.28e-05	2.39e-07	3.77e-05
MW-20S	C - USCU	First Reaction	2.14e-08	0.00573	0.00378	1.96e-05	0.00257	0.00261	0.000866	3.28e-05	2.27e-07	6.80e-05
MW-20S	C - USCU	Second Reaction	1.31e-08	0.00474	0.00378	1.95e-05	0.00230	0.00235	0.000866	3.28e-05	2.44e-07	4.99e-05

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	P	Mn	Fe	Al	Sb	Be	Cd	Cr	Co	Pb
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.30e-06	6.64e-06	7.90e-06	4.41e-08	1.64e-09	2.21e-09	2.04e-10	3.12e-09	5.69e-10	1.70e-09
MW-12	C - UA	Second Reaction	1.12e-06	6.80e-06	4.62e-06	5.16e-08	1.64e-09	1.76e-09	1.39e-10	2.52e-09	4.65e-10	1.11e-09
MW-28	C - UA	First Reaction	1.01e-07	6.66e-06	1.45e-07	4.63e-08	1.64e-09	3.54e-09	1.46e-10	3.94e-09	7.41e-10	1.21e-09
MW-28	C - UA	Second Reaction	9.20e-08	6.76e-06	1.62e-07	5.35e-08	1.64e-09	2.90e-09	1.02e-10	3.22e-09	5.63e-10	8.00e-10
MW-32	C - UA	First Reaction	1.17e-07	8.87e-06	3.99e-07	4.39e-08	1.64e-09	2.19e-09	3.90e-10	3.96e-09	2.43e-09	3.37e-09
MW-32	C - UA	Second Reaction	1.00e-07	7.16e-06	3.32e-07	5.14e-08	1.64e-09	1.73e-09	2.78e-10	3.30e-09	1.75e-09	2.39e-09
MW-20S	C - USCU	First Reaction	3.00e-07	5.09e-06	1.14e-06	4.23e-08	1.64e-09	3.70e-09	6.55e-10	7.09e-09	1.21e-09	5.65e-09
MW-20S	C - USCU	Second Reaction	2.58e-07	5.69e-06	8.95e-07	4.82e-08	1.64e-09	2.90e-09	5.20e-10	6.17e-09	9.60e-10	4.59e-09
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.45e-06	5.62e-06	1.74e-05	4.11e-08	1.64e-09	2.62e-09	4.05e-10	4.35e-09	8.41e-10	4.01e-09
MW-12	C - UA	Second Reaction	1.20e-06	5.82e-06	1.17e-05	4.72e-08	1.64e-09	2.00e-09	2.84e-10	3.55e-09	6.03e-10	2.86e-09
MW-28	C - UA	First Reaction	1.09e-07	6.06e-06	8.71e-08	4.33e-08	1.64e-09	4.09e-09	2.76e-10	4.95e-09	1.24e-09	2.50e-09
MW-28	C - UA	Second Reaction	9.59e-08	5.86e-06	8.20e-08	4.91e-08	1.64e-09	3.25e-09	1.92e-10	4.02e-09	8.63e-10	1.78e-09
MW-32	C - UA	First Reaction	1.30e-07	1.65e-05	5.25e-07	4.09e-08	1.64e-09	2.61e-09	6.27e-10	5.38e-09	3.77e-09	6.23e-09
MW-32	C - UA	Second Reaction	1.07e-07	1.04e-05	4.20e-07	4.70e-08	1.64e-09	1.98e-09	4.95e-10	4.75e-09	2.91e-09	5.04e-09
MW-20S	C - USCU	First Reaction	3.25e-07	5.09e-06	1.25e-06	4.00e-08	1.64e-09	4.28e-09	7.12e-10	7.63e-09	1.33e-09	5.97e-09
MW-20S	C - USCU	Second Reaction	2.79e-07	5.64e-06	9.84e-07	4.46e-08	1.64e-09	3.30e-09	5.66e-10	6.45e-09	1.06e-09	4.88e-09
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.38e-06	6.34e-06	1.12e-05	4.22e-08	1.64e-09	2.43e-09	2.72e-10	3.58e-09	6.44e-10	2.43e-09
MW-12	C - UA	Second Reaction	1.16e-06	6.51e-06	6.79e-06	4.90e-08	1.64e-09	1.88e-09	1.80e-10	2.85e-09	4.76e-10	1.60e-09
MW-28	C - UA	First Reaction	1.05e-07	6.44e-06	1.14e-07	4.45e-08	1.64e-09	3.84e-09	1.88e-10	4.36e-09	8.91e-10	1.62e-09
MW-28	C - UA	Second Reaction	9.36e-08	6.45e-06	1.19e-07	5.09e-08	1.64e-09	3.08e-09	1.26e-10	3.51e-09	6.22e-10	1.07e-09
MW-32	C - UA	First Reaction	1.23e-07	1.07e-05	4.46e-07	4.21e-08	1.64e-09	2.41e-09	4.89e-10	4.57e-09	3.00e-09	4.49e-09
MW-32	C - UA	Second Reaction	1.04e-07	7.50e-06	3.52e-07	4.88e-08	1.64e-09	1.86e-09	3.56e-10	3.83e-09	2.16e-09	3.31e-09
MW-20S	C - USCU	First Reaction	3.14e-07	5.09e-06	1.20e-06	4.10e-08	1.64e-09	4.01e-09	6.85e-10	7.36e-09	1.27e-09	5.82e-09
MW-20S	C - USCU	Second Reaction	2.68e-07	5.66e-06	9.42e-07	4.62e-08	1.64e-09	3.11e-09	5.44e-10	6.30e-09	1.01e-09	4.74e-09
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.31e-06	6.66e-06	8.35e-06	4.41e-08	1.64e-09	2.21e-09	2.79e-10	3.23e-09	5.95e-10	1.82e-09
MW-12	C - UA	Second Reaction	1.13e-06	6.81e-06	4.87e-06	5.16e-08	1.64e-09	1.76e-09	1.85e-10	2.61e-09	4.82e-10	1.18e-09
MW-28	C - UA	First Reaction	1.01e-07	6.68e-06	1.46e-07	4.63e-08	1.64e-09	3.54e-09	1.79e-10	4.01e-09	7.70e-10	1.26e-09
MW-28	C - UA	Second Reaction	9.25e-08	6.76e-06	1.62e-07	5.35e-08	1.64e-09	2.90e-09	1.23e-10	3.28e-09	5.81e-10	8.34e-10
MW-32	C - UA	First Reaction	1.18e-07	9.01e-06	4.11e-07	4.39e-08	1.64e-09	2.19e-09	5.25e-10	4.12e-09	2.56e-09	3.57e-09
MW-32	C - UA	Second Reaction	1.01e-07	7.19e-06	3.40e-07	5.14e-08	1.64e-09	1.73e-09	3.72e-10	3.45e-09	1.84e-09	2.54e-09
MW-20S	C - USCU	First Reaction	3.02e-07	5.14e-06	1.18e-06	4.23e-08	1.64e-09	3.69e-09	8.36e-10	7.28e-09	1.26e-09	5.86e-09
MW-20S	C - USCU	Second Reaction	2.59e-07	5.71e-06	9.27e-07	4.82e-08	1.64e-09	2.90e-09	6.62e-10	6.35e-09	1.00e-09	4.77e-09
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.46e-06	5.70e-06	1.86e-05	4.11e-08	1.64e-09	2.62e-09	5.70e-10	4.56e-09	9.01e-10	4.31e-09
MW-12	C - UA	Second Reaction	1.21e-06	5.85e-06	1.25e-05	4.72e-08	1.64e-09	2.00e-09	3.97e-10	3.73e-09	6.43e-10	3.07e-09
MW-28	C - UA	First Reaction	1.09e-07	6.14e-06	8.88e-08	4.33e-08	1.64e-09	4.09e-09	3.47e-10	5.07e-09	1.31e-09	2.63e-09
MW-28	C - UA	Second Reaction	9.63e-08	5.89e-06	8.32e-08	4.91e-08	1.64e-09	3.25e-09	2.40e-10	4.11e-09	9.06e-10	1.86e-09
MW-32	C - UA	First Reaction	1.31e-07	1.72e-05	5.46e-07	4.10e-08	1.64e-09	2.60e-09	8.53e-10	5.63e-09	3.99e-09	6.58e-09
MW-32	C - UA	Second Reaction	1.08e-07	1.06e-05	4.36e-07	4.70e-08	1.64e-09	1.97e-09	6.72e-10	4.99e-09	3.07e-09	5.32e-09
MW-20S	C - USCU	First Reaction	3.27e-07	5.13e-06	1.29e-06	4.00e-08	1.64e-09	4.27e-09	9.08e-10	7.81e-09	1.38e-09	6.20e-09
MW-20S	C - USCU	Second Reaction	2.80e-07	5.66e-06	1.02e-06	4.46e-08	1.64e-09	3.30e-09	7.22e-10	6.63e-09	1.10e-09	5.07e-09
MW-12	C - UA	Initial Soln	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Initial Soln	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Initial Soln	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Initial Soln	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	Speciation Model	9.37e-07	8.09e-06	6.28e-05	6.74e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-28	C - UA	Speciation Model	8.09e-08	2.11e-05	6.22e-07	9.12e-07	1.65e-09	1.11e-08	1.56e-09	1.69e-08	6.37e-09	5.56e-09
MW-32	C - UA	Speciation Model	8.08e-08	5.93e-05	1.46e-06	7.24e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	8.07e-09	5.56e-09
MW-20S	C - USCU	Speciation Model	2.02e-07	4.86e-06	2.68e-06	7.52e-07	1.64e-09	1.11e-08	1.56e-09	1.68e-08	2.55e-09	5.56e-09
MW-12	C - UA	First Reaction	1.39e-06	6.37e-06	1.19e-05	4.23e-08	1.64e-09	2.43e-09	3.77e-10	3.73e-09	6.82e-10	2.59e-09
MW-12	C - UA	Second Reaction	1.17e-06	6.52e-06	7.18e-06	4.90e-08	1.64e-09	1.88e-09	2.46e-10	2.97e-09	5.00e-10	1.70e-09
MW-28	C - UA	First Reaction	1.05e-07	6.46e-06	1.15e-07	4.45e-08	1.64e-09	3.84e-09	2.33e-10	4.45e-09	9.32e-10	1.69e-09
MW-28	C - UA	Second Reaction	9.40e-08	6.46e-06	1.20e-07	5.10e-08	1.64e-09	3.08e-09	1.55e-10	3.58e-09	6.47e-10	1.12e-09
MW-32	C - UA	First Reaction	1.25e-07	1.10e-05	4.62e-07	4.21e-08	1.64e-09	2.41e-09	6.63e-10	4.77e-09	3.16e-09	4.75e-09
MW-32	C - UA	Second Reaction	1.05e-07	7.57e-06	3.63e-07	4.88e-08	1.64e-09	1.85e-09	4.81e-10	4.01e-09	2.28e-09	3.50e-09
MW-20S	C - USCU	First Reaction	3.15e-07	5.14e-06	1.24e-06	4.10e-08	1.64e-09	4.00e-09	8.74e-10	7.55e-09	1.33e-09	6.04e-09
MW-20S	C - USCU	Second Reaction	2.70e-07	5.68e-06	9.75e-07	4.62e-08	1.64e-09	3.10e-09	6.94e-10	6.48e-09	1.05e-09	4.92e-09

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	Mo	Se	Hfo_s	Hfo_w	Hao_	m_Hfo_wOH	m_Hfo_wOH2+	m_Hfo_wOHSO4-2	m_Hfo_wSO4-	m_Hfo_ wOSi(OH)3
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000145	0.00580	0.00109	0.000257	0.000487	1.64e-05	1.56e-05	0.000877
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000145	0.00580	0.00109	0.000329	0.000443	3.83e-05	2.59e-05	0.00114
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000145	0.00580	0.00109	0.000270	0.000457	2.42e-05	2.05e-05	0.000784
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000250	0.0100	0.00693	0.000565	0.000762	4.19e-05	2.83e-05	0.00145
MW-12	C - UA	First Reaction	2.01e-08	2.43e-09	0.000145	0.00580	0.00109	0.000630	0.000489	3.57e-06	1.39e-06	0.000688
MW-12	C - UA	Second Reaction	1.88e-08	1.83e-09	0.000145	0.00580	0.00109	0.000792	0.000472	4.44e-06	1.33e-06	0.000649
MW-28	C - UA	First Reaction	2.62e-08	2.57e-09	0.000145	0.00580	0.00109	0.000612	0.000404	4.13e-06	1.37e-06	0.000886
MW-28	C - UA	Second Reaction	2.04e-08	2.07e-09	0.000145	0.00580	0.00109	0.000734	0.000393	4.59e-06	1.23e-06	0.000827
MW-32	C - UA	First Reaction	2.04e-08	2.37e-09	0.000145	0.00580	0.00109	0.000673	0.000463	5.02e-06	1.73e-06	0.000607
MW-32	C - UA	Second Reaction	1.88e-08	1.75e-09	0.000145	0.00580	0.00109	0.000850	0.000450	6.16e-06	1.63e-06	0.000575
MW-20S	C - USCU	First Reaction	1.99e-08	3.01e-09	0.000250	0.0100	0.00693	0.000993	0.000727	7.97e-06	2.93e-06	0.00119
MW-20S	C - USCU	Second Reaction	1.85e-08	2.25e-09	0.000250	0.0100	0.00693	0.00125	0.000729	8.94e-06	2.61e-06	0.00110
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000245	0.00980	0.00858	0.000434	0.000823	2.78e-05	2.64e-05	0.00148
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000245	0.00980	0.00858	0.000555	0.000748	6.47e-05	4.37e-05	0.00192
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000245	0.00980	0.00858	0.000457	0.000773	4.09e-05	3.47e-05	0.00133
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000425	0.0170	0.00825	0.000960	0.00130	7.12e-05	4.82e-05	0.00247
MW-12	C - UA	First Reaction	2.11e-08	3.50e-09	0.000245	0.00980	0.00858	0.000914	0.000814	5.42e-06	2.42e-06	0.00120
MW-12	C - UA	Second Reaction	1.87e-08	3.30e-09	0.000245	0.00980	0.00858	0.00119	0.000817	6.44e-06	2.22e-06	0.00111
MW-28	C - UA	First Reaction	3.01e-08	2.98e-09	0.000245	0.00980	0.00858	0.000910	0.000675	6.91e-06	2.57e-06	0.00155
MW-28	C - UA	Second Reaction	2.17e-08	2.31e-09	0.000245	0.00980	0.00858	0.00112	0.000677	6.84e-06	2.07e-06	0.00144
MW-32	C - UA	First Reaction	2.17e-08	2.86e-09	0.000245	0.00980	0.00858	0.000973	0.000767	7.69e-06	3.04e-06	0.00106
MW-32	C - UA	Second Reaction	1.88e-08	2.02e-09	0.000245	0.00980	0.00858	0.00127	0.000774	9.11e-06	2.77e-06	0.000978
MW-20S	C - USCU	First Reaction	2.08e-08	3.49e-09	0.000425	0.0170	0.00825	0.00148	0.00121	1.27e-05	5.18e-06	0.00208
MW-20S	C - USCU	Second Reaction	1.87e-08	2.62e-09	0.000425	0.0170	0.00825	0.00188	0.00125	1.36e-05	4.51e-06	0.00193
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000200	0.00800	0.00238	0.000354	0.000672	2.27e-05	2.16e-05	0.00121
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000200	0.00800	0.00238	0.000453	0.000611	5.28e-05	3.57e-05	0.00157
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000200	0.00800	0.00238	0.000373	0.000631	3.34e-05	2.83e-05	0.00108
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000335	0.0134	0.00759	0.000757	0.00102	5.61e-05	3.80e-05	0.00195
MW-12	C - UA	First Reaction	2.06e-08	2.73e-09	0.000200	0.00800	0.00238	0.000799	0.000671	4.57e-06	1.93e-06	0.000963
MW-12	C - UA	Second Reaction	1.87e-08	2.02e-09	0.000200	0.00800	0.00238	0.00103	0.000662	5.70e-06	1.84e-06	0.000897
MW-28	C - UA	First Reaction	2.83e-08	2.78e-09	0.000200	0.00800	0.00238	0.000787	0.000555	5.50e-06	1.95e-06	0.00125
MW-28	C - UA	Second Reaction	2.11e-08	2.18e-09	0.000200	0.00800	0.00238	0.000962	0.000550	6.00e-06	1.72e-06	0.00115
MW-32	C - UA	First Reaction	2.10e-08	2.62e-09	0.000200	0.00800	0.00238	0.000852	0.000633	6.48e-06	2.42e-06	0.000849
MW-32	C - UA	Second Reaction	1.87e-08	1.88e-09	0.000200	0.00800	0.00238	0.00110	0.000629	7.95e-06	2.28e-06	0.000792
MW-20S	C - USCU	First Reaction	2.04e-08	3.27e-09	0.000335	0.0134	0.00759	0.00124	0.000965	1.03e-05	4.01e-06	0.00162
MW-20S	C - USCU	Second Reaction	1.85e-08	2.44e-09	0.000335	0.0134	0.00759	0.00157	0.000982	1.13e-05	3.54e-06	0.00150
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000145	0.00580	0.00109	0.000256	0.000482	1.69e-05	1.60e-05	0.000873
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000145	0.00580	0.00109	0.000328	0.000440	3.89e-05	2.62e-05	0.00113
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000145	0.00580	0.00109	0.000270	0.000453	2.49e-05	2.10e-05	0.000781
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000250	0.0100	0.00693	0.000563	0.000757	4.27e-05	2.88e-05	0.00145
MW-12	C - UA	First Reaction	2.03e-08	2.49e-09	0.000145	0.00580	0.00109	0.000631	0.000489	3.56e-06	1.39e-06	0.000686
MW-12	C - UA	Second Reaction	1.89e-08	1.88e-09	0.000145	0.00580	0.00109	0.000792	0.000472	4.43e-06	1.33e-06	0.000648
MW-28	C - UA	First Reaction	2.65e-08	2.60e-09	0.000145	0.00580	0.00109	0.000612	0.000404	4.13e-06	1.37e-06	0.000884
MW-28	C - UA	Second Reaction	2.04e-08	2.09e-09	0.000145	0.00580	0.00109	0.000735	0.000393	4.59e-06	1.23e-06	0.000826
MW-32	C - UA	First Reaction	2.07e-08	2.41e-09	0.000145	0.00580	0.00109	0.000674	0.000463	5.01e-06	1.73e-06	0.000606
MW-32	C - UA	Second Reaction	1.88e-08	1.79e-09	0.000145	0.00580	0.00109	0.000850	0.000450	6.15e-06	1.63e-06	0.000574
MW-20S	C - USCU	First Reaction	2.01e-08	3.05e-09	0.000250	0.0100	0.00693	0.000994	0.000728	7.92e-06	2.91e-06	0.00118
MW-20S	C - USCU	Second Reaction	1.86e-08	2.28e-09	0.000250	0.0100	0.00693	0.00125	0.000730	8.93e-06	2.61e-06	0.00110
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000245	0.00980	0.00858	0.000432	0.000815	2.85e-05	2.70e-05	0.00148
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000245	0.00980	0.00858	0.000554	0.000744	6.57e-05	4.43e-05	0.00192
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000245	0.00980	0.00858	0.000455	0.000765	4.21e-05	3.54e-05	0.00132
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000425	0.0170	0.00825	0.000957	0.00129	7.25e-05	4.89e-05	0.00246
MW-12	C - UA	First Reaction	2.14e-08	3.87e-09	0.000245	0.00980	0.00858	0.000916	0.000815	5.35e-06	2.39e-06	0.00119
MW-12	C - UA	Second Reaction	1.88e-08	3.91e-09	0.000245	0.00980	0.00858	0.00119	0.000817	6.43e-06	2.21e-06	0.00111
MW-28	C - UA	First Reaction	3.06e-08	3.02e-09	0.000245	0.00980	0.00858	0.000911	0.000675	6.87e-06	2.55e-06	0.00155
MW-28	C - UA	Second Reaction	2.18e-08	2.33e-09	0.000245	0.00980	0.00858	0.00112	0.000677	6.84e-06	2.07e-06	0.00143
MW-32	C - UA	First Reaction	2.21e-08	2.91e-09	0.000245	0.00980	0.00858	0.000975	0.000769	7.60e-06	3.01e-06	0.00105
MW-32	C - UA	Second Reaction	1.89e-08	2.06e-09	0.000245	0.00980	0.00858	0.00128	0.000775	9.10e-06	2.77e-06	0.000976
MW-20S	C - USCU	First Reaction	2.11e-08	3.54e-09	0.000425	0.0170	0.00825	0.00149	0.00121	1.26e-05	5.14e-06	0.00208
MW-20S	C - USCU	Second Reaction	1.88e-08	2.66e-09	0.000425	0.0170	0.00825	0.00188	0.00125	1.35e-05	4.50e-06	0.00193
MW-12	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	3.32e-08	3.81e-09	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	1.12e-08	3.80e-09	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000200	0.00800	0.00238	0.000353	0.000665	2.33e-05	2.20e-05	0.00120
MW-28	C - UA	Speciation Model	3.32e-08	3.81e-09	0.000200	0.00800	0.00238	0.000452	0.000608	5.36e-05	3.61e-05	0.00156
MW-32	C - UA	Speciation Model	1.12e-08	3.80e-09	0.000200	0.00800	0.00238	0.000372	0.000624	3.44e-05	2.89e-05	0.00108
MW-20S	C - USCU	Speciation Model	1.12e-08	3.80e-09	0.000335	0.0134	0.00759	0.000754	0.00101	5.72e-05	3.85e-05	0.00194
MW-12	C - UA	First Reaction	2.08e-08	2.83e-09	0.000200	0.00800	0.00238	0.000799	0.000672	4.55e-06	1.92e-06	0.000961
MW-12	C - UA	Second Reaction	1.88e-08	2.10e-09	0.000200	0.00800	0.00238	0.00103	0.000663	5.69e-06	1.84e-06	0.000895
MW-28	C - UA	First Reaction	2.87e-08	2.81e-09	0.000200	0.00800	0.00238	0.000787	0.000556	5.49e-06	1.94e-06	0.00124
MW-28	C - UA	Second Reaction	2.12e-08	2.20e-09	0.000200	0.00800	0.00238	0.000963	0.000550	6.00e-06	1.72e-06	0.00115
MW-32	C - UA	First Reaction	2.14e-08	2.67e-09	0.000200	0.00800	0.00238	0.000852	0.000634	6.45e-06	2.41e-06	0.000847
MW-32	C - UA	Second Reaction	1.88e-08	1.92e-09	0.000200	0.00800	0.00238	0.00110	0.000630	7.94e-06	2.28e-06	0.000790
MW-20S	C - USCU	First Reaction	2.06e-08	3.31e-09	0.000335	0.0134	0.00759	0.00124	0.000966	1.02e-05	3.98e-06	0.00161
MW-20S	C - USCU	Second Reaction	1.86e-08	2.47e-09	0.000335	0.0134	0.00759	0.00157	0.000983	1.13e-05	3.53e-06	0.00150

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	m_Hfo_ wOSiO(OH)2-	m_Hfo_wHCO3	m_Hfo_wCO3-	m_Hfo_wPO4-2	m_Hfo_wHPO4-	m_Hfo_wH2PO4	m_Hfo_sCO3-	m_Hfo_sHCO3	m_Hfo_sHPO4-	m_Hfo_sH2BO3
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000285	0.00300	0.000268	3.27e-05	0.000149	1.15e-05	1.01e-07	1.13e-06	5.61e-08	1.37e-10
MW-28	C - UA	Speciation Model	0.000521	0.00237	0.000299	3.51e-06	1.13e-05	6.23e-07	7.25e-08	5.75e-07	2.75e-09	2.92e-10
MW-32	C - UA	Speciation Model	0.000286	0.00323	0.000325	4.13e-06	1.67e-05	1.15e-06	1.32e-07	1.32e-06	6.82e-09	7.43e-11
MW-20S	C - USCU	Speciation Model	0.000664	0.00483	0.000607	1.96e-05	6.34e-05	3.48e-06	1.47e-07	1.17e-06	1.54e-08	1.15e-10
MW-12	C - UA	First Reaction	0.000547	0.00206	0.000451	6.57e-05	0.000122	3.86e-06	1.05e-07	4.80e-07	2.85e-08	1.01e-10
MW-12	C - UA	Second Reaction	0.000672	0.00163	0.000463	7.74e-05	0.000111	2.69e-06	1.02e-07	3.59e-07	2.44e-08	8.44e-11
MW-28	C - UA	First Reaction	0.000826	0.00170	0.000437	5.88e-06	9.32e-06	2.51e-07	8.94e-08	3.48e-07	1.91e-09	1.07e-10
MW-28	C - UA	Second Reaction	0.000955	0.00137	0.000435	6.69e-06	8.57e-06	1.87e-07	8.61e-08	2.71e-07	1.70e-09	8.15e-11
MW-32	C - UA	First Reaction	0.000545	0.00223	0.000550	8.16e-06	1.34e-05	3.76e-07	1.09e-07	4.42e-07	2.67e-09	7.17e-11
MW-32	C - UA	Second Reaction	0.000671	0.00177	0.000567	9.57e-06	1.21e-05	2.62e-07	1.02e-07	3.19e-07	2.19e-09	6.36e-11
MW-20S	C - USCU	First Reaction	0.000998	0.00375	0.000869	3.07e-05	5.39e-05	1.61e-06	1.21e-07	5.21e-07	7.49e-09	1.11e-10
MW-20S	C - USCU	Second Reaction	0.00116	0.00313	0.000910	3.54e-05	4.95e-05	1.18e-06	1.10e-07	3.77e-07	5.97e-09	1.14e-10
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000482	0.00507	0.000453	5.52e-05	0.000251	1.94e-05	1.71e-07	1.91e-06	9.47e-08	2.32e-10
MW-28	C - UA	Speciation Model	0.000880	0.00401	0.000505	5.93e-06	1.92e-05	1.05e-06	1.22e-07	9.71e-07	4.64e-09	4.93e-10
MW-32	C - UA	Speciation Model	0.000483	0.00546	0.000549	6.97e-06	2.83e-05	1.95e-06	2.23e-07	2.22e-06	1.15e-08	1.25e-10
MW-20S	C - USCU	Speciation Model	0.00113	0.00820	0.00103	3.33e-05	0.000108	5.92e-06	2.51e-07	1.99e-06	2.61e-08	1.95e-10
MW-12	C - UA	First Reaction	0.000829	0.00386	0.000735	0.000101	0.000216	7.83e-06	1.47e-07	7.73e-07	4.33e-08	2.37e-10
MW-12	C - UA	Second Reaction	0.000997	0.00318	0.000787	0.000120	0.000198	5.53e-06	1.41e-07	5.71e-07	3.55e-08	2.40e-10
MW-28	C - UA	First Reaction	0.00129	0.00318	0.000729	9.22e-06	1.64e-05	4.96e-07	1.39e-07	6.05e-07	3.12e-09	3.09e-10
MW-28	C - UA	Second Reaction	0.00147	0.00267	0.000751	1.05e-05	1.52e-05	3.74e-07	1.35e-07	4.80e-07	2.74e-09	2.86e-10
MW-32	C - UA	First Reaction	0.000825	0.00417	0.000898	1.26e-05	2.38e-05	7.65e-07	1.58e-07	7.35e-07	4.20e-09	1.40e-10
MW-32	C - UA	Second Reaction	0.000992	0.00344	0.000962	1.49e-05	2.17e-05	5.37e-07	1.39e-07	4.98e-07	3.14e-09	1.44e-10
MW-20S	C - USCU	First Reaction	0.00157	0.00687	0.00143	4.86e-05	9.50e-05	3.16e-06	2.19e-07	1.05e-06	1.45e-08	1.81e-10
MW-20S	C - USCU	Second Reaction	0.00180	0.00595	0.00152	5.57e-05	8.85e-05	2.39e-06	2.04e-07	7.95e-07	1.18e-08	1.87e-10
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000393	0.00414	0.000370	4.51e-05	0.000205	1.59e-05	1.39e-07	1.56e-06	7.73e-08	1.90e-10
MW-28	C - UA	Speciation Model	0.000718	0.00327	0.000412	4.84e-06	1.56e-05	8.59e-07	9.99e-08	7.93e-07	3.79e-09	4.03e-10
MW-32	C - UA	Speciation Model	0.000394	0.00446	0.000448	5.69e-06	2.31e-05	1.59e-06	1.82e-07	1.82e-06	9.40e-09	1.02e-10
MW-20S	C - USCU	Speciation Model	0.000889	0.00647	0.000814	2.62e-05	8.49e-05	4.67e-06	1.97e-07	1.57e-06	2.06e-08	1.54e-10
MW-12	C - UA	First Reaction	0.000707	0.00302	0.000611	8.58e-05	0.000173	5.93e-06	1.38e-07	6.81e-07	3.90e-08	1.63e-10
MW-12	C - UA	Second Reaction	0.000857	0.00245	0.000645	0.000102	0.000158	4.15e-06	1.36e-07	5.15e-07	3.32e-08	1.50e-10
MW-28	C - UA	First Reaction	0.00109	0.00249	0.000600	7.77e-06	1.32e-05	3.79e-07	1.21e-07	5.03e-07	2.66e-09	1.86e-10
MW-28	C - UA	Second Reaction	0.00125	0.00205	0.000610	8.87e-06	1.22e-05	2.83e-07	1.19e-07	4.00e-07	2.37e-09	1.56e-10
MW-32	C - UA	First Reaction	0.000704	0.00327	0.000746	1.07e-05	1.91e-05	5.78e-07	1.43e-07	6.26e-07	3.66e-09	1.07e-10
MW-32	C - UA	Second Reaction	0.000853	0.00266	0.000788	1.26e-05	1.73e-05	4.03e-07	1.33e-07	4.47e-07	2.91e-09	1.04e-10
MW-20S	C - USCU	First Reaction	0.00128	0.00525	0.00115	3.95e-05	7.38e-05	2.34e-06	1.68e-07	7.69e-07	1.08e-08	1.45e-10
MW-20S	C - USCU	Second Reaction	0.00148	0.00447	0.00121	4.55e-05	6.82e-05	1.74e-06	1.55e-07	5.70e-07	8.70e-09	1.50e-10
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000285	0.00300	0.000270	3.31e-05	0.000150	1.15e-05	9.98e-08	1.11e-06	5.53e-08	1.34e-10
MW-28	C - UA	Speciation Model	0.000521	0.00237	0.000300	3.54e-06	1.14e-05	6.24e-07	7.18e-08	5.68e-07	2.73e-09	2.87e-10
MW-32	C - UA	Speciation Model	0.000287	0.00324	0.000327	4.19e-06	1.69e-05	1.15e-06	1.31e-07	1.29e-06	6.75e-09	7.26e-11
MW-20S	C - USCU	Speciation Model	0.000664	0.00483	0.000610	1.97e-05	6.36e-05	3.49e-06	1.46e-07	1.16e-06	1.52e-08	1.13e-10
MW-12	C - UA	First Reaction	0.000545	0.00206	0.000450	6.61e-05	0.000123	3.89e-06	1.02e-07	4.65e-07	2.78e-08	9.76e-11
MW-12	C - UA	Second Reaction	0.000670	0.00163	0.000463	7.79e-05	0.000111	2.71e-06	9.90e-08	3.48e-07	2.38e-08	8.13e-11
MW-28	C - UA	First Reaction	0.000825	0.00170	0.000437	5.91e-06	9.37e-06	2.52e-07	8.80e-08	3.42e-07	1.89e-09	1.05e-10
MW-28	C - UA	Second Reaction	0.000953	0.00137	0.000435	6.72e-06	8.62e-06	1.88e-07	8.48e-08	2.67e-07	1.68e-09	8.03e-11
MW-32	C - UA	First Reaction	0.000544	0.00223	0.000550	8.23e-06	1.36e-05	3.80e-07	1.05e-07	4.26e-07	2.59e-09	6.84e-11
MW-32	C - UA	Second Reaction	0.000669	0.00177	0.000567	9.65e-06	1.22e-05	2.64e-07	9.83e-08	3.07e-07	2.13e-09	6.07e-11
MW-20S	C - USCU	First Reaction	0.000995	0.00375	0.000869	3.08e-05	5.42e-05	1.62e-06	1.18e-07	5.07e-07	7.34e-09	1.07e-10
MW-20S	C - USCU	Second Reaction	0.00116	0.00313	0.000909	3.55e-05	4.98e-05	1.18e-06	1.07e-07	3.66e-07	5.83e-09	1.10e-10
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000482	0.00507	0.000457	5.59e-05	0.000253	1.94e-05	1.69e-07	1.87e-06	9.34e-08	2.26e-10
MW-28	C - UA	Speciation Model	0.000880	0.00401	0.000507	5.98e-06	1.93e-05	1.05e-06	1.21e-07	9.60e-07	4.61e-09	4.86e-10
MW-32	C - UA	Speciation Model	0.000484	0.00547	0.000553	7.07e-06	2.85e-05	1.95e-06	2.21e-07	2.19e-06	1.14e-08	1.23e-10
MW-20S	C - USCU	Speciation Model	0.00113	0.00821	0.00104	3.35e-05	0.000108	5.92e-06	2.48e-07	1.97e-06	2.59e-08	1.91e-10
MW-12	C - UA	First Reaction	0.000826	0.00385	0.000735	0.000102	0.000217	7.89e-06	1.41e-07	7.40e-07	4.17e-08	2.26e-10
MW-12	C - UA	Second Reaction	0.000994	0.00318	0.000786	0.000121	0.000199	5.57e-06	1.35e-07	5.46e-07	3.42e-08	2.29e-10
MW-28	C - UA	First Reaction	0.00129	0.00318	0.000729	9.27e-06	1.65e-05	4.98e-07	1.36e-07	5.93e-07	3.07e-09	3.02e-10
MW-28	C - UA	Second Reaction	0.00147	0.00267	0.000751	1.06e-05	1.53e-05	3.76e-07	1.32e-07	4.70e-07	2.70e-09	2.81e-10
MW-32	C - UA	First Reaction	0.000823	0.00416	0.000897	1.27e-05	2.40e-05	7.71e-07	1.52e-07	7.04e-07	4.06e-09	1.33e-10
MW-32	C - UA	Second Reaction	0.000990	0.00344	0.000962	1.50e-05	2.19e-05	5.42e-07	1.33e-07	4.75e-07	3.03e-09	1.37e-10
MW-20S	C - USCU	First Reaction	0.00157	0.00687	0.00143	4.88e-05	9.55e-05	3.17e-06	2.13e-07	1.03e-06	1.43e-08	1.75e-10
MW-20S	C - USCU	Second Reaction	0.00179	0.00595	0.00152	5.59e-05	8.89e-05	2.40e-06	1.99e-07	7.75e-07	1.16e-08	1.81e-10
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0.000394	0.00414	0.000373	4.57e-05	0.000207	1.59e-05	1.38e-07	1.53e-06	7.62e-08	1.85e-10
MW-28	C - UA	Speciation Model	0.000718	0.00328	0.000414	4.88e-06	1.57e-05	8.60e-07	9.91e-08	7.84e-07	3.76e-09	3.96e-10
MW-32	C - UA	Speciation Model	0.000395	0.00446	0.000451	5.77e-06	2.33e-05	1.59e-06	1.81e-07	1.79e-06	9.31e-09	1.00e-10
MW-20S	C - USCU	Speciation Model	0.000889	0.00647	0.000818	2.64e-05	8.53e-05	4.67e-06	1.96e-07	1.55e-06	2.04e-08	1.51e-10
MW-12	C - UA	First Reaction	0.000704	0.00302	0.000610	8.64e-05	0.000174	5.98e-06	1.33e-07	6.57e-07	3.79e-08	1.57e-10
MW-12	C - UA	Second Reaction	0.000854	0.00245	0.000644	0.000103	0.000159	4.18e-06	1.31e-07	4.97e-07	3.23e-08	1.44e-10
MW-28	C - UA	First Reaction	0.00109	0.00250	0.000600	7.81e-06	1.32e-05	3.81e-07	1.19e-07	4.95e-07	2.62e-09	1.83e-10
MW-28	C - UA	Second Reaction	0.00124	0.00205	0.000611	8.92e-06	1.22e-05	2.84e-07	1.17e-07	3.93e-07	2.34e-09	1.53e-10
MW-32	C - UA	First Reaction	0.000702	0.00327	0.000745	1.08e-05	1.92e-05	5.83e-07	1.37e-07	6.02e-07	3.55e-09	1.02e-10
MW-32	C - UA	Second Reaction	0.000851	0.00266	0.000788	1.27e-05	1.75e-05	4.07e-07	1.27e-07	4.29e-07	2.82e-09	9.87e-11
MW-20S	C - USCU	First Reaction	0.00128	0.00525	0.00114	3.97e-05	7.41e-05	2.35e-06	1.64e-07	7.50e-07	1.06e-08	1.40e-10
MW-20S	C - USCU	Second Reaction	0.00147	0.00447	0.00121	4.57e-05	6.86e-05	1.75e-06	1.51e-07	5.55e-07	8.52e-09	1.45e-10

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	m_Hfo_sH2PO4	m_Hfo_sOSi(OH)3	m_Hfo_ sOSiO(OH)2-	m_Hfo_sOHSO4-2	m_Hfo_sSO4-	m_Hao_SO4-	m_Hao_OHSO4-2	m_Hao_H2BO3	m_Hao_H3BO4-	Ferrihydrite
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	4.34e-09	3.31e-07	1.07e-07	6.19e-09	5.89e-09	2.79e-14	0.000113	0.000806	1.53e-11	0.0286
MW-28	C - UA	Speciation Model	1.51e-10	2.76e-07	1.26e-07	9.27e-09	6.27e-09	1.55e-14	8.52e-05	0.000935	2.40e-11	0.0286
MW-32	C - UA	Speciation Model	4.69e-10	3.19e-07	1.16e-07	9.86e-09	8.36e-09	4.38e-14	0.000133	0.000725	1.03e-11	0.0286
MW-20S	C - USCU	Speciation Model	8.45e-10	3.52e-07	1.61e-07	1.02e-08	6.88e-09	1.85e-13	0.000875	0.00459	1.02e-10	0.0500
MW-12	C - UA	First Reaction	9.00e-10	1.60e-07	1.28e-07	8.33e-10	3.24e-10	4.95e-15	0.000145	0.000652	8.92e-11	0.0290
MW-12	C - UA	Second Reaction	5.93e-10	1.43e-07	1.48e-07	9.80e-10	2.93e-10	4.55e-15	0.000175	0.000547	9.83e-11	0.0290
MW-28	C - UA	First Reaction	5.13e-11	1.81e-07	1.69e-07	8.44e-10	2.80e-10	3.96e-15	0.000117	0.000741	1.02e-10	0.0290
MW-28	C - UA	Second Reaction	3.70e-11	1.64e-07	1.89e-07	9.09e-10	2.44e-10	3.97e-15	0.000152	0.000618	1.11e-10	0.0290
MW-32	C - UA	First Reaction	7.48e-11	1.21e-07	1.08e-07	9.98e-10	3.44e-10	5.72e-15	0.000156	0.000607	7.76e-11	0.0290
MW-32	C - UA	Second Reaction	4.72e-11	1.04e-07	1.21e-07	1.11e-09	2.95e-10	4.93e-15	0.000182	0.000519	8.97e-11	0.0290
MW-20S	C - USCU	First Reaction	2.24e-10	1.65e-07	1.39e-07	1.11e-09	4.07e-10	3.24e-14	0.000849	0.00441	5.40e-10	0.0500
MW-20S	C - USCU	Second Reaction	1.42e-10	1.33e-07	1.40e-07	1.08e-09	3.15e-10	2.53e-14	0.000895	0.00424	7.00e-10	0.0500
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	7.33e-09	5.59e-07	1.82e-07	1.05e-08	9.96e-09	2.20e-13	0.000892	0.00635	1.21e-10	0.0492
MW-28	C - UA	Speciation Model	2.55e-10	4.66e-07	2.13e-07	1.57e-08	1.06e-08	1.22e-13	0.000672	0.00737	1.89e-10	0.0492
MW-32	C - UA	Speciation Model	7.93e-10	5.40e-07	1.97e-07	1.67e-08	1.41e-08	3.45e-13	0.00105	0.00571	8.09e-11	0.0492
MW-20S	C - USCU	Speciation Model	1.44e-09	5.99e-07	2.74e-07	1.73e-08	1.17e-08	2.20e-13	0.00104	0.00546	1.21e-10	0.0847
MW-12	C - UA	First Reaction	1.57e-09	2.40e-07	1.66e-07	1.09e-09	4.85e-10	3.20e-14	0.000889	0.00605	7.86e-10	0.0490
MW-12	C - UA	Second Reaction	9.93e-10	1.99e-07	1.79e-07	1.16e-09	3.98e-10	2.57e-14	0.000957	0.00579	1.01e-09	0.0490
MW-28	C - UA	First Reaction	9.43e-11	2.95e-07	2.45e-07	1.31e-09	4.88e-10	2.29e-14	0.000614	0.00695	8.71e-10	0.0490
MW-28	C - UA	Second Reaction	6.73e-11	2.59e-07	2.65e-07	1.23e-09	3.73e-10	1.95e-14	0.000696	0.00662	1.11e-09	0.0490
MW-32	C - UA	First Reaction	1.35e-10	1.86e-07	1.46e-07	1.36e-09	5.36e-10	4.25e-14	0.00103	0.00552	6.27e-10	0.0490
MW-32	C - UA	Second Reaction	7.77e-11	1.41e-07	1.44e-07	1.32e-09	4.01e-10	3.19e-14	0.00108	0.00535	8.44e-10	0.0490
MW-20S	C - USCU	First Reaction	4.83e-10	3.18e-07	2.40e-07	1.94e-09	7.93e-10	4.46e-14	0.00100	0.00528	5.56e-10	0.0850
MW-20S	C - USCU	Second Reaction	3.19e-10	2.58e-07	2.40e-07	1.81e-09	6.02e-10	3.45e-14	0.00104	0.00512	7.21e-10	0.0850
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	5.98e-09	4.56e-07	1.48e-07	8.54e-09	8.13e-09	6.09e-14	0.000247	0.00176	3.34e-11	0.0395
MW-28	C - UA	Speciation Model	2.08e-10	3.80e-07	1.74e-07	1.28e-08	8.64e-09	3.39e-14	0.000186	0.00204	5.24e-11	0.0395
MW-32	C - UA	Speciation Model	6.48e-10	4.40e-07	1.61e-07	1.36e-08	1.15e-08	9.56e-14	0.000290	0.00158	2.24e-11	0.0395
MW-20S	C - USCU	Speciation Model	1.13e-09	4.72e-07	2.16e-07	1.36e-08	9.21e-09	2.02e-13	0.000959	0.00503	1.11e-10	0.0674
MW-12	C - UA	First Reaction	1.33e-09	2.17e-07	1.59e-07	1.03e-09	4.34e-10	1.01e-14	0.000280	0.00155	2.02e-10	0.0400
MW-12	C - UA	Second Reaction	8.72e-10	1.89e-07	1.80e-07	1.20e-09	3.88e-10	8.88e-15	0.000324	0.00140	2.38e-10	0.0400
MW-28	C - UA	First Reaction	7.64e-11	2.51e-07	2.20e-07	1.11e-09	3.93e-10	7.67e-15	0.000212	0.00177	2.29e-10	0.0400
MW-28	C - UA	Second Reaction	5.51e-11	2.25e-07	2.43e-07	1.17e-09	3.34e-10	7.34e-15	0.000265	0.00158	2.67e-10	0.0400
MW-32	C - UA	First Reaction	1.11e-10	1.63e-07	1.35e-07	1.24e-09	4.63e-10	1.23e-14	0.000310	0.00143	1.70e-10	0.0400
MW-32	C - UA	Second Reaction	6.79e-11	1.33e-07	1.44e-07	1.34e-09	3.84e-10	1.00e-14	0.000346	0.00131	2.12e-10	0.0400
MW-20S	C - USCU	First Reaction	3.43e-10	2.37e-07	1.88e-07	1.51e-09	5.87e-10	3.84e-14	0.000925	0.00484	5.45e-10	0.0670
MW-20S	C - USCU	Second Reaction	2.22e-10	1.91e-07	1.88e-07	1.44e-09	4.51e-10	2.99e-14	0.000968	0.00468	7.08e-10	0.0670
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	4.25e-09	3.22e-07	1.05e-07	6.23e-09	5.89e-09	2.80e-14	0.000113	0.000800	1.51e-11	0.0286
MW-28	C - UA	Speciation Model	1.49e-10	2.71e-07	1.25e-07	9.31e-09	6.27e-09	1.55e-14	8.40e-05	0.000934	2.37e-11	0.0286
MW-32	C - UA	Speciation Model	4.62e-10	3.12e-07	1.15e-07	9.96e-09	8.39e-09	4.40e-14	0.000133	0.000719	1.01e-11	0.0286
MW-20S	C - USCU	Speciation Model	8.35e-10	3.46e-07	1.59e-07	1.02e-08	6.89e-09	1.85e-13	0.000874	0.00456	1.01e-10	0.0500
MW-12	C - UA	First Reaction	8.79e-10	1.55e-07	1.23e-07	8.04e-10	3.13e-10	4.97e-15	0.000146	0.000647	8.91e-11	0.0290
MW-12	C - UA	Second Reaction	5.79e-10	1.39e-07	1.43e-07	9.48e-10	2.83e-10	4.57e-15	0.000176	0.000543	9.80e-11	0.0290
MW-28	C - UA	First Reaction	5.08e-11	1.78e-07	1.66e-07	8.30e-10	2.75e-10	3.96e-15	0.000117	0.000741	1.03e-10	0.0290
MW-28	C - UA	Second Reaction	3.66e-11	1.61e-07	1.86e-07	8.95e-10	2.40e-10	3.97e-15	0.000153	0.000617	1.11e-10	0.0290
MW-32	C - UA	First Reaction	7.27e-11	1.16e-07	1.04e-07	9.58e-10	3.30e-10	5.75e-15	0.000158	0.000603	7.73e-11	0.0290
MW-32	C - UA	Second Reaction	4.58e-11	9.97e-08	1.16e-07	1.07e-09	2.83e-10	4.94e-15	0.000183	0.000515	8.94e-11	0.0290
MW-20S	C - USCU	First Reaction	2.19e-10	1.60e-07	1.35e-07	1.07e-09	3.94e-10	3.25e-14	0.000858	0.00438	5.40e-10	0.0500
MW-20S	C - USCU	Second Reaction	1.39e-10	1.29e-07	1.36e-07	1.05e-09	3.06e-10	2.55e-14	0.000903	0.00421	6.98e-10	0.0500
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	7.18e-09	5.45e-07	1.78e-07	1.05e-08	9.95e-09	2.21e-13	0.000891	0.00630	1.19e-10	0.0492
MW-28	C - UA	Speciation Model	2.52e-10	4.59e-07	2.10e-07	1.57e-08	1.06e-08	1.22e-13	0.000662	0.00736	1.86e-10	0.0492
MW-32	C - UA	Speciation Model	7.80e-10	5.28e-07	1.94e-07	1.68e-08	1.42e-08	3.47e-13	0.00104	0.00566	7.98e-11	0.0492
MW-20S	C - USCU	Speciation Model	1.42e-09	5.89e-07	2.70e-07	1.74e-08	1.17e-08	2.20e-13	0.00104	0.00543	1.20e-10	0.0847
MW-12	C - UA	First Reaction	1.51e-09	2.29e-07	1.59e-07	1.03e-09	4.58e-10	3.20e-14	0.000903	0.00600	7.92e-10	0.0490
MW-12	C - UA	Second Reaction	9.57e-10	1.90e-07	1.71e-07	1.10e-09	3.80e-10	2.58e-14	0.000971	0.00575	1.01e-09	0.0490
MW-28	C - UA	First Reaction	9.27e-11	2.88e-07	2.40e-07	1.28e-09	4.75e-10	2.28e-14	0.000615	0.00694	8.75e-10	0.0490
MW-28	C - UA	Second Reaction	6.62e-11	2.53e-07	2.58e-07	1.21e-09	3.65e-10	1.95e-14	0.000698	0.00661	1.11e-09	0.0490
MW-32	C - UA	First Reaction	1.30e-10	1.78e-07	1.39e-07	1.29e-09	5.08e-10	4.25e-14	0.00104	0.00548	6.29e-10	0.0490
MW-32	C - UA	Second Reaction	7.49e-11	1.35e-07	1.37e-07	1.26e-09	3.83e-10	3.21e-14	0.00109	0.00530	8.43e-10	0.0490
MW-20S	C - USCU	First Reaction	4.74e-10	3.10e-07	2.34e-07	1.88e-09	7.68e-10	4.47e-14	0.00101	0.00525	5.56e-10	0.0850
MW-20S	C - USCU	Second Reaction	3.13e-10	2.51e-07	2.34e-07	1.76e-09	5.87e-10	3.47e-14	0.00105	0.00508	7.20e-10	0.0850
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	5.86e-09	4.45e-07	1.45e-07	8.59e-09	8.13e-09	6.12e-14	0.000247	0.00175	3.29e-11	0.0395
MW-28	C - UA	Speciation Model	2.06e-10	3.74e-07	1.72e-07	1.28e-08	8.65e-09	3.39e-14	0.000183	0.00204	5.16e-11	0.0395
MW-32	C - UA	Speciation Model	6.37e-10	4.31e-07	1.58e-07	1.37e-08	1.16e-08	9.60e-14	0.000289	0.00157	2.21e-11	0.0395
MW-20S	C - USCU	Speciation Model	1.12e-09	4.64e-07	2.13e-07	1.37e-08	9.23e-09	2.03e-13	0.000957	0.00499	1.10e-10	0.0674
MW-12	C - UA	First Reaction	1.30e-09	2.09e-07	1.53e-07	9.88e-10	4.17e-10	1.01e-14	0.000283	0.00154	2.02e-10	0.0400
MW-12	C - UA	Second Reaction	8.49e-10	1.82e-07	1.73e-07	1.16e-09	3.74e-10	8.92e-15	0.000327	0.00138	2.38e-10	0.0400
MW-28	C - UA	First Reaction	7.55e-11	2.47e-07	2.15e-07	1.09e-09	3.85e-10	7.66e-15	0.000213	0.00177	2.30e-10	0.0400
MW-28	C - UA	Second Reaction	5.44e-11	2.20e-07	2.38e-07	1.15e-09	3.29e-10	7.34e-15	0.000265	0.00158	2.67e-10	0.0400
MW-32	C - UA	First Reaction	1.08e-10	1.56e-07	1.29e-07	1.19e-09	4.44e-10	1.23e-14	0.000314	0.00142	1.70e-10	0.0400
MW-32	C - UA	Second Reaction	6.57e-11	1.28e-07	1.37e-07	1.28e-09	3.68e-10	1.01e-14	0.000349	0.00130	2.11e-10	0.0400
MW-20S	C - USCU	First Reaction	3.36e-10	2.31e-07	1.83e-07	1.46e-09	5.69e-10	3.85e-14	0.000934	0.00481	5.46e-10	0.0670
MW-20S	C - USCU	Second Reaction	2.17e-10	1.86e-07	1.83e-07	1.40e-09	4.39e-10	3.00e-14	0.000977	0.00465	7.07e-10	0.0670

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	d_Ferrihydrite	Gibbsite	d_Gibbsite	Barite	d_Barite	Calcite	d_Calcite	Dolomite (ordered)	d_Dolomite (ordered)	Gypsum
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.213	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	1.79e-06	0.0330	7.33e-07	4.16E-07	4.16E-07	1	0.00111	2	-1.56E-03	0
MW-12	C - UA	Second Reaction	1.69e-06	0.0330	7.25e-07	8.41E-07	4.24E-07	1	0.000943	2	-1.15E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.0330	7.30e-07	4.26E-07	4.26E-07	1	0.00109	2	-1.47E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.0330	7.23e-07	8.52E-07	4.26E-07	1	0.00092	2	-1.08E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.0330	7.33e-07	4.20E-07	4.20E-07	1	0.00109	2	-1.55E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.0330	7.25e-07	8.45E-07	4.25E-07	1	0.000926	2	-1.14E-03	0
MW-20S	C - USCU	First Reaction	1.72e-06	0.210	7.34e-07	4.31E-07	4.31E-07	0.0813	0.00128	0.0182	-1.81E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.210	7.29e-07	8.48E-07	4.17E-07	0.0823	0.00104	0.0169	-1.32E-03	0
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.246	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	2.21e-06	0.260	7.36e-07	4.21E-07	4.21E-07	1	0.0014	2	-1.97E-03	0
MW-12	C - UA	Second Reaction	1.57e-06	0.260	7.30e-07	8.31E-07	4.10E-07	1	0.00112	2	-1.41E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.260	7.33e-07	4.44E-07	4.44E-07	1	0.00139	2	-1.88E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.260	7.28e-07	8.54E-07	4.10E-07	1	0.0011	2	-1.34E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.260	7.36e-07	4.27E-07	4.27E-07	1	0.00139	2	-1.98E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.260	7.30e-07	8.42E-07	4.15E-07	1	0.00107	2	-1.38E-03	0
MW-20S	C - USCU	First Reaction	1.72e-06	0.250	7.37e-07	4.34E-07	4.34E-07	0.0814	0.00139	0.0179	-2.08E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.250	7.32e-07	8.46E-07	4.12E-07	0.0825	0.0011	0.0164	-1.50E-03	0
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.229	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	1.90e-06	0.0720	7.35e-07	4.14E-07	4.14E-07	1	0.00121	2	-1.74E-03	0
MW-12	C - UA	Second Reaction	1.64e-06	0.0720	7.28e-07	8.32E-07	4.18E-07	1	0.00102	2	-1.28E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.0720	7.32e-07	4.28E-07	4.28E-07	1	0.00119	2	-1.65E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.0720	7.26e-07	8.47E-07	4.19E-07	1	0.000992	2	-1.20E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.0720	7.35e-07	4.19E-07	4.19E-07	1	0.00119	2	-1.74E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.0720	7.28e-07	8.39E-07	4.20E-07	1	0.00099	2	-1.26E-03	0
MW-20S	C - USCU	First Reaction	1.72e-06	0.230	7.36e-07	4.32E-07	4.32E-07	0.0813	0.00134	0.018	-1.95E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.230	7.31e-07	8.46E-07	4.14E-07	0.0824	0.00107	0.0166	-1.41E-03	0
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.0332	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.213	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	1.81e-06	0.0330	7.33e-07	4.16E-07	4.16E-07	1	0.00111	2	-1.56E-03	0
MW-12	C - UA	Second Reaction	1.68e-06	0.0330	7.25e-07	8.41E-07	4.24E-07	1	0.000943	2	-1.15E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.0330	7.30e-07	4.26E-07	4.26E-07	1	0.00109	2	-1.47E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.0330	7.23e-07	8.52E-07	4.26E-07	1	0.00092	2	-1.08E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.0330	7.33e-07	4.20E-07	4.20E-07	1	0.00108	2	-1.55E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.0330	7.25e-07	8.45E-07	4.25E-07	1	0.000926	2	-1.14E-03	0
MW-20S	C - USCU	First Reaction	1.72e-06	0.210	7.34e-07	4.29E-07	4.29E-07	0.0813	0.00127	0.0182	-1.80E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.210	7.29e-07	8.46E-07	4.17E-07	0.0823	0.00104	0.0169	-1.31E-03	0
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.260	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.246	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	2.31e-06	0.260	7.36e-07	4.19E-07	4.19E-07	1	0.00138	2	-1.96E-03	0
MW-12	C - UA	Second Reaction	1.54e-06	0.260	7.30e-07	8.29E-07	4.10E-07	1	0.00112	2	-1.41E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.260	7.33e-07	4.43E-07	4.43E-07	1	0.00138	2	-1.87E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.260	7.28e-07	8.53E-07	4.10E-07	1	0.0011	2	-1.34E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.260	7.36e-07	4.25E-07	4.25E-07	1	0.00137	2	-1.96E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.260	7.30e-07	8.39E-07	4.15E-07	1	0.00107	2	-1.38E-03	0
MW-20S	C - USCU	First Reaction	1.73e-06	0.250	7.37e-07	4.32E-07	4.32E-07	0.0814	0.00138	0.0179	-2.07E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.250	7.32e-07	8.44E-07	4.12E-07	0.0825	0.0011	0.0164	-1.50E-03	0
MW-12	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-28	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-32	C - UA	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-20S	C - USCU	Initial Soln	0	0	0	0	0	0	0	0	0	0
MW-12	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-28	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-32	C - UA	Speciation Model	0	0.0722	0	0	0	1.02	0	1.79	0	0
MW-20S	C - USCU	Speciation Model	0	0.229	0	0	0	0.0785	0	0.0213	0	0
MW-12	C - UA	First Reaction	1.93e-06	0.0720	7.35e-07	4.13E-07	4.13E-07	1	0.00121	2	-1.74E-03	0
MW-12	C - UA	Second Reaction	1.62e-06	0.0720	7.28e-07	8.31E-07	4.18E-07	1	0.00102	2	-1.28E-03	0
MW-28	C - UA	First Reaction	1.72e-06	0.0720	7.32e-07	4.28E-07	4.28E-07	1	0.00119	2	-1.64E-03	0
MW-28	C - UA	Second Reaction	1.72e-06	0.0720	7.26e-07	8.47E-07	4.19E-07	1	0.000992	2	-1.20E-03	0
MW-32	C - UA	First Reaction	1.72e-06	0.0720	7.35e-07	4.19E-07	4.19E-07	1	0.00118	2	-1.73E-03	0
MW-32	C - UA	Second Reaction	1.72e-06	0.0720	7.28e-07	8.39E-07	4.20E-07	1	0.00099	2	-1.26E-03	0
MW-20S	C - USCU	First Reaction	1.72e-06	0.230	7.36e-07	4.30E-07	4.30E-07	0.0813	0.00132	0.0181	-1.94E-03	0
MW-20S	C - USCU	Second Reaction	1.72e-06	0.230	7.31e-07	8.45E-07	4.14E-07	0.0824	0.00107	0.0166	-1.41E-03	0

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

Attachment D. PHREEQC modeling output
Groundwater Polishing Report
Ash Pond
Kincaid Power Plant
Kincaid, IL

Location	Location Description	Model	d_Gypsum	si_Ferrihydrite	si_Gibbsite	si_Barite	si_Calcite	si_Dolomite (ordered)	si_Gypsum
MW-12	C - UA	Initial Soln	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Initial Soln	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Initial Soln	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Initial Soln	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	Speciation Model	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Speciation Model	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Speciation Model	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Speciation Model	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.51E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-12	C - UA	Initial Soln	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Initial Soln	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Initial Soln	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Initial Soln	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	Speciation Model	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Speciation Model	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Speciation Model	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Speciation Model	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.49E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.59E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.50E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.47E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.56E+00
MW-12	C - UA	Initial Soln	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Initial Soln	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Initial Soln	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Initial Soln	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	Speciation Model	0	1.16	1.22	0.833	-5.74E-01	-1.30E+00	-8.45E-01
MW-28	C - UA	Speciation Model	0	1.2	1.43	0.594	-3.67E-01	-8.44E-01	-4.67E-01
MW-32	C - UA	Speciation Model	0	0.954	1.28	0.627	-6.65E-01	-1.39E+00	-9.05E-01
MW-20S	C - USCU	Speciation Model	0	0.23	1.38	0.479	-4.41E-01	-9.33E-01	-8.18E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.49E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-12	C - UA	Initial Soln	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Initial Soln	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Initial Soln	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Initial Soln	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	Speciation Model	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Speciation Model	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Speciation Model	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Speciation Model	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.55E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.51E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-12	C - UA	Initial Soln	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Initial Soln	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Initial Soln	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Initial Soln	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	Speciation Model	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Speciation Model	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Speciation Model	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Speciation Model	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.49E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.59E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.51E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.48E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.56E+00
MW-12	C - UA	Initial Soln	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Initial Soln	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Initial Soln	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Initial Soln	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	Speciation Model	0	1.18	1.22	0.858	-5.58E-01	-1.27E+00	-8.24E-01
MW-28	C - UA	Speciation Model	0	1.21	1.43	0.609	-3.59E-01	-8.27E-01	-4.55E-01
MW-32	C - UA	Speciation Model	0	0.971	1.28	0.651	-6.51E-01	-1.36E+00	-8.84E-01
MW-20S	C - USCU	Speciation Model	0	0.245	1.38	0.497	-4.29E-01	-9.10E-01	-8.02E-01
MW-12	C - UA	First Reaction	0	0	0	0	0	0	-1.54E+00
MW-12	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-28	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-28	C - UA	Second Reaction	0	0	0	0	0	0	-1.58E+00
MW-32	C - UA	First Reaction	0	0	0	0	0	0	-1.52E+00
MW-32	C - UA	Second Reaction	0	0	0	0	0	0	-1.57E+00
MW-20S	C - USCU	First Reaction	0	0	0	0	0	0	-1.49E+00
MW-20S	C - USCU	Second Reaction	0	0	0	0	0	0	-1.57E+00

NOTES:
All model results are in units of moles with the exceptions of:
pH and pe (standard units)
charge (equivalents)
Results beginning with 'd_' (change from prior model step)
Results beginning with 'si_' (saturation index)

APPENDIX B
CORRECTIVE ACTION GROUNDWATER MONITORING PLAN

Intended for
Kincaid Generation, LLC
199 IL 104
Kincaid, IL 62540

Date
May 8, 2025

Project No.
1940110241-007

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN

KINCAID POWER PLANT, ASH POND, IEPA ID NO W0218140002-01

RAMBOLL Bright ideas. Sustainable change.

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN KINCAID POWER PLANT, ASH POND, IEPA ID NO W0218140002-01

Project name	**Kincaid Power Plant Ash Pond**
Project no.	**1940110241-007**
Recipient	**Kincaid Generation, LLC**
Document type	**Corrective Action Groundwater Monitoring Plan**
Revision	**FINAL**
Date	**May 8, 2025**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Brian G. Hennings, PG
Project Officer Hydrogeology

CONTENTS

TABLES (ATTACHED)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
AP	Ash Pond
BCU	Bedrock Confining Unit
CAAA	Corrective Action Alternatives Analysis
CCR	coal combustion residuals
COC	constituent of concern
CSM	conceptual site model
E001	Event 1
GMP	Groundwater Monitoring Plan
GWP	groundwater polishing
GWPS	groundwater protection standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
KPP	Kincaid Power Plant
LCU	lower confining unit
NID	National Inventory of Dams
No.	number
PMP	potential migration pathway
QA/QC	quality assurance/quality control
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RL	reporting limit
SI	surface impoundment
StAP	Statistical Analysis Plan
TDS	total dissolved solids
UA	uppermost aquifer
UCL	upper confidence level
USCU	upper semi-confining unit
USEPA	United States Environmental Protection Agency

1. INTRODUCTION

1.1 Overview

In accordance with requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845: Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments, Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Corrective Action Groundwater Monitoring Plan (GMP) on behalf of Kincaid Power Plant (KPP), operated by Kincaid Generation, LLC. This GMP will apply specifically to the coal combustion residuals (CCR) Unit referred to as the Kincaid Ash Pond (AP), CCR identification (ID) number (No.) 141, Illinois Environmental Protection Agency (IEPA) ID No. W0218140002-01, and National Inventory of Dams (NID) No. IL50706. The Kincaid Ash Pond is a 172-acre, unlined surface impoundment (SI) used to manage CCR and non-CCR waste streams at the KPP. Its total storage capacity is approximately 3,560 acre-feet. This Corrective Action GMP includes 35 I.A.C. § 845 content requirements specific to 35 I.A.C. § 845.630 (*Groundwater Monitoring System*), 35 I.A.C. § 845.640 (*Groundwater Sampling and Analysis*), 35 I.A.C. § 845.650 (*Groundwater Monitoring Program*), and 35 I.A.C. § 845.680 (*Implementation of the Corrective Action Plan*) for the AP at the KPP.

A checklist in **Table 1-1** provides references to sections, tables, and figures within this document that meet the specific requirements of 35 I.A.C. § 845.630, 35 I.A.C. § 845.640, 35 I.A.C. § 845.650, and 35 I.A.C. § 845.680.

This Corrective Action GMP will be included as Appendix B to the Corrective Action Plan for the KPP AP. The Corrective Action Plan proposes source control (*i.e.,* closure of the AP) followed by groundwater polishing (GWP) as the remedy for the AP. As described in the Corrective Action Plan, the proposed remedy meets the performance standards of 35 I.A.C. § 845.670(d) and addresses all current and potential future releases from the AP. Likewise, this Corrective Action GMP establishes how data will be collected, documented, and evaluated to assess remedy effectiveness for all currently documented and potential future releases from the AP[1] per the process outlined in **Figure 1-1**.

Adaptive site management strategies are an integral part of corrective action groundwater monitoring. The adaptive site management approach consistent with National Research Council, Interstate Technology & Regulatory Council and United States Environmental Protection Agency (USEPA) methodologies will allow timely incorporation of new site information throughout corrective action to ensure the achievement of the groundwater protection standard (GWPS). The adaptive site management approach expedites progress toward meeting the GWPS while acknowledging uncertainties, such as the persistence of current groundwater flow directions and potential related changes in geochemical conditions. The structured decision-making process proposed in this Corrective Action GMP includes specific metrics used to evaluate remedy progress, criteria which would trigger adaptive management evaluation, and options for those management actions.

1.2 Site Location and Background

The KPP is located in the southwest quarter of Section 1, and the northeast quarter of Section 12, Township 13 North, Range 4 West, along West Route 104, Christian County, Illinois and

[1] The presence of exceedances at the waste boundary will continue to be evaluated under the Operating permit GMP previously submitted to IEPA [3].

approximately four miles west of the Village of Kincaid. The KPP operates as a coal-fired power plant and has a single CCR management unit, the AP (**Figure 1-2**), a 172-acre, unlined SI used to manage CCR and non-CCR waste streams at the KPP with a total storage capacity of approximately 3,560 acre-feet. The AP is located between two lobes of Sangchris Lake (**Figure 1-3**), which was formed in 1964 by damming Clear Creek, a tributary to the south fork of the Sangamon River. Sangchris Lake was created to provide a source of cooling water for the KPP. The western lobe of Sangchris Lake forms part of the western and northern border of the AP and is connected to an intake flume for the KPP on the western edge of the AP. A discharge flume from the KPP forms the southern border of Kincaid Ash Pond and is connected to the eastern lobe of Sangchris Lake. The KPP property is surrounded by the lobes of Sangchris Lake and Sangchris Lake State Park to the north and east, and a combination of undeveloped land and surface support facilities associated with the former Peabody Coal Company #10 mine to the south and west.

1.3 Conceptual Site Model

Significant site investigation has been completed at the KPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the AP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (HCR) [1] included in the Operating Permit Application[2] and the Nature and Extent Report [2][3]. A conceptual site model (CSM) has been developed and is discussed below.

In addition to the CCR present at the AP, there are three principal layers of unlithified material present above the bedrock, which are categorized into the hydrostratigraphic units described below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Semi-Confining Unit (USCU)/Potential Migration Pathway (PMP):** Low permeability clay with some silt and minor sand, silt layers, and occasional discontinuous sand lenses. Includes the lithologic layers identified as the Cahokia Formation. Sand lenses with higher permeability within the USCU are more likely to facilitate contaminant migration and these materials are referred to as the PMPs.
- **Uppermost Aquifer (UA)**: Thin (generally less than 4 feet), moderate permeability sand, silty sand, and clayey sand and gravel units, which includes the unconfined clays and silts of the Upper Cahokia Formation, where saturated, and the thin, moderate permeability sands and gravels of the Lower Cahokia Formation, which, at some locations also includes the interface with the Vandalia Till.
- **Lower Confining Unit (LCU):** Underlying the aquifer unit is dense grey clay till; this till is easily distinguished during investigation by difficult drilling and/or refusal and is apparent on boring logs. The till was encountered at elevations ranging from approximately 570 to 583.5 feet[4]. The LCU is comprised of low permeability silt and clay with minor sand, silt

[2] The HCR was previously included as Attachment H of the Kincaid Ash Pond Operating Permit Application, submitted to IEPA on October 25, 2021.
[3] The Nature and Extent Report was previously submitted to IEPA and is provided with updates as Appendix D of the Corrective Action Alternatives Analysis (CAAA). The CAAA serves as Appendix A to the Corrective Action Plan to which this report is attached.
[4] All elevations in this report are referenced to North American Vertical Datum of 1988 unless otherwise noted.

layers, and occasional discontinuous sand lenses (more frequently near the top of the unit) identified as the Vandalia Till.

- **Bedrock Confining Unit (BCU)**: This unit is composed of interbedded shale and limestone of the Bond Formation that underlie the Vandalia Till, and is present beneath the entire AP. Using locations where bedrock was encountered, the elevation of the top of bedrock is highest at MW-20 (548.02 feet) beneath the eastern portion of the AP and declines in elevation to the west toward MW-12D (540.68 feet) and to the south toward KIN-B005 (520 feet).

The UA potentiometric surface map for the August 2024 groundwater monitoring event as presented in **Figure 1-4** indicates that there is a groundwater divide beneath the AP running from approximately the southwest corner to the northeast corner of the unit. Generally, these groundwater elevations result in horizontal groundwater flow in the UA to the northwest and southeast toward the lobes of Sangchris Lake. Localized flow toward historic drainage features that were present prior to construction of the ash pond (*i.e.,* near MW-7/7S and MW-27, MW-28, and MW-31) is also observed on the west and north side of the unit.

There also appears to be a component of groundwater flow to the south and east toward the discharge flume that flows to the eastern lobe of Sangchris Lake as evidenced by groundwater elevations from USCU monitoring wells on the southern side of the AP being consistently below the screen interval of MW-11S (591-595 feet); this monitoring well was consistently dry during 2021 groundwater monitoring. These observations also suggest a groundwater divide beneath the AP which appears in both USCU and UA monitoring wells.

1.4 Groundwater Quality

Groundwater monitoring in accordance with the proposed Operating GMP and sampling methodologies provided in the operating permit application for groundwater compliance at the AP began in the second quarter of 2023 [3]. The proposed compliance monitoring wells yield groundwater samples that represent the quality of downgradient groundwater at the CCR boundary (as required in 35 I.A.C. § 845.630(a)(2)).

The Event 1 (E001) quarterly groundwater monitoring event was completed on June 13, 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), and the statistical analysis plan submitted with the operating permit application (Appendix A of the Groundwater Monitoring Plan) constituent concentrations observed at compliance wells were evaluated for compliance with the GWPSs summarized in 35 I.A.C. § 845.600 to determine exceedances[5] of the GWPS. The following GWPS exceedances at compliance groundwater monitoring wells were identified [4]:

- Boron at wells MW-12, and MW-28
- Sulfate at wells MW-20S, MW-28, and MW-32
- Total dissolved solids (TDS) at well MW-28

[5] Throughout this document, “exceedance” or “exceedances” is intended to refer only to potential exceedances of proposed applicable background statistics or Groundwater Protection Standards (GWPSs) as described in the proposed groundwater monitoring program, which was submitted to the IEPA on October 25, 2021 as part of Kincaid Generation, LLC’s operating permit application for the KPP AP. That operating permit application, including the proposed groundwater monitoring program, remains under review by the IEPA and therefore Kincaid Generation, LLC has not identified any actual exceedances.

The subsequent compliance sampling events were evaluated for exceedances of the GWPS as described in 35 I.A.C. § 845.600 [5, 6, 7, 8, 9, 10]. In addition to the exceedances listed above, the following exceedances were identified:

- Boron at well MW-7S
- Sulfate at well MW-7S

In accordance with 35 I.A.C. § 845.660, a Corrective Measures Assessment was developed to address current and potential future GWPS exceedances originating from the AP and was submitted to IEPA on May 12, 2024 [11]. The 35 I.A.C. § 845.650 groundwater monitoring requirements will continue to ensure that there will be timely detection of changes in groundwater. The selected remedy will meet the performance standards of 35 I.A.C. § 845.670(d) and once implemented and completed, the selected remedy presented in the Corrective Action Plan will attain the GWPSs.

1.5 Nature and Extent Investigation

A limited investigation was conducted in June 2024 to further assess the nature, degree, and extent of sulfate groundwater impacts downgradient of MW-20S. The following monitoring wells were installed downgradient of MW-20S to further delineate the sulfate above the GWPS:

- MW-33S, MW-34S, and MW-35S

Soil lithology was logged continuously from borings completed at the above locations, and soil samples were collected from each boring for laboratory analysis from within the screened interval of each well and from the soil just above the screened interval (in cases where the lithology of this soil was different than the material in the screened interval). Soil samples were analyzed for total metals by 7-step sequential extraction procedure, bulk mineralogy and clay mineralogy by x-ray diffraction, loss on ignition, and cation exchange capacity.

Additionally, groundwater at the three new delineation wells and one existing well (PZ-4A) used for delineation was sampled and analyzed for 35 I.A.C. § 845.600 parameters, major ions, and dissolved iron and manganese. An evaluation of the data is provided in the Addendum to the Nature and Extent Report.[6]

[6] The Nature and Extent Report was previously submitted to IEPA [2] and is provided with updates as Appendix D of the CAAA. The CAAA serves as Appendix A to the Corrective Action Plan to which this report is attached.

2. CORRECTIVE ACTION GROUNDWATER MONITORING PLAN

This Corrective Action GMP is being provided to propose a groundwater monitoring program specific to the AP that will comply with 35 I.A.C. § 845.680. The Corrective Action GMP will monitor and evaluate groundwater quality specifically to document the effectiveness of the corrective action remedy. The groundwater monitoring program will include sampling and analysis procedures that are consistent and that provide an accurate representation of groundwater quality.

2.1 Corrective Action Groundwater Monitoring Program and Parameters

2.1.1 35 I.A.C. § 845 Corrective Action Groundwater Monitoring

The proposed 35 I.A.C. § 845 corrective action monitoring well network will consist of thirteen wells to document the effectiveness of the corrective action remedy and ultimately demonstrate compliance with GWPSs (**Figure 2-1**). The wells included in the corrective action monitoring well network include select compliance monitoring wells from the Operating GMP network (*e.g.*, those with previously reported exceedances of the GWPS) (**Section 1.4**) and monitoring wells installed during the Nature and Extent Investigation (**Section 1.5**).

As appropriate to meet the corrective action monitoring objectives and evaluate the effectiveness of the corrective action remedy (as described in **Section 3**), the corrective action monitoring program involves assigning each well to a monitoring category or purpose (**Table 2-1**). These monitoring categories include:

- **Inside Plume**: monitoring wells installed at the CCR boundary with GWPS exceedances.
- **Plume Definition**: wells located along the lateral or vertical boundary of the plume.

A summary of the well locations and associated purpose as it relates to the above categories is presented in **Table 2-1** and **Figure 2-1**. Monitoring well depths and construction details are listed in **Table 2-2**, and boring logs and monitoring well construction forms are provided in **Appendix A**. Groundwater samples will be collected and analyzed for the laboratory and field parameters in **Table 2-3**. Laboratory parameters include major ions for evaluating groundwater chemistry and constituents of concern (COCs) (*i.e.*, reported exceedances in accordance with the Operating GMP) the Corrective Action is intended to address. Sampling to evaluate corrective action effectiveness will begin the quarter after the corrective action remedy is implemented and commissioned.

2.2 Sampling Schedule

All wells in the corrective action GMP network, as presented in **Table 2-1**, will be sampled quarterly to provide a complete picture of corrective action effectiveness. Groundwater elevations will be determined at the time of sample collection from each well. Sampling will end in accordance with 35 I.A.C. § 845.680(c), when compliance with the GWPS has been demonstrated “at all points within the plume of contamination that lies beyond the waste boundary […] for a period of three consecutive years” (details in **Section 3.3**).

Consistent with 35 I.A.C. § 845.650(b)(4), quarterly sampling may be reduced to a semiannual frequency with IEPA approval after completion of five years of monitoring. A request for reduced sampling frequency will include a demonstration that corrective action monitoring effectiveness will not be compromised; sufficient data has been collected to evaluate ongoing remedy effectiveness; and existing data show trends consistent with anticipated remedy performance (details in **Section 3.1**).

2.3 Groundwater Sample Collection

Groundwater sampling procedures have been developed and the collection of groundwater samples is being implemented to meet the requirements of 35 I.A.C. § 845.640. In addition to groundwater well samples, quality assurance samples will be collected as described in **Section 2.5** (**Table 2-3**). Groundwater samples will be collected and analyzed in accordance with the Multi-Site Sampling and Analysis Plan [12].[7]

2.4 Laboratory Analysis

Laboratory analysis will be performed consistent with the requirements of 35 I.A.C. § 845.640(j) by a state-certified laboratory using methods approved by IEPA and USEPA. Laboratory methods may be modified based on laboratory equipment availability or procedures, but the Reporting Limit (RL) for all parameters analyzed, regardless of method, will be lower than the applicable groundwater quality standard [13]. Concentrations lower than the RL will be reported as less than the RL.

2.5 Quality Assurance Program

Consistent with the requirements of 35 I.A.C. § 845.640(a)(5), the sampling and analysis program includes procedures and techniques for quality assurance/quality control (QA/QC).[7] Additional quality assurance samples to be collected will include the following:

- Field duplicates will be collected at a frequency of one per group of ten or fewer investigative water samples.
- One equipment blank sample will be collected and analyzed for each day of sampling. If dedicated sampling equipment is used, then equipment blank samples will not be collected.
- The duplicate and equipment blank quality assurance samples will be supplemented by the laboratory QA/QC program, which typically includes:
  - Regular generation of instrument calibration curves to assure instrument reliability
  - Laboratory control samples and/or quality control check standards that have been spiked, and analyses to monitor the performance of the analytical method
  - Matrix spike/matrix spike duplicate analyses to determine percent recoveries and relative percent differences for each of the parameters detected
  - Analysis of replicate samples to check the precision of the instrumentation and/or methodology employed for all analytical methods
  - Analysis of method blanks to assure that the system is free of contamination

Water quality meters used to measure pH and turbidity will be calibrated according to manufacturer's specifications. At a minimum, it is recommended that calibration of pH occur daily

[7] The Multi-Site Sampling and Analysis Plan and Multi-Site Quality Assurance Project plan are living documents which are subject to routine evaluation and updates in accordance with USEPA recommended best practices [20, 21]

prior to sampling and checked for accuracy at the end of each day. Unusual or suspect pH measurements during sampling events will be flagged, evaluated, and additional calibration may be performed throughout the sampling events. Turbidity meters will be checked daily, prior to and following sampling. Unusual measurements or erratic meter performance will be flagged and evaluated for overall effects on the data prior to reporting.

2.6 Groundwater Monitoring Well Maintenance Plan

Consistent with the requirements of 35 I.A.C. § 845.630(e)(2), maintenance will be performed according to the Multi-Site Sampling and Analysis Plan [12] as needed to assure that the monitoring wells provide representative groundwater samples. Monitoring wells will be inspected during each groundwater sampling event; inspections will consist of the following:

- Visual inspection, clearing of vegetation, replacement of markers, and painting of protective casings as needed to assure that monitoring wells are clearly marked and accessible
- Visual inspection and repair or replacement of well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved
- Visual inspection and repair or replacement of protective casings as needed to assure that they are undamaged, and that locks are present and functional
- Checks to assure that well caps are intact and vented, unless in flood-prone areas, in which case caps will not be vented
- Routine measurement of monitoring well depths to determine the degree of siltation within the wells. Wells will be redeveloped as needed to remove siltation from the screened interval if it impedes flow of water into the well
- Checks to assure that wells are clear of internal obstructions, and flow freely

If wells are damaged or become otherwise inoperable, they will be replaced by wells screened at the same elevation and as close to the original well as possible (ideally within 10 feet) and notification will be provided to IEPA. If a replacement well cannot be installed within approximately 10 feet of the original well location, notification will be sent to IEPA and a monitoring well will be installed as close as possible to the original monitoring well and given a new well identification number. Any well replacement activities will also be documented in the Annual Groundwater Monitoring and Corrective Action Report.

2.7 Statistical Analysis

A Multi-Site Statistical Analysis Plan (StAP) (**Appendix B**) has been developed to summarize the statistical procedures that will be used to evaluate the groundwater results.

2.8 Data Reporting

Groundwater monitoring and analysis completed in accordance with 35 I.A.C. § 845 under an approved monitoring program will be reported to IEPA annually by January 31 as required by I.A.C. § 845.550, for data collected the preceding year. The Annual Groundwater Monitoring and Corrective Action Report will include the status of the groundwater monitoring and Corrective Action Plan for the AP in addition to other requirements detailed in 35 I.A.C. § 845.610(e).

2.9 Compliance with Applicable Groundwater Protection Standards

As provided in 35 I.A.C. § 845.680(c)(2), corrective action is considered complete when compliance with the GWPS has been achieved by demonstrating that concentration of constituents listed in 35 I.A.C. § 845.600 have not exceeded the GWPSs for a period of three consecutive years, using the statistical procedures and performance standards in 35 I.A.C. § 845.640(f) and (g).

Attainment of GWPSs and conclusion of corrective action monitoring is discussed below in **Section 3.3**.

If a new exceedance is determined during monitoring under the Operating GMP, the Corrective Action groundwater monitoring program will be evaluated for monitoring of additional locations and/or constituents using the adaptive site management methods presented herein.

3. EFFECTIVENESS OF THE CORRECTIVE ACTION REMEDY

The methods for evaluating the effectiveness of the corrective action remedy described in this section are based on the following guidance documents:

- "Methods for Evaluating the Attainment of Cleanup Standards Volume 2: Ground Water," USEPA, Office of Policy, Planning, and Evaluation, 1992. [14]
- "Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind," USEPA, Office of Solid Waste and Emergency Response, 2014. [15]
- "Adaptive Site Management – A Framework for Implementing Adaptive Management at Contaminated Sediment Superfund Sites," USEPA, Office of Superfund Remediation and Technology Innovation, 2022. [16]
- "Environmental Cleanup Best Management Practices: Effective Use of the Project Life Cycle Conceptual Site Model," USEPA, Office of Solid Waste and Emergency Response, 2011. [17]

Evaluation of corrective action remedy effectiveness will occur in three phases (**Figure 3-1**): remedy progress evaluation, stability evaluation, and attainment evaluation [14].

1. Remedy progress evaluation occurs after implementation of corrective actions to assess if the remedy is functioning as anticipated.
2. The stability evaluation, which assesses if a new post-treatment steady state in the groundwater has been reached.
3. Attainment evaluation occurs after a new steady state has been achieved and assesses if COC concentrations are below the GWPS.

COCs are parameters with exceedances of the GWPS to be addressed by the Corrective Action Plan. Corrective action monitoring at KPP AP includes the following COC parameters:

- Boron, sulfate, and TDS.

The effectiveness of the remedy at each phase is evaluated using performance metrics designed to assess the goals of that phase. Performance metrics answer questions designed to evaluate multiple aspects of remedy effectiveness with the ultimate goal of holistically guiding management decisions [15]. These metrics may be evaluated using qualitative (subject to expert judgement) or quantitative (numerical outcomes) methods.

This section details the goals and performance metrics of each phase of remedy evaluation. Within each phase, the well groups described in **Section 2.1** have distinct applicable metrics and/or potential management actions consistent with the role of that well group within the corrective action monitoring framework. The remedy evaluation metrics documented here are specific to wells within the Corrective Action monitoring program.

3.1 Remedy Progress Evaluation

The goal of remedy process evaluation is to determine if a groundwater remedy is on track to achieve cleanup standards within the proposed time frame and to inform adaptive management decisions if performance metrics are not achieved. Evaluation of remedy progress includes evaluating the response of COCs in individual monitoring wells and in the plume as a whole. Remedy progress is evaluated using performance metrics as described below. **Table 3-1** details the questions used to assess remedy progress and metrics which would trigger additional evaluation of adaptive site management options. **Figure 3-2** presents an outline of the decision-making process regarding adaptive management actions (the first step of which is assessing remedy progress per **Table 3-1**).

Documentation of remedy progress metrics will be provided in the Annual Groundwater Monitoring and Corrective Action Report (**Section 2.8**) beginning after the second year of data collection: a minimum of eight data points is required to complete meaningful statistical analysis required for evaluation of the remedy progress metrics, which will be available after two years of quarterly sampling. Per USEPA guidance [15], a thorough review of corrective action progress and remedy effectiveness will be conducted every five years. A Five-Year Annual Groundwater Monitoring and Corrective Action Report will evaluate the comprehensive data set and, if triggered by the results of the remedy progress evaluation metrics (**Table 3-1**), evaluate whether adaptive management actions are needed (**Figure 3-2**). The five-year time frame allows adaptive management decisions to be based on robust data sufficient to complete meaningful statistical analysis while remaining responsive to changing site conditions [15]. The remedy progress evaluation metrics and triggers for additional evaluation are described below.

3.1.1 Comparison to Groundwater Protection Standard

The Inside Plume wells in this monitoring plan were defined based on exceedances of the GWPS. The question posed to evaluate whether exceedances of the GWPS occur, and associated method of evaluation is (**Table 3-1**):

- Are COC concentrations greater than the GWPS? – Compare data points or summary statistics to site-specific GWPS values.

COC concentrations below the GWPS Inside Plume wells may indicate that remedial actions are approaching completion and that moving to the next phase of remedy effectiveness evaluation may be warranted (see **Section 3.2**). Persistence of COC concentrations above the GWPS in Plume Definition wells may indicate that the plume is no longer properly delineated. Therefore, the trigger criterion for further evaluation is a central tendency measure of the last eight data points exceeding the GWPS.

3.1.2 Agreement with Groundwater Model

A groundwater flow and transport model[8] was used to compare the anticipated time to reach the GWPS for the different corrective actions considered at the AP.

The question posed to evaluate agreement of corrective action remedy progress with the groundwater model results is provided in **Table 3-1** and summarized below:

- Are concentrations of COCs at individual wells consistent with modeling expectations? – Evaluate if the observed results track with the predicted results in general direction and magnitude using expert professional judgement.

Only Inside Plume and Plume Definition wells included in the flow and transport model are evaluated according to this metric. Trigger criteria for additional adaptive site management

[8] The Groundwater Modeling Technical Memorandum is included as an attachment to the Corrective Actions Alternative Assessment Analysis Supporting Information Report which is attached to CAAA presented as part of the Corrective Action Plan.

evaluation include monitoring results failing to follow the general magnitude and direction of groundwater model results at one or more locations. It is acceptable to conclude that no further adaptive site management evaluation is triggered if future observations do not precisely match modeled results on an individual well basis if the direction of remedy progress is adequate.

3.1.3 Trend Analysis

Evaluation of COC trends in wells both within and outside of the plume is a major component of remedy progress evaluations [14, 15]. Decreasing COC concentrations within the groundwater plume provides critical support for remedy effectiveness evaluations. Changing concentrations in wells defining the plume may indicate unanticipated plume migration or a need for better plume definition. Both short-term and long-term trends are important to evaluate remedy performance [14]. All trend analyses are performed in accordance with the Multi-Site StAP (**Appendix B**) and the USEPA Unified Guidance for groundwater statistics [18].

The questions posed to evaluate if COC concentrations are decreasing in Inside Plume wells and the associated methods for evaluation are provided in **Table 3-1** and summarized as follows:

- Are average plume COC concentrations decreasing? – Evaluate trend based on quarterly average of COC concentrations of Inside Plume wells, both for the last eight sampling events and since corrective action was initiated.

The questions posed to evaluate if COC concentrations are changing in Inside Plume wells and Plume Definition wells and the associated methods for evaluation are provided in **Table 3-1** and summarized below:

- Are concentrations of COCs at individual wells changing? – Evaluate trend of COC concentrations, both for the last eight sampling events and since corrective action was initiated.

The goal of the corrective action is to reduce COC concentrations in the groundwater. Therefore, trigger criteria have been established for the two types of corrective action monitoring wells as follows:

- Inside Plume well triggers for adaptive site management evaluation are based on no decreasing trend in COC concentrations (short-term or long-term).
- Plume Definition well triggers are based on increasing COC concentrations, which may indicate improper delineation of the plume. Therefore, the trigger criterion for adaptive site management evaluation at Plume Definition wells is increasing short- or long-term trend.

3.1.4 Adaptive Management Actions

The goal of adaptive management actions is to understand why performance metrics are not met and, if the remedy is found to be unsuccessful in meeting remediation goals, drive supplemental corrective actions or, in extreme cases, re-evaluation of remedy selection. This section describes in greater detail the steps in the flow chart presented in **Figure 3-2** (adapted from Figure 2 in [15]).

As the remedy progress evaluation metrics are evaluated annually, failure to meet the metrics (as described in **Table 3-1**) leads to further action. If the data available at the time of the Five-Year Review are anticipated to be inadequate for determining the need for adaptive site management actions, additional data may be collected before the Five-Year Review including collecting samples from additional wells or measuring additional parameters.

If the remedy progress is not found to be adequate during the Five-Year Review, the most critical question is whether or not the remedy is likely to achieve the GWPS in a reasonable time frame. This may be evaluated using methods such as regression analysis or analysis of groundwater flow. If the remedy progress is not judged to be adequate but the remedy is likely to achieve the GWPS in a reasonable time frame, the CSM or the groundwater model may require updating to reflect evolving field conditions[9]. Additional data collected may also suggest ways to optimize the monitoring network or performance metrics [15].

If the remedy does not appear likely to achieve the GWPS in a reasonable time frame, it may be due to changing hydrogeochemical dynamics within the plume or an additional source of COCs not accounted for in the CSM. If available data suggests either occurrence, the Five-Year Review will describe additional activities planned to investigate if the existing remedy is still a viable option for attaining the GWPS. If the remedy is still viable, an update to the CSM and groundwater model is likely required [15, 17] and will be conducted after additional investigation is completed.

If the remedy does not appear likely to achieve the GWPS in a reasonable time frame, there is no alternative source of COCs not accounted for in the CSM, and the plume is appropriately delineated; or if the investigation into the hydrogeochemical changes or alternative source of COCs determines that the remedial action is no longer solely viable as a corrective action, an evaluation of additional remedial actions will be initiated.

If the remedy progress evaluation metrics indicate that concentrations across the monitoring network are below the GWPS, the remedy progress phase may be considered complete, and the monitoring program may move to the Stability Evaluation phase (see **Section 3.2**).

3.2 Stability Evaluation

Evaluation of groundwater stability reflects the idea that implementation of a remedy will, by necessity, cause changes to the physical and chemical environment of the groundwater. Before assessing if compliance with the GWPS has been attained (**Section 3.3**), any transient effects of treatment on the groundwater (e.g., rebounding concentrations) should be allowed to dissipate [14]. Stability is evaluated to assess if a new stable equilibrium has been reached after final closure has been implemented. Stability is achieved when groundwater elevations are stable (accounting for seasonal variability), average COC concentrations are stable across all wells, and COC concentrations are stable at each well.

Trends in groundwater elevation and COC concentrations at each plume well will be evaluated using the most recent eight data points (*i.e.*, two years of data when sampling quarterly) according to methods presented in the Multi-Site StAP (**Appendix B**). This metric is met for a plume well when there is no statistically significant trend in groundwater elevation or COC concentrations.

[9] As stated in Section 1.4.1 of the Corrective Action Plan, “Estimated times to reach GWPS will be periodically reviewed and updated based on observed corrective action performance via an adaptive site management strategy.”

Plume COC concentrations will be evaluated for trend using the most recent eight data points, with the average concentration across plume wells per sampling event considered as one data point, according to methods presented in the Multi-Site StAP (**Appendix B**). This metric is met when there is no statistically significant trend in average COC concentrations.

3.3 Attainment Evaluation and Conclusion of Corrective Action Monitoring

The ultimate goal of groundwater corrective action is to attain compliance with the GWPS for each COC in Inside Plume wells. After stability has been achieved per the metrics discussed in **Section 3.2**, attainment evaluation will begin. Per 35 I.A.C. § 845.680(c), corrective action is considered complete when compliance with the GWPS has been demonstrated "at all points within the plume of contamination that lies beyond the waste boundary […] for a period of three consecutive years". Attainment of the GWPS will be evaluated in accordance with the Multi-Site StAP (**Appendix B**). Corrective Action monitoring is considered complete for the site when COCs in the corrective action monitoring network do not exceed the GWPS for three years.

4. REFERENCES

[1] Ramboll Americas Engineering Solutions, Inc., Hydrogeologic Site Characterization Report. Kincaid Power Plant, Ash Pond, Kincaid, Illinois. Kincaid Generation, LLC, October 25, 2021.

[2] Ramboll Americas Engineering Solutions, Inc., Nature and Extent Report, Kincaid Power Plant, Ash Pond , IEPA ID No. W0218140002-01, May 12, 2024.

[3] Ramboll Americas Engineering Solutions, Inc., Groundwater Monitoring Plan, Kincaid Power Plant, Ash Pond, Kincaid, Illinois, October 25, 2021.

[4] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances, 2023 Quarter 2, Ash Pond, Kincaid Power Plant, Kincaid, Illinois, September 15, 2023.

[5] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 3, 2023: Ash Pond, Kincaid Power Plant, Kincaid, Illinois., December 12, 2023.

[6] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 4, 2023: Ash Pond, Kincaid Power Plant, Kincaid, Illinois., March 3, 2024.

[7] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 1, 2024: Ash Pond, Kincaid Power Plant, Kincaid, Illinois, June 3, 2024.

[8] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 2, 2024: Ash Pond, Kincaid Power Plant, Kincaid, Illinois, August 18, 2024.

[9] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 3, 2024: Ash Pond, Kincaid Power Plant, Kincaid, Illinois, November 18, 2024.

[10] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845.610(B)(3)(D) Groundwater Monitoring Data and Detected Exceedances Quarter 4, 2024: Ash Pond, Kincaid Power Plant, Kincaid, Illinois, February 25, 2025.

[11] Ramboll Americas Engineering Solutions, Inc., 35 I.A.C. § 845 Corrective Measures Assessment, Kincaid Power Plant, Ash Pond, IEPA ID: W021814002-01, May 12, 2024.

[12] Ramboll Americas Engineering Solutions, Inc., "Multi-Site Sampling and Analysis Plan", December 28, 2022. [Online]. Available: https://www.luminant.com/documents/ccr/il-ccr/Kincaid/2023/Multi-Site%20Sampling%20Analysis%20Plan-Kincaid-W0218140002%E2%80%9001.pdf.

[13] Ramboll Americas Engineering Solutions, Inc., "Multi-Site Quality Assurance Project Plan," December 28, 2022. [Online]. Available: https://www.luminant.com/documents/ccr/il-ccr/Kincaid/2023/Multi-site%20Quality%20Assurance%20Project%20Plan-Kincaid-W0218140002%E2%80%9001.pdf.

[14] United States Environmental Protection Agency, "Methods for Evaluating the Attainment of Cleanup Standards Volume 2: Groundwater," Office of Policy, Planning, and Evaluation, 1992.

[15] United States Environmental Protection Agency, "Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind," Office of Solid Waste and Emergency Response, 2014.

[16] United States Environmental Protection Agency, "Adaptive Site Management - A Framework for Implementing Adaptive Management at Contaminated Sediment Superfund Sites," Office of Superfund Remediation and Technology Innovation, 2022.

[17] United States Environmental Protection Agency, "Environmental Cleanup Best Management Practices: Effective Use of the Project Life Cycle Conceptual Site Model," Office of Solid Waste and Emergency Response, 2011.

[18] United States Environmental Protection Agency, "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance," Office of Resource Conservation and Recovery, 2009.

[19] United States Environmental Protection Agency, "Quality Assurance Project Plan Standard," https://www.epa.gov/system/files/documents/2024-04/quality_assurance_project_plan_standard.pdf, 2023.

[20] United States Environmental Protection Agency, "EPA QA Field Activities Procedure," https://www.epa.gov/system/files/documents/2022-09/epa_qa_field_activities_procedure.pdf, 2020.

TABLES

Table 1-1. 35 I.A.C. § 845 Requirements Checklist

Corrective Action Groundwater Monitoring Plan

Kincaid Power Plant

Ash Pond

Kincaid, IL

35 I.A.C. § 845 Reference	35 I.A.C. § 845 Components	Location of Information in Corrective Action GMP
845.630	**Groundwater Monitoring Systems**	
845.630(a)(2)	Potential contaminant pathways must be monitored.	NA
845.630(a) 845.630(b) 845.630(c)	At least two upgradient wells and four downgradient wells (min. 1 and 3, but requires additional documentation)	Section 2.1 Figure 1-4
845.630(a) 845.630(b) 845.630(c)	Downgradient Well Density	Figure 2-1
845.630(a)(2)	Downgradient wells at waste boundary	Figure 2-1
845.640	**Groundwater Sampling and Analysis Requirements**	
845.640(a)	Consistent sampling and analysis procedures	Section 2 Tables 2-1 and 2-3
845.640(b)	Methods are appropriate	Section 2 Tables 2-1 and 2-3
845.640(c)	Groundwater elevations must be measured in each well prior to purging, each time groundwater is sampled.	Section 2.2
845.640 (d)(e)(f)(g)(h)	Establishment of background and application of statistical methods	Section 2.6
845.640(i)	Analyze total recoverable metals	Sections 2.1 and Section 2.5
845.640(j)	Analyze groundwater samples using a certified laboratory	Section 2.4

Table 1-1. 35 I.A.C. § 845 Requirements Checklist
Corrective Action Groundwater Monitoring Plan
Kincaid Power Plant
Ash Pond
Kincaid, IL

35 I.A.C. § 845 Reference	35 I.A.C. § 845 Components	Location of Information in Corrective Action GMP
845.650	**Groundwater Monitoring Program**	
845.650(a)	Must include monitoring for all constituents with a groundwater protection standard in Section 845.600(a), calcium, and turbidity	Section 2.1
845.650(b)(c)	Groundwater Monitoring Frequency	Sections 2.1
845.650(d)(e)	Exceedances of the groundwater protection standard	Sections 3.1.1
845.650(b)(2) and (3)	Staff gauge/ piezometer to monitor head in impoundment	Section 1.3 Figure 1-4 (XSG-01)
NA	Staff gauge/ piezometer to monitor head of neighboring surface water body	Section 1.3 Figure 1-4 (SG-02)
845.680	**Implementation of the Corrective Action Plan**	
845.680(a)(1)(a)	Establish and implement a corrective action groundwater monitoring program that meets requirements of 845.650	Sections 2.1 and 3 Tables 2-1 and 3-1 Figure 2-1
845.680(a)(1)(b)	Document the effectiveness of the corrective action remedy	Section 3
845.680(a)(1)(c)	Demonstrate compliance with the groundwater protection standard under Subsection [845.680] (c)	Section 2.9

Table 1-1. 35 I.A.C. § 845 Requirements Checklist

Corrective Action Groundwater Monitoring Plan

Kincaid Power Plant

Ash Pond

Kincaid, IL

35 I.A.C. § 845 Reference	35 I.A.C. § 845 Components	Location of Information in Corrective Action GMP
845.680(c)(1)	Demonstrate compliance with the groundwater protection standards established by 845.600 has been achieved at all points within the plume of contamination that lies beyond the waste boundary	Section 2.9
845.680(c)(2)	Demonstrate that concentrations of constituents listed in 845.600 have not exceeded the groundwater protection standards for a period of three consecutive years using statistical procedures and performance standards in 845.640(f) and (g)	Section 3

[O: MJD 10/23/2024; C: MJD 04/11/2025]

Notes:

GMP = Groundwater Monitoring Plan

NA = Not Applicable

Table 2-1. Summary of Monitoring Well Locations and Purpose

Corrective Action Groundwater Monitoring Plan
Kincaid Power Plant
Ash Pond
Kincaid, IL

Well ID	Monitored Unit	Corrective Action Monitoring Well System	
		Inside Plume	Plume Definition
MW-4	UA		X
MW-5	UA		X
MW-6	UA		X
MW-7	UA		X
MW-7S	USCU	X	
MW-12	UA	X	
MW-12D	BCU		X
MW-20S	USCU	X	
MW-27	USCU		X
MW-28	UA	X	
MW-30	UA		X
MW-32	UA	X	
MW-34S	USCU		X

Notes:

[O: MJD 10/23/2024; C: CJC 11/06/2024]

BCU = bedrock confining unit
UA = uppermost aquifer
USCU = upper semi-confining unit

Table 2-2. Monitoring Well Locations and Construction Details

Corrective Action Groundwater Monitoring Plan
Kincaid Power Plant
Ash Pond
Kincaid, IL

Location	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft bgs)	Screen Bottom Depth (ft bgs)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft bgs)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
MW-4	UA	4/14/2010	600.79	600.79	Top of PVC	598.37	12	22	586.37	576.37	22	560.37	10	2	39.600751	-89.487354
MW-5	UA	4/22/2010	619.35	619.52	Top of PVC	617.69	30	40	587.69	577.69	40	541.69	10	2	39.601297	-89.490401
MW-6	UA	4/16/2010	600.24	600.41	Top of PVC	598.26	10	20	588.26	578.26	20	572.76	10	2	39.598639	-89.498944
MW-7	UA	4/16/2010	597.51	597.68	Top of PVC	595.82	10	20	585.82	575.82	20	569.32	10	2	39.597638	-89.498958
MW-7S	USCU	2/2/2021	597.38	597.55	Top of PVC	595.28	6	11	589.28	584.28	11	580.28	5	2	39.597653	-89.498977
MW-12	UA	7/23/2015	591.31	591.48	Top of PVC	588.99	15	25	573.99	563.99	25	563.99	10	2	39.600201	-89.496381
MW-12D	BCU	1/26/2021	590.89	591.06	Top of PVC	588.90	50	55	538.90	533.90	55	488.90	5	2	39.600188	-89.496418
MW-20S	USCU	1/26/2021	600.66	600.83	Top of PVC	598.27	4	10	594.27	588.27	10	588.27	6	2	39.598658	-89.487279
MW-27	USCU	2/2/2021	599.81	599.98	Top of PVC	596.97	10	15	586.97	581.97	15	576.97	5	2	39.596687	-89.497928
MW-28	UA	2/2/2021	601.32	601.49	Top of PVC	598.26	12	22	586.26	576.26	22	573.26	10	2	39.599251	-89.497962
MW-30	UA	2/3/2021	618.39	618.56	Top of PVC	615.93	35	40	580.93	575.93	40	570.93	5	2	39.601263	-89.493996
MW-32	UA	2/3/2021	619.36	619.53	Top of PVC	617.19	32	37	585.19	580.19	37	577.19	5	2	39.601279	-89.488644
MW-34S	USCU	6/6/2024	600.59	600.76	Top of PVC	597.51	5	15	592.51	582.51	15	582.51	10	2	39.598679	-89.486873

Notes:

[O: MJD 10/23/2024; C: CJC 11/06/2024]

All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
BCU = bedrock confining unit
bgs = below ground surface
CCR = coal combustion residuals
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
UA = uppermost aquifer
USCU = upper semi-confining unit

RAMBOLL

Table 2-3. Sampling and Analysis Summary
Corrective Action Groundwater Monitoring Plan
Kincaid Power Plant
Ash Pond
Kincaid, IL

Parameter	Analytical Method [1]	Number of Samples	Field Duplicates [2]	Field Blanks [3]	Equipment Blanks [3]	MS/MSD [4]	Total	Container Type	Minimum Volume [5]	Preservation (Cool to 4 °C for all samples)	Sample Hold Time from Collection Date
Corrective Action Parameter(s) [6]											
Boron	6020 [7]	13	2	0	0	1	16	plastic	600 mL	HNO_3 to pH<2	6 months
Sulfate	9036 or EPA 300	13	2	0	0	1	16	plastic	50 mL	Cool to 4 °C	28 days
Total Dissolved Solids	SM 2540 C	13	2	0	0	1	16	plastic	200 mL	Cool to 4 °C	7 days
Inorganic Parameters											
Alkalinity, bicarbonate	SM 2320 B	13	2	0	0	1	16	plastic	500 mL	Cool to 4 °C	14 days
Alkalinity, carbonate	SM 2320 B	13	2	0	0	1	16	plastic	500 mL	Cool to 4 °C	14 days
Calcium	6020 [7]	13	2	0	0	1	16	plastic	600 mL	HNO_3 to pH<2	6 months
Chloride	9251 or EPA 300	13	2	0	0	1	16	plastic	100 mL	Cool to 4 °C	28 days
Fluoride	9214 or EPA 300	13	2	0	0	1	16	plastic	300 mL	Cool to 4 °C	28 days
Magnesium	6020 [7]	13	2	0	0	1	16	plastic	600 mL	HNO_3 to pH<2	6 months
Potassium	6020 [7]	13	2	0	0	1	16	plastic	600 mL	HNO_3 to pH<2	6 months
Sodium	6020 [7]	13	2	0	0	1	16	plastic	600 mL	HNO_3 to pH<2	6 months
Field Parameters											
pH	SM 4500-H+ B	13	NA	NA	NA	NA	13	flow-through cell	NA	none	immediately
Dissolved Oxygen [8]	SM 4500-O/405.1	13	NA	NA	NA	NA	13	flow-through cell	NA	none	immediately
Temperature [8]	SM 2550	13	NA	NA	NA	NA	13	flow-through cell	NA	none	immediately
Oxidation/Reduction Potential [8]	SM 258O B	13	NA	NA	NA	NA	13	flow-through cell	NA	none	immediately
Specific Conductance [8]	SM 2510 B	13	NA	NA	NA	NA	13	flow-through cell	NA	none	immediately
Turbidity [9]	SM 2130 B	13	NA	NA	NA	NA	13	flow-through cell or hand-held turbidity meter	NA	none	immediately

[O: MJD 10/23/2024; C: CJC 11/06/2024]

Notes:
[1] Analytical method numbers are from SW-846 unless otherwise indicated. Analytical methods may be updated with more recent versions as appropriate.
[2] Field duplicates will be collected at a frequency of one per group of 10 or fewer investigative water samples. Field duplicates will not be collected for radium analysis.
[3] Field blanks will be collected at the discretion of the project manager; Equipment blanks will be collected at a rate of 1 per sampling event if non-dedicated equipment is used.
[4] Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will be collected at a frequency of one per group of 20 or fewer investigative water samples per CCR unit/multi-unit. Additional volume to be determined by laboratory.
[5] Sample volume is estimated and will be determined by the laboratory.
[6] Determined by reported exceedances under the Operating Groundwater Monitoring Plan
[7] Metals may be analyzed via ICP/ ICP-MS USEPA methods 6010 or 6020 depending on laboratory instrument availability.
[8] Parameter collected for quality assurance and quality control for field sampling purposes only; not required to be collected or reported under 35 IAC § 845; collection of parameter may be discontinued without notification.
[9] If turbidity exceeds 10 NTU, a duplicate sample filtered through a 0.45 micron filter may be collected for metals analysis in addition to the unfiltered sample. Both samples would be submitted for analysis.
< = less than
°C = degrees Celsius
HNO_3 = nitric acid
mL = milliliter
NA = not applicable
NTU = nephelometric turbidity unit

RAMBOLL

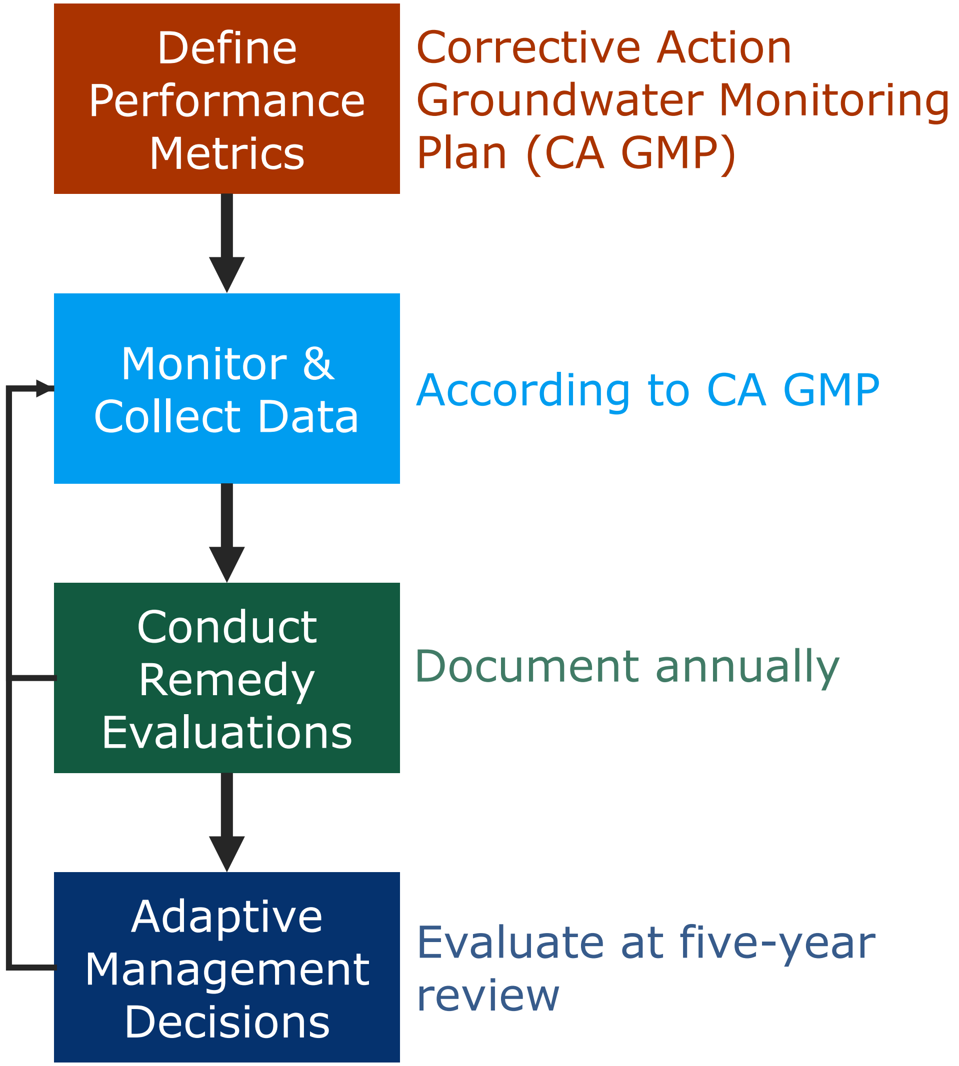
Table 3-1. Adaptive Site Management Metrics and Trigger Criteria
Corrective Action Groundwater Monitoring Plan
Kincaid Power Plant
Ash Pond
Kincaid, IL

QUESTION	**Are COC concentrations greater than the GWPS?**		**Are concentrations of COCs at individual wells consistent with modeling expectations?[a]**		**Are the average COC concentrations decreasing?**	**Are concentrations of COCs at individual wells changing?**	**Adaptive Site Management Outcome**
EVALUATION[b]	Compare data points or summary statistics to site-specific GWPS		Do the observed results track with the predicted results in general direction and magnitude? (Professional judgement)		Evaluate trend on quarterly average of well concentrations, both for last 8 data points and since corrective action initiated or closure completed	Evaluate trend of COCs at each well, both for last 8 data points and since corrective action initiated	
Inside Plume	Central tendency concentration of last eight data points above the GWPS	**AND**	Results inconsistent with model	**AND MORE THAN ONE OF**	Neither trend decreasing	Neither trend decreasing	**Additional Evaluation Triggered (See Figure 3-2)**
Lateral/Vertical Plume Definition	Central tendency concentration of last eight data points above the GWPS		Results inconsistent with model		--	Either trend increasing	

[O: CJC 10/23/2024; C: AOC 10/30/2024]

Notes:
[a] Only applies to wells included in the flow and transport model
[b] To be documented in Annual Monitoring and Corrective Action Reports
-- = No relevant trigger criteria
COC = constituent of concern
GWPS = groundwater protection standard

FIGURES



RAMBOLL

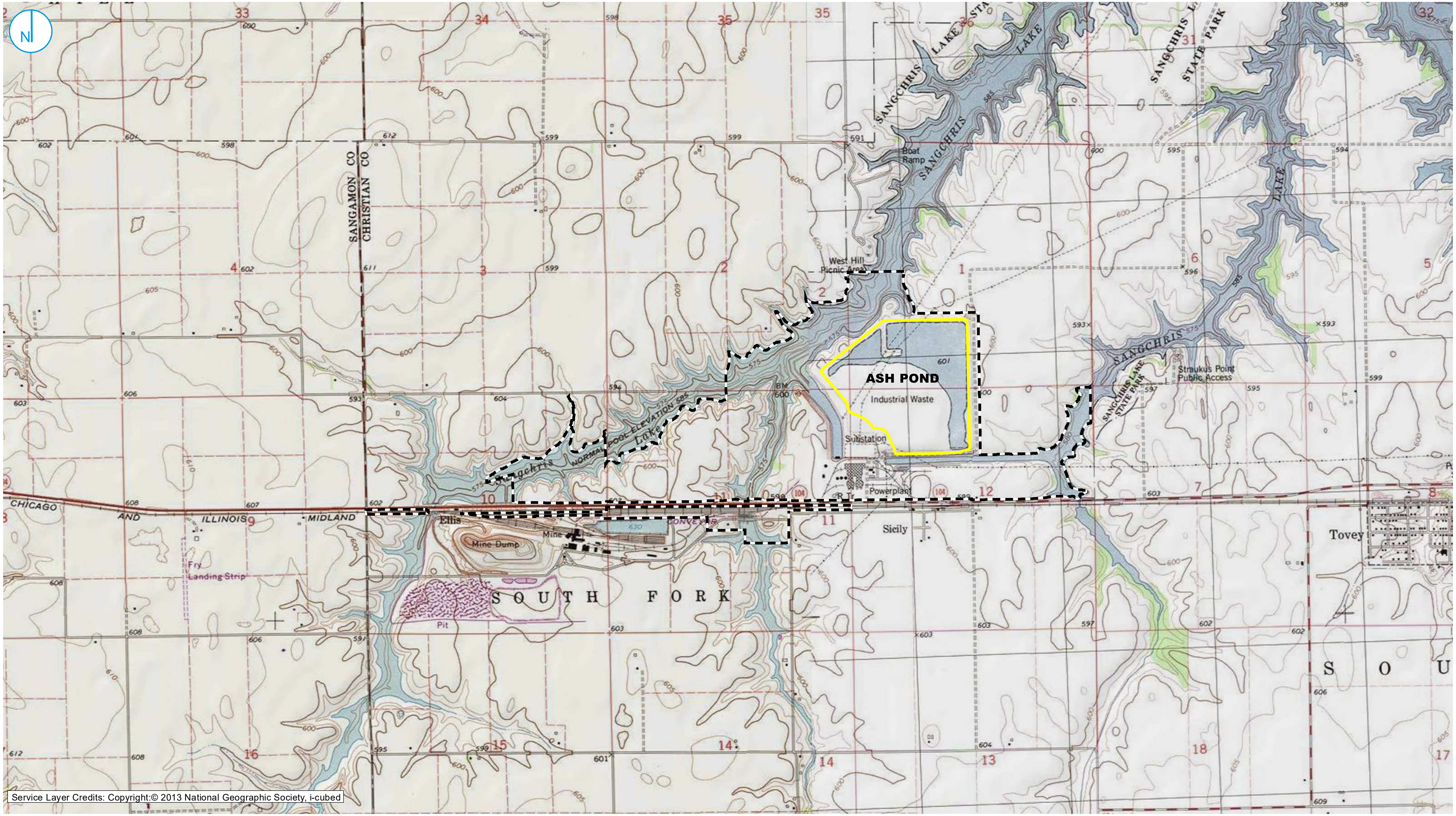
DRAFTED BY: AO 11/8/2024

CORRECTIVE ACTION MONITORING OUTLINE

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Figure 1-1

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Kincaid\Figure 1-1_Site Location Map.mxd



PROJECT: 169000XXXX | DATED: 8/5/2021 | DESIGNER: galarnmc

REGULATED UNIT (SUBJECT UNIT)

PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-2

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

SITE MAP

FIGURE 1-3

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
ASH POND

KINCAID POWER PLANT
KINCAID, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2024\Kincaid\2024_Kincaid_Pot_Map.aprx

PROJECT: 169000XXXX | DATED: 1/3/2025 | DESIGNER: PWYSIATKO

NOTES:

**SANGCHRIS LAKE ELEVATION OBTAINED FROM A TRANSDUCER MONITORING WATER LEVELS LOCATED NEAR PLANT INTAKE (SG-02). ELEVATION DATUM PRE-DATED NAVD88 AND WAS ASSUMED TO BE IN NGVD29. ELEVATION DATA WAS CONVERTED TO NAVD88. THE AVERAGE ELEVATION FROM NOVEMBER 18, 2024 WAS ESTIMATED TO THE NEAREST 0.01 FOOT.

1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATIONS IN BRACKETS WERE OBTAINED OUTSIDE OF THE 24 HOUR PERIOD FROM INITIATION OF DEPTH TO GROUNDWATER MEASUREMENTS BUT WITHIN THE SAME SAMPLING EVENT.
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
PORE WATER WELL
MONITORING WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY
GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

0 250 500 Feet

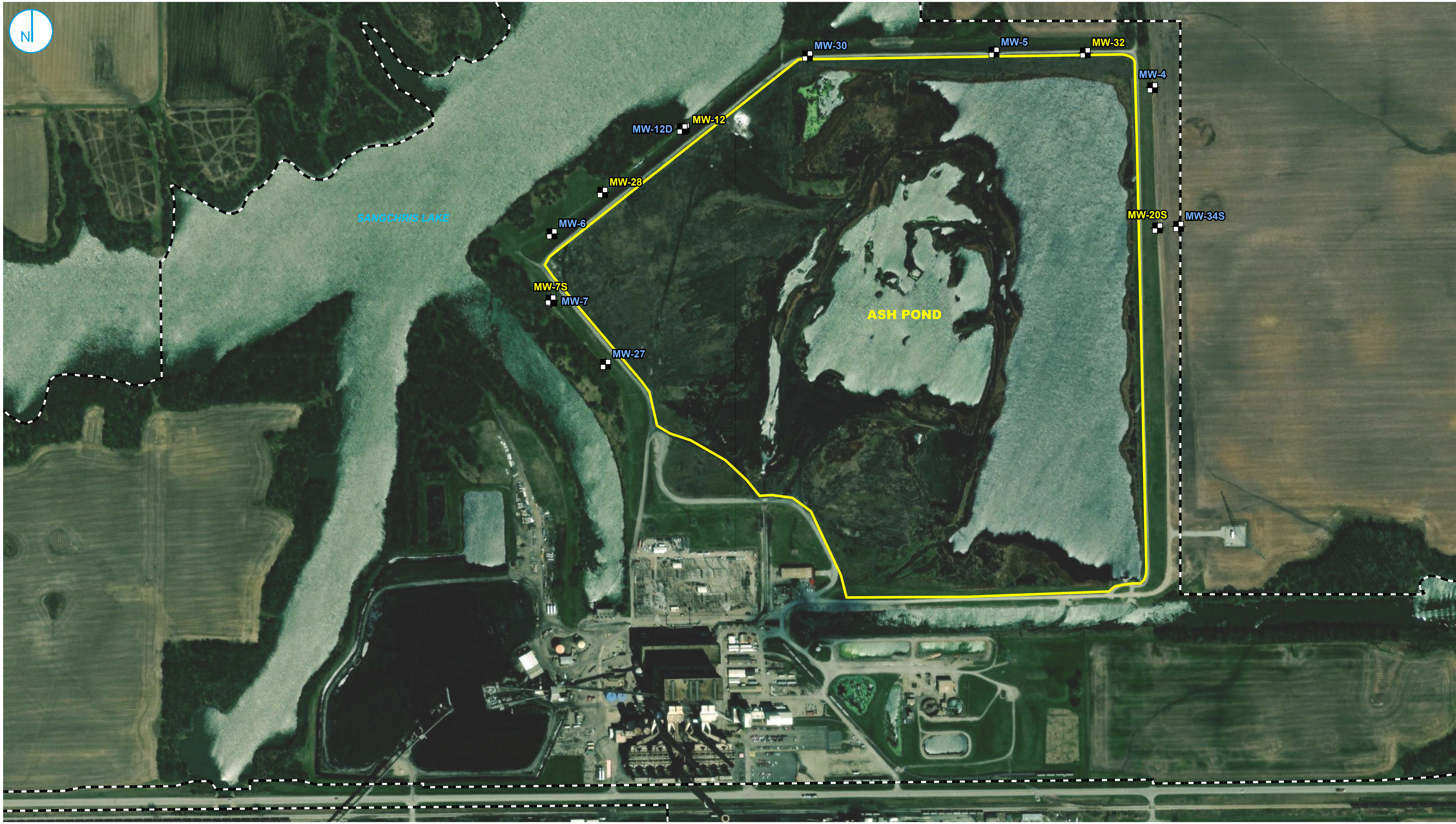
UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP
NOVEMBER 18, 2024

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 1-4

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



Y:\Mapping\Projects\22\2285\MXD\GMP\Kincaid\845_CorrectiveAction\KIN_141_CA_GMP.aprx

PROJECT: 169000XXXX | DATED: 10/24/2024 | DESIGNER: GALARNMC

MONITORING WELL
XXX INSIDE PLUME MONITORING WELL
XXX PLUME DEFINITION MONITORING WELL
REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 250 500 Feet

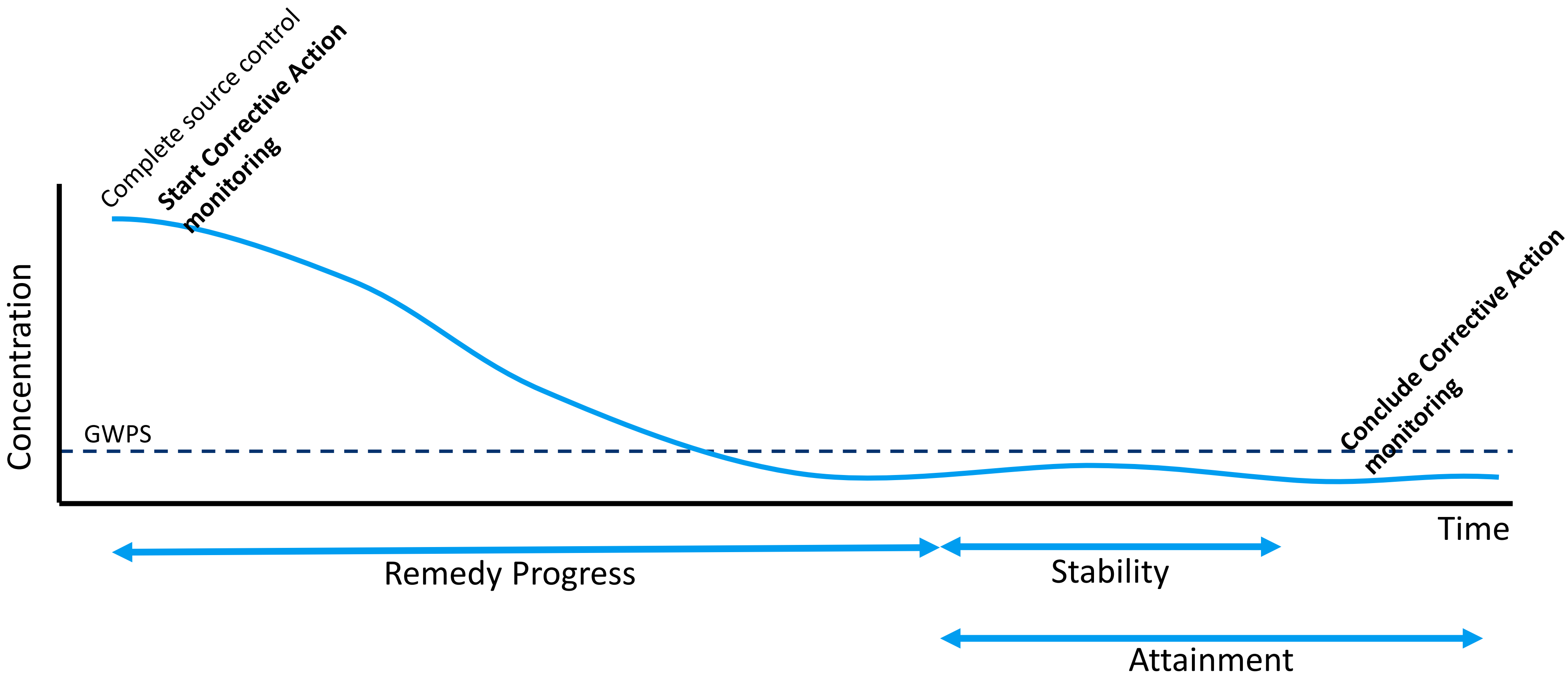
PROPOSED 35 I.A.C. § 845 CORRECTIVE ACTION MONITORING WELL LOCATION MAP

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
ASH POND
KINCAID POWER PLANT
KINCAID, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL



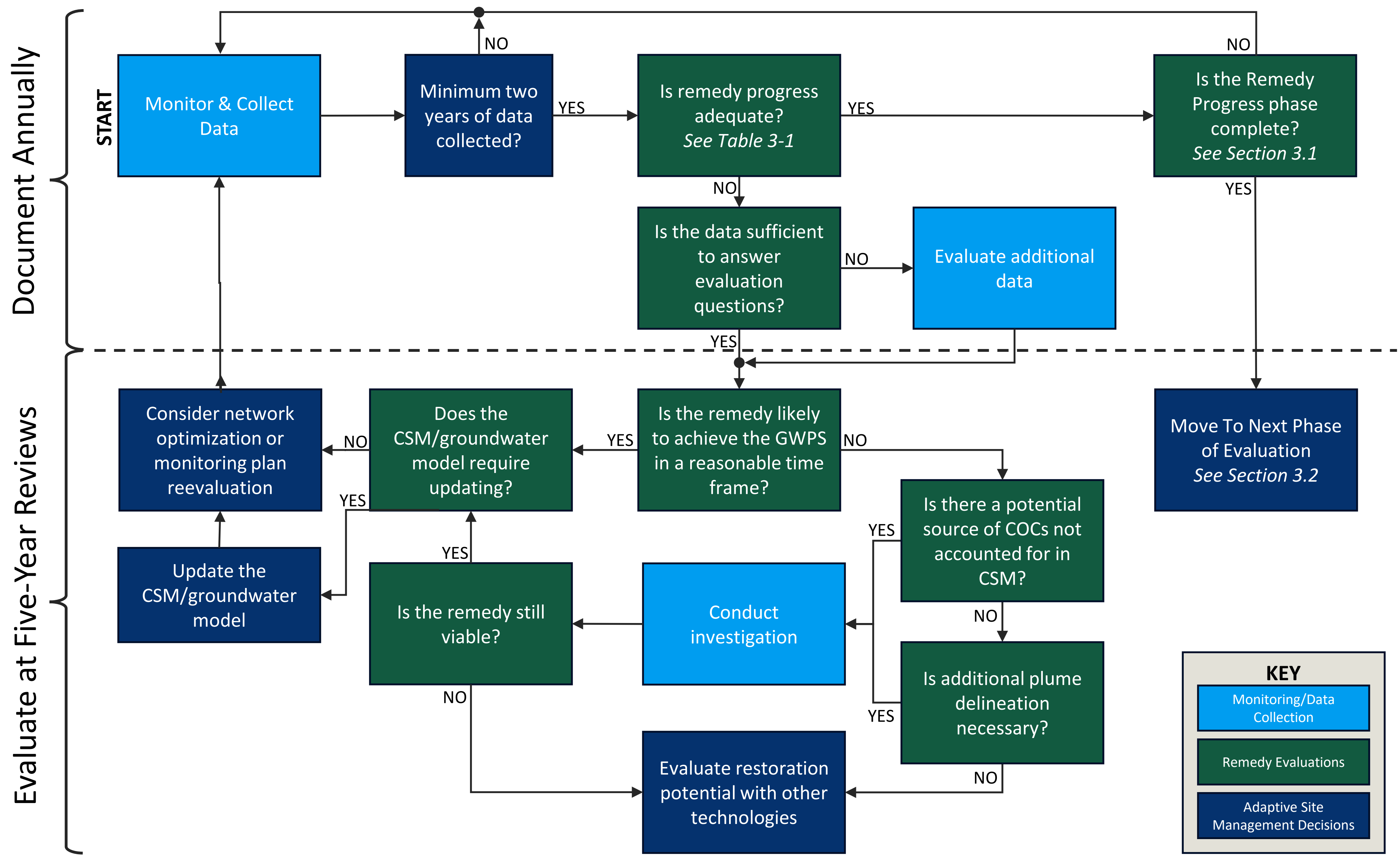
RAMBOLL

DRAFTED BY: AO | 11/8/2024

CORRECTIVE ACTION MONITORING TIMELINE

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Figure 3-1



Adapted from Figure 2 in USEPA (2014) *"Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind,"* Office of Solid Waste and Emergency Response. 9200.2-144. May. https://semspub.epa.gov/work/HQ/100000021.pdf

RAMBOLL

ADAPTIVE SITE MANAGEMENT DECISION-MAKING FLOW CHART

CORRECTIVE ACTION GROUNDWATER MONITORING PLAN
KINCAID POWER PLANT
ASH POND
KINCAID, ILLINOIS

Figure 3-2

DRAFTED BY: AO | 11/8/2024

APPENDICES

APPENDIX A
BORING LOGS AND WELL CONSTRUCTION FORMS

BORING LOGS

Civil & Environmental Consultants, Inc.

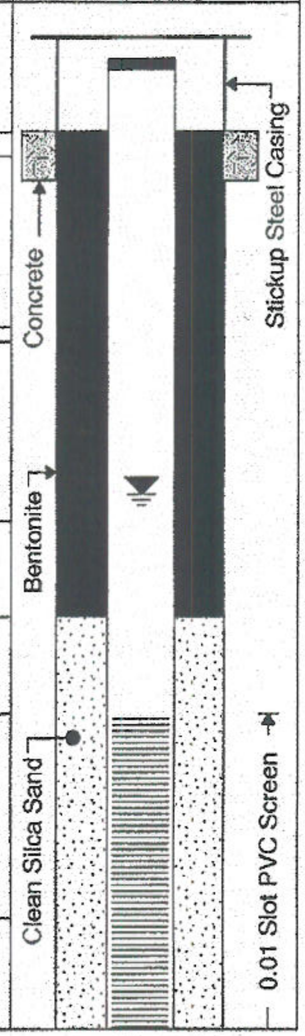
Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-4
	Casing Elevation: 601.18
	Ground Elevation: NA
Project No.: 100-399	Groundwater Ele.: 593.73

Date Started: 4/14/2010 Completed: 4/14/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 12-22' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					-2		
					0	Ground Surface	0.0
						Topsoil	
					2	Dark brown SILTY CLAY, very stiff, mottled, moist(-)	
1	1.3	3-4-5	0.0	SS			-4.0
2	1.4	4-5-6	0.0	SS	4	Orange brown SILTY CLAY, moist	
3	1.2	2-2-3	0.0	SS	6	Orangish tan CLAYEY SILT, medium stiff, mottled, moist	-8.0
4	1.0	1-1-2	0.0	SS	8	Light tan CLAYEY SILT, soft, slightly plastic, moist	-10.0
5	0.9	1-2-2	0.0	SS	10	Greyish tan CLAYEY SILT, soft, slightly plastic, mottled, moist	-12.0
6	1.5	2-2-4	0.0	SS	12	Orangish tan CLAYEY SILT, medium stiff, mottled, moist, grades to a silty clay	
7	1.5	1-3-3	0.0	SS	14	Trace sand and gravel, very moist	-16.2
8	1.2	2-4-5	0.0	SS	16	GLACIAL TILL Grey SILTY CLAY, trace gravel, medium stiff	
					18		

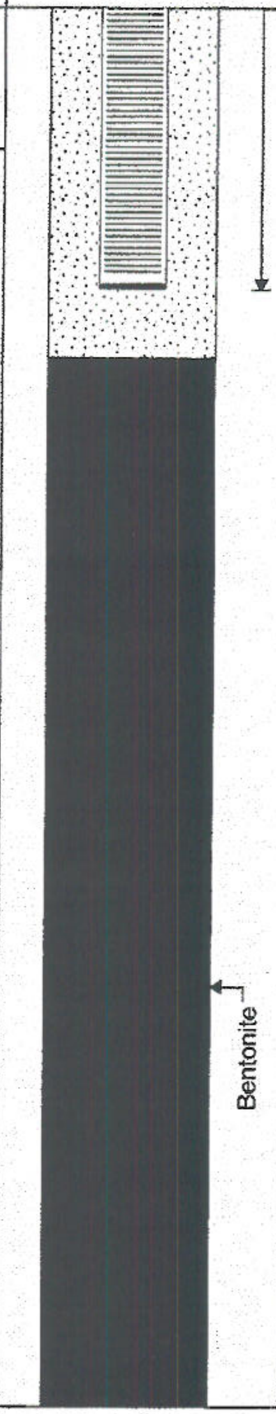
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-4

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
9	1.2	3-7-30	0.0	SS		Thin sand lense, wet	
10	1.0	44-41-50/2	0.0	SS	20	Grey SILTY CLAY, trace gravel, moist to moist(-)	-20.0
11	0.8	42-50/2.5	0.0	SS	22		
12	1.0	28-30-40	0.0	SS	24		
13	1.5	17-20-35	0.0	SS	26	Grey SILTY CLAY, trace gravel, very stiff, dry to moist	-26.0
14	1.5	7-20-40	0.0	SS	28		
15	0.0	50/0	0.0	SS	30		
16	1.0	31-50/0	0.0	SS	32	Trace sand and gravel	
17	0.7	40-50/2.5	0.0	SS	34		
					36		
					38	Auger refusal @ 38'	-38.0

Well Diagram

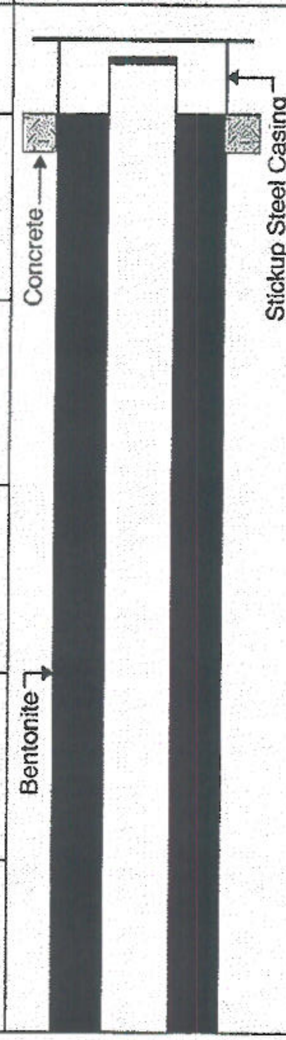


Civil & Environmental Consultants, Inc. Chicago Cincinnati Columbus Export Detroit Indianapolis Nashville Pittsburgh St. Louis	Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-5
		Casing Elevation: 619.91
		Ground Elevation: NA
	Project No.: 100-399	Groundwater Ele.: 594.83

Date Started: 4/21/2010 Completed: 4/22/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 30-40' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)
					-2			
					0	Ground Surface		0.0
					0–5	FILL Brown SILTY CLAY, some gravel		
1	1.3	4-6-10	0.0	SS	5–10	Grey brown SILTY CLAY, some sand and gravel, very stiff, moist		-5.0
2	1.5	3-5-7	0.0	SS	10–15	Greenish grey SILTY CLAY, trace gravel, very stiff, moist		-10.0
3	1.3	2-3-5	0.0	SS	15–20	Dark grey to black CLAYEY SILT, soft, moist		-15.0
4	1.4	4-5-7	0.0	SS	20–24	Grey brown SILTY CLAY, medium stiff, moist		-20.0

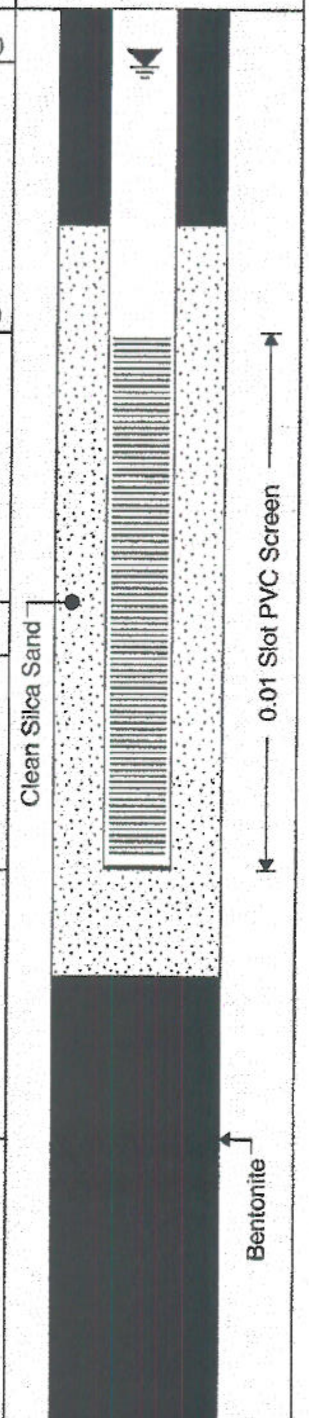
Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-5

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Graphic Log	Elevation (feet, msl)
								-25.0
5	1.5	3-3-4	0.0	SS	26	Light to dark grey CLAYEY SILT, soft, moist		
					28			
6	1.0	3-2-2	0.0	SS	30	Brownish grey SILTY CLAY, plastic, medium stiff, moist		-30.0
					32			
					34			-35.0
7	1.5	2-4-5	0.0	SS	36	Orangish tan CLAYEY SILT, medium stiff, moist, native		-36.0
						Orangish brown SILTY SAND, wet		
					38			
8	1.3	23-41-50/5	0.0	SS	40	GLACIAL TILL Light grey SILTY CLAY, some gravel, hard, moist(-)		-40.0
					42			
					44			-45.0
9	0.7	45-50/2	0.0	SS	46	Grey SILTY CLAY, some sand and gravel, hard, moist(-)		
					48			
					50			

Well Diagram



Civil & Environmental Consultants, Inc.	Project Name: Project No.: 100-399	Borehole/Well ID: MW-5

Sample No./ Core Run	Recovery	Blow Counts/ RQD	Organic Vapor	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)	Well Diagram
					52, 54		-55.0	
10		50/2.5	0.0	SS	56, 58, 60, 62, 64	Dark grey SANDY SILT, trace gravel, stiff, moist	-65.0	Bentonite
11	1.3	16-30-36	0.0	SS	66, 68, 70, 72, 74	Dark greyish green SANDY SILT, trace gravel, stiff, moist	-75.0	
12	0.4	30-42-3	0.0	SS	76	BEDROCK SHALE, weathered	-76.0	

Civil & Environmental Consultants, Inc.

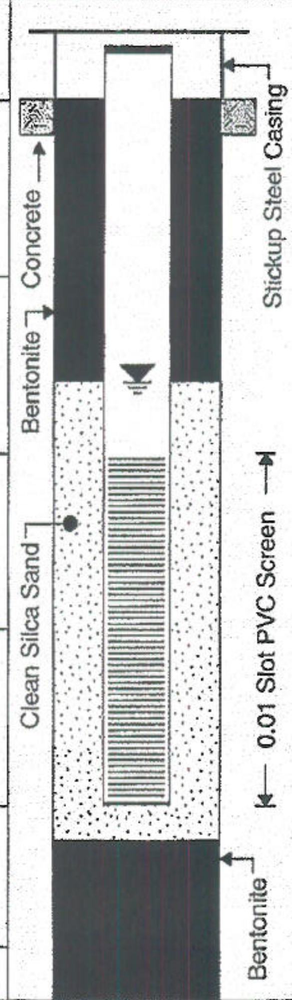
Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-6
	Casing Elevation: 600.83
	Ground Elevation: NA
Project No.: 100-399	Groundwater Ele.: 592.85

Date Started: 4/16/2010 Completed: 4/16/2010	Sample Information: No analytical analysis was performed.
Drilling Company: Roberts Environmental Drilling, Inc.	
Driller:	
CEC Representative: Corey Strain	
Drilling Method: HSA	Comments/Problems:
Bore Hole: 4.25" Core Size: 2"	
Well Installed: ☑	
Screened Interval: 10-20' bgs	

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					-2	Ground Surface	0.0
1	1.3	2-4-4	0.0	SS	0	Dark brown CLAYEY SILT, some organics, slightly plastic, medium stiff, moist	-5.0
2	1.3	2-1-2	0.0	SS	5	Tan brown CLAYEY SILT, trace organics, slightly plastic, soft, moist	-10.0
3	1.5	2-3-4	0.0	SS	10	Brown SANDY SILT, some clay, trace gravel, medium stiff, moist to wet	-15.0
4	1.3	3-1-1	0.0	SS	15	Orangish brown SILTY SAND, coarse grained, trace gravel, soft, wet	-20.0
5	0.8	30-50/5.5	0.0	SS	20	GLACIAL TILL Grey SILTY CLAY, trace gravel, medium stiff, moist	-24.0
6	1.3	20-36-50/5.5	0.0	SS	24	Grey SILTY CLAY, trace gravel, very stiff, dry	-25.5

Well Diagram



Civil & Environmental Consultants, Inc.

Chicago Cincinnati Columbus Export Detroit
Indianapolis Nashville Pittsburgh St. Louis

Project Name: Dominion Energy Kincaid Power Station Kincaid, Illinois	Borehole/Well ID: MW-7	
	Casing Elevation: 598.02	
	Ground Elevation: NA	
Project No.: 100-399	Groundwater Ele.: 589.32	

Date Started: 4/16/2010 Completed: 4/16/2010

Drilling Company: Roberts Environmental Drilling, Inc.

Driller:

CEC Representative: Corey Strain

Drilling Method: HSA

Bore Hole: 4.25" Core Size: 2"

Well Installed: ☑

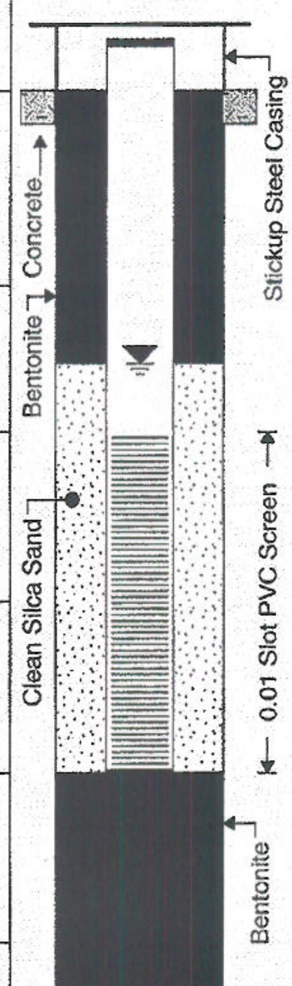
Screened Interval: 10-20' bgs

Sample Information:
No analytical analysis was performed.

Comments/Problems:

Sample No./ Core Run	Recovery (feet)	Blow Counts/ RQD	Organic Vapor Reading (ppm)	Sample Type	Depth (feet)	Material Description and Comments	Elevation (feet, msl)
					-2	Ground Surface	0.0
1	1.5	3-4-3	0.0	SS	0	Brown CLAYEY SILT, trace sand and gravel, medium stiff, moist	-5.7
2	1.5	3-2-4	0.0	SS	6	Dark grey CLAYEY SILT, trace gravel, some organics, slightly plastic, moist	-10.0
3	1.4	2-3-4	0.0	SS	10	Brown grey SILTY CLAY, trace gravel, plastic, medium stiff, mottled, moist	-15.0
4	1.5	1-1-2	0.0	SS	16	Orangish brown SANDY SILT, trace gravel, soft, wet	-20.0
5	1.5	10-25-35	0.0	SS	20	GLACIAL TILL Grey SILTY CLAY, trace gravel, non-plastic, moist(-)	-25.0
6	1.5	20-35-45	0.0	SS	26	Grey SILTY CLAY, trace sand and gravel, stiff, non-plastic, dry	-26.5

Well Diagram



SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-12

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/22/2015	7/23/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-12	Feet (NAVD88)	588.86 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,944.76 N, 2,485,453.08 E E/Ⓦ
1/4 of 1/4 of Section , T N, R

Lat 39° 36' 0.722"
Long -89° 29' 46.969"

Local Grid Location
Feet ☐N ☐S Feet ☐E ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	Illinois	Kincaid

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0–2	0 - 2' **FILL, SILT:** ML.	(FILL) ML								0-15' Blind Drilled. See log B-12 for soil description details.
			2–4	2 - 4' **FILL, CLAYEY SILT** ML/CL.	(FILL) ML/CL								
			4–6	4 - 6' Shelby Tube Sample Collected at Location B-12.									
			6–6.2	6 - 6.2' **FILL, CLAYEY SILT** ML/CL.	(FILL) ML/CL								
			6.2–8	6.2 - 8' **SILTY CLAY** CL/ML.	CL/ML								
			8–10	8 - 10' **CLAYEY SILT** ML/CL.	ML/CL								
			10–12	10 - 12' **CLAYEY SAND:** SC.	SC								

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

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number MW-12

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			12–14.4	12 - 14.4' **WELL-GRADED SAND:** SW.	SW								
			14.4–15	14.4 - 15' **SILTY SAND:** SW-SM.	SW-SM								
1 SS	24 20	9 19 26 26	15–15.2	15 - 15.2' **SILT:** ML, very dark gray (2.5YR 3/1), trace roots, clay, gravel, and sand, noncohesive, moist.	ML								
			15.2–17	15.2 - 17' **CLAYEY SILT** to **SANDY SILT:** ML/CL, yellowish brown (10YR 5/4), very fine sand, sand content increasing with depth, nonplastic, cohesive, moist. 15.9' gray (2.5YR 5/1).	ML/CL								
2 SS	24 15	9 19 32 48	17–17.4	17 - 17.4' **SILTY SAND:** SM, gray (2.5YR 5/1), trace clay, moist.	SM								
			17.4–19	17.4 - 19' **SILTY CLAY** to **CLAYEY SILT** CL/ML, gray (2.5YR 5/1), trace coarse sand, clay content decreasing with depth, low to medium plasticity, cohesive.	CL/ML								
3 SS	23 22	19 36 40 50 for 5"	19–23	19 - 23' **CLAYEY SILT** ML/CL, gray (2.5YR 5/1), trace coarse sand, low plasticity, cohesive, moist.	ML/CL								
4 SS	17 15	25 43 50 for 5"											
			23–25	23 - 25' **SILTY CLAY** to **POORLY-GRADED SAND:** CL/ML.	CL/ML								23-25' Overdrilled. See log B-12 for soil description details.
			25	25' End of Boring.									

SOIL BORING LOG INFORMATION

NATURAL RESOURCE TECHNOLOGY

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		B-12

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Chad Dutton Bulldog Drilling	7/20/2015	7/21/2015	hollow stem auger

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
	Feet (NAVD88)	588.86 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,944.76 N, 2,485,453.08 E E/W
1/4 of 1/4 of Section , T N, R
Lat 39° 36' 0.722"
Long -89° 29' 46.969"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	Illinois	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 SS	24 15	1 3 7 6	0–2	0 - 2' **FILL, SILT:** ML, very dark gray (2.5YR 3/1), mostly silt, trace clay, roots, and subangular gravel, noncohesive, dry. 0.9' dark grayish brown (2.5YR 4/2), no roots, noncohesive to cohesive.	(FILL) ML								
2 SS	24 20	4 6 7 7	2–4	2 - 4' **FILL, CLAYEY SILT** ML/CL, dark grayish brown (2.5YR 4/2), trace gravel, trace fine sand seams, nonplastic, cohesive, dry to moist. 3.3' very dark grayish brown (2.5YR 3/2), trace ash, trace slag, trace clear glass fragments.	(FILL) ML/CL								
3 ST	24 17		4–6	4 - 6' Shelby Tube Sample.									ST3: 24" push at 150 lbs of pressure.
4 SS	24 17	2 1 2 1	6–8	6 - 6.2' **FILL, CLAYEY SILT** ML/CL, dark grayish brown (2.5YR 4/2), trace gravel, trace fine sand seams, trace fine to coarse ash, nonplastic, cohesive, moist. 6.2 - 8' **SILTY CLAY** CL/ML, yellowish brown (10YR 5/4), trace sand seams, trace gravel. 6.9' noncohesive to cohesive, wet.	(FILL) ML/CL CL/ML								
5 SS	24 20	1 1 1 4	8–10	8 - 10' **CLAYEY SILT** ML/CL, yellowish brown (10YR 5/4), trace gravel, trace to few fine sand, wet. 9.4' nonplastic, noncohesive to cohesive.	ML/CL								
6 SS	24 16.5	5 9 13 19	10–12	10 - 12' **CLAYEY SAND:** SC, yellowish brown (10YR 5/4), trace yellowish brown (10YR 5/8) mottling, clay content decreasing with depth, trace fine gravel, noncohesive, moist.	SC								

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

Signature [signature]

Firm Natural Resource Technology
234 W. Florida St., Fifth Floor, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
7 SS	24 18	2 4 5 7	12–14.4	12 - 14.4' **WELL-GRADED SAND:** SW, yellowish brown (10YR 5/4), trace clay, trace subrounded gravel, noncohesive, wet.	SW									
8 SS	24 22	13 23 45 50	14.4–16	14.4 - 16' **SILTY SAND:** SW-SM, yellowish brown (10YR 5/4), mostly very fine sand, trace yellowish brown (10YR 5/8) mottling, trace fine sand seams, trace gravel, trace black silt, trace clay, nonplastic, cohesive, moist to dry.	SW-SM									
9 ST	9 5		16–18	16 - 18' Shelby Tube Sample.										ST9: 9" push at 950lbs of pressure.
10 SS	23 20	20 28 34 50 for 5"	18	18 - 30' **SILTY CLAY** to **POORLY-GRADED SAND:** CL/ML, gray (2.5YR 5/1), some very fine sand, little clay, nonplastic, cohesive, dry.	CL/ML									
			19.2	19.2' dark gray (2.5YR 4/1), trace coarse sand.										
11 SS	12 13	28 50 for 6"	20	20' - 21.2' trace clay, trace coarse sand to fine gravel.										
12 SS	17 14	16 39 50 for 5"	22	22' - 23.2' trace to little clay, trace coarse sand.										
			22.8	22.8' trace gravel.										
13 SS	12 13	31 50 for 6"	24	24' -25.1' clay (0-15%), trace coarse sand.										
14 SS	11 4.5	43 50 for 5"	26	26' clay (15-30%).										
15 SS	12 11	37 50 for 6"	28											
16 ST	8 0		30–32	30 - 32' Shelby Tube Sample, No Recovery.										ST16: 8" push at 650lbs of pressure.

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
17 ST	6 4		32 - 34	32 - 34' Shelby Tube Sample.										ST17: 6" push at 650lbs of pressure.
18 SS	23 21.5	12 23 42 50 for 5"	34 - 42	34 - 42' **CLAYEY SILT** ML/CL, gray (2.5YR 5/1), trace to few fine to coarse sand, nonplastic to low plasticity, cohesive, hard (>4.5 tsf), moist. 35.2' trace gravel.	ML/CL									
19 SS	23 24	10 18 34 50 for 5"		36' olive brown (2.5YR 4/4) mottling, trace fine sand, trace coarse sand, hard (>4.5 tsf), moist to dry.										
20 SS	18 18	16 24 50 for 6"		37.9' trace fine sand seams, hard (4.0 - 4.5+ tsf).										
21 SS	17 22	25 33 50 for 5"		40' low plasticity, stiff to very stiff (1.5 - 3.0 tsf), dry.										
22 ST	4.5 5		42 - 44	42 - 44' Shelby Tube Sample.										ST22: 4.5" push at 700lbs of pressure.
23 SS	6 6	50 for 6"	44 - 48	44 - 48' **LEAN CLAY:** CL, very dark gray (10YR 3/1), trace silt, medium plasticity, cohesive, soft (0.5 tsf), dry.	CL									
24 SS	6 6	50 for 6"		46 - 48' trace gravel-sized shale pieces, very stiff to hard (3.0 - 4.5+ tsf).										
25 ST	5 5		48 - 50	48 - 50' Shelby Tube Sample.										ST25: 5" push at 700lbs of pressure.
26 SS	6 5	50 for 6"	50 - 52	50 - 52' **LEAN CLAY:** CL, as above, hard (>4.5 tsf).	CL									

SOIL BORING LOG INFORMATION SUPPLEMENT

NATURAL RESOURCE TECHNOLOGY

Boring Number B-12

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram		Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
27 SS	1 0	50 for 1"		52 - 52.1' No Recovery.										Split Spoon Refusal at 52.1' bgs.
28 CORE	119 116			52.1 - 62' **LIMESTONE:** BDX (LS), white (GLEY 1 8/N), trace shaley limestone, fossiliferous, vuggy texture, microcrystalline, massive, intensely fractured, very narrow to moderately narrow apertures. 53.5' no vuggy texture. 54.8' mud-filled fracture. 57.6' color change to light gray (GLEY 17/N). 60.2' shale layer (0.1" thick).	BDX (LS)									RQD = 61.3% (fair).
				62' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Kincaid Power Station		MW-7S	
Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	2/2/2021	2/2/2021	Mini Sonic
Common Well Name: MW-7S	Final Static Water Level: Feet (NAVD88)	Surface Elevation: 595.59 Feet (NAVD88)	Borehole Diameter: 6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,011.16 N, 2,484,728.09 E E/W
1/4 of 1/4 of Section 2, T 13 N, R 4 W
Lat 39° 35' 51.5472"
Long -89° 29' 56.3208"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 104		0.5–3.5	0 - 3.5' **CLAYEY SILT** ML/CL, very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2) mottling (5-15%), dark yellowish brown (10YR 4/6) mottling (5-15%), sand (5-15%), gravel (0-5%), roots (0-5%), firm, slow dilatancy, low to medium toughness, low plasticity, moist.	ML/CL				1 1.25					CS = Core Sample
			3.5–7.5	3.5 - 7.5' **LEAN CLAY:** CL, grayish brown (10YR 5/2), very dark grayish brown (10YR 3/2) mottling (5-15%), dark yellowish brown (10YR 4/6) mottling (5-15%), silt (15-30%), sand (0-5%), gravel (0-5%), stiff to soft, no dilatancy, medium toughness, low to medium plasticity, moist. 7.2' red brick (15-30%).	CL				2.75 0.5					
			7.5–11.0	7.5 - 13' **LEAN CLAY:** CL, grayish brown (10YR 5/2), silt (15-30%), dark yellowish brown (10YR 4/4) mottling (5-15%), sand (0-5%), gravel (0-5%), no dilatancy, low to medium toughness, medium plasticity, moist.	CL				0.25					
2 CS	60 60		10.0											

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

Signature

Firm Ramboll
234 W. Florida Street, Milwaukee,WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Boring Number MW-7S

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			11.5 12.0 12.5	7.5 - 13' **LEAN CLAY:** CL, grayish brown (10YR 5/2), silt (15-30%), dark yellowish brown (10YR 4/4) mottling (5-15%), sand (0-5%), gravel (0-5%), no dilatancy, low to medium toughness, medium plasticity, moist. *(continued)*	CL									
			13.0 13.5 14.0 14.5	13 - 15' **SANDY LEAN CLAY:** to **CLAYEY SAND:** s(CL), dark yellowish brown (10YR 4/4), gravel (0-5%), non-cohesive to cohesive, low plasticity, wet.	s(CL)									
			15.0	15' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Kincaid Power Station		MW-12D	
Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	1/26/2021	1/26/2021	Mini Sonic
Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-12D	Feet (NAVD88)	589.08 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,939.69 N, 2,485,442.58 E E/W(circled W)
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 36' 0.6732"
Long -89° 29' 47.1048"
Local Grid Location: ☐N ☐S Feet; ☐E ☐W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 60		0 – 1.8	0 - 1.8' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/6), roots (5-15%), silt (5-15%), sand (0-5%), no dilatancy, medium toughness, medium plasticity, wet.	CL									CS = Core Sample
			1.8 – 3.1	1.8 - 3.1' **POORLY-GRADED SAND:** SP, dark yellowish brown (10YR 4/6), silt (15-30%), clay (5-15%), gravel (0-5%), loose, moist.	SP									
			3.1 – 5.0	3.1 - 5' **LEAN CLAY:** CL, dark grayish brown (10YR 4/2), silt (15-30%), sand (0-5%), roots (0-5%), no dilatancy, low toughness, low plasticity.	CL									
2 SH	24 24		5.0 – 7.0	5 - 7' **CLAYEY SAND:** SC.	SC					18.6	22	9	45.3	SH = Shelby Tube
3 CS	36 36		7.0 – 7.5	7 - 7.5' **LEAN CLAY:** CL, dark grayish brown (10YR 4/2), silt (15-30%), sand (0-5%), roots (0-5%), no dilatancy, low toughness, low plasticity.	CL									
			7.5 – 10.0	7.5 - 10' **LEAN CLAY:** CL, brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/6) mottling (5-15%), no dilatancy, low toughness, low to medium plasticity, moist.	CL									

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

Signature: [signature]

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

Boring Number MW-12D

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 MC	24 24		10.5 – 12.0	10 - 12' **LEAN CLAY:** CL.	CL					18.2	22	10	64.2	MC = Modified California
5 CS	36 36		12.0 – 12.8	12 - 12.8' **WELL-GRADED SAND WITH SILT:** SW, brownish yellow (10YR 6/6), subrounded to subangular sand, gravel (15-30%), clay (5-15%), wet.	SW									
			12.8 – 14.5	12.8 - 14.5' **SILTY SAND:** to **SANDY SILT:** SM, brownish yellow (10YR 6/6), fine subrounded sand, clay (15-30%), dense, wet.	SM									
6 CS	60 60		14.5 – 20.0	14.5 - 20' **SILT:** ML, grayish brown (10YR 5/2), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, low plasticity, dry.	ML									
7 SH	24 7		20.0 – 22.0	20 - 22' **CLAYEY SAND:** SC.	SC					14	22	9	47.6	
8 CS	156 156		22.0 – 26.5	22 - 39.8' **SILT:** ML, grayish brown (10YR 5/2), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, low plasticity, dry. 23.5' - 24' layer of silty clay, olive brown (2.5Y 4/3) mottling (5-15%), gray (10YR 5/1) mottling (0-5%), sand (5-15%), gravel (0-5%). 25' - 26.5' layer of silty clay, olive brown (2.5Y 4/3) mottling (0-5%), gray (10YR 5/1) mottling (5-15%).	ML									

RAMBOLL

Boring Number MW-12D

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			27.0	22 - 39.8' **SILT:** ML, grayish brown (10YR 5/2), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, high toughness, low plasticity, dry. *(continued)*										
			28.5	28.5' gray (10YR 5/1) mottling (15-30%), olive brown (2.5Y 4/3) mottling (5-15%), sand (15-30%).										
			31.0	31' - 33.5' layer of silty clay, gray (10YR 5/1), grayish brown (10YR 5/2) mottling (15-30%), olive brown (2.5Y 4/3) mottling (0-5%), dark yellowish brown (10YR 3/4) mottling (0-5%).										
			33.5	33.5' brown (10YR 4/3).	ML									
			34.0	34' - 34.5' layer of silty clay, gray (10YR 5/1), grayish brown (10YR 5/2) mottling (15-30%), olive brown (2.5Y 4/3) mottling (0-5%), dark yellowish brown (10YR 3/4) mottling (0-5%).										
9 CS	36 36		35.0	34.5' dark gray (10YR 4/1).										
10 CS	120 98		38.0											
			40.0	39.9 - 47.3' **LEAN CLAY:** CL, very dark gray (10YR 3/1), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), slow dilatancy, high toughness, high plasticity, moist, laminated black (10YR 2/1) (0-5%).	CL									

Depth scale: 27.0, 27.5, 28.0, 28.5, 29.0, 29.5, 30.0, 30.5, 31.0, 31.5, 32.0, 32.5, 33.0, 33.5, 34.0, 34.5, 35.0, 35.5, 36.0, 36.5, 37.0, 37.5, 38.0, 38.5, 39.0, 39.5, 40.0, 40.5, 41.0, 41.5, 42.0, 42.5, 43.0

Boring Number MW-12D

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			43.5–47.3	39.9 - 47.3' **LEAN CLAY:** CL, very dark gray (10YR 3/1), gray (10YR 5/1) mottling (0-5%), sand (0-5%), gravel (0-5%), slow dilatancy, high toughness, high plasticity, moist, laminated black (10YR 2/1) (0-5%). *(continued)*	CL									
11 CS	72 72		47.3–48.4	47.3 - 48.4' **WELL-GRADED GRAVEL:** GW, gray (10YR 5/1), sand (5-15%), dry.	GW									
12 CS	72 72		48.4–56.6	48.4 - 56.6' **LIMESTONE:** BDX (LS), bluish black (GLEY2 5PB 2.5/1), fossiliferous, light gray (GLEY1 N 7/1) in recrystallized fossils, calcite replacement in some fossils.	BDX (LS)									
			56.6–60.0	56.6 - 60.8' **SHALE:** BDX (SH), black (GLEY 1 2.5/N).	BDX (SH)									

Boring Number MW-12D

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
13 CS	240 120		60.5	56.6 - 60.8' **SHALE:** BDX (SH), black (GLEY 1 2.5/N). *(continued)*	BDX (SH)									
			61.0–68.5	60.8 - 68.8' **LIMESTONE:** BDX (LS), bluish black (GLEY2 5PB 2.5/1), fossiliferous, light gray (GLEY1 N 7/1) in recrystallized fossils, calcite replacement in some fossils.	BDX (LS)									
			69.0–76.5	68.8 - 81' **SHALE:** BDX (SH), black (GLEY 1 2.5/N).	BDX (SH)									

Depth scale: 60.5, 61.0, 61.5, 62.0, 62.5, 63.0, 63.5, 64.0, 64.5, 65.0, 65.5, 66.0, 66.5, 67.0, 67.5, 68.0, 68.5, 69.0, 69.5, 70.0, 70.5, 71.0, 71.5, 72.0, 72.5, 73.0, 73.5, 74.0, 74.5, 75.0, 75.5, 76.0, 76.5

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
14 CS	120 71		77.0–81.0	68.8 - 81' **SHALE:** BDX (SH), black (GLEY 1 2.5/N). *(continued)*	BDX (SH)									
			81.0–83.0	81 - 83' **LIMESTONE:** BDX (LS), bluish black (GLEY2 5PB 2.5/1), fossiliferous, light gray (GLEY1 N 7/1) in recrystallized fossils, calcite replacement in some fossils.	BDX (LS)									
15 CS	120 120		83.0–93.0	83 - 100' **SHALE:** BDX (SH), greenish gray (GLEY 1 10Gy 5/1) to gray (GLEY1 N 5/N), dark gray (10YR 4/1) laminae (5-15%), white (10YR 8/1) laminae (0-5%).	BDX (SH)									

Boring Number MW-12D

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93.5 – 100.0	83 - 100' **SHALE:** BDX (SH), greenish gray (GLEY 1 10Gy 5/1) to gray (GLEY1 N 5/N), dark gray (10YR 4/1) laminae (5-15%), white (10YR 8/1) laminae (0-5%). *(continued)* 97' dark gray (10YR 4/1).	BDX (SH)									
			100.0	100' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-20S

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade Drilling	1/26/2021	1/26/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-20S	Feet (NAVD88)	598.43 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,402.07 N, 2,488,021.76 E E/Ⓦ
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 35' 55.1688"
Long -89° 29' 14.2044"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0 - 2	0 - 2' **FILL, LEAN CLAY:** CL, Blind drill to 10 feet below ground surface. See MW-20 boring log for detailed lithologies.	(FILL) CL								
			2 - 6.2	2 - 6.2' **CLAYEY SILT** ML/CL.	ML/CL								
			6.2 - 10	6.2 - 10' **LEAN CLAY:** CL.	CL								
			10	10' End of Boring.									

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

Signature	Firm	
[signature]	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Kincaid Power Station		MW-27	
Boring Drilled By: Name of crew chief (first, last) and Firm	**Date Drilling Started**	**Date Drilling Completed**	**Drilling Method**
Dave Gordon Cascade Drilling	2/2/2021	2/2/2021	Mini Sonic
Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-27	Feet (NAVD88)	597.35 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,067,661.72 N, 2,485,026.71 E E/W (W circled)
1/4 of 1/4 of Section 11, T 13 N, R 4 W
Lat 39° 35' 48.0732"
Long -89° 29' 52.5372"
Local Grid Location: Feet ☐ N ☐ S; Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 95		0–1	0 - 1.2' **SILT:** ML, very dark grayish brown (10YR 3/2) to dark yellowish brown (10YR 4/6), clay (15-30%), gravel (0-5%), roots (0-5%), very soft, no dilatancy, low to medium toughness, low plasticity, wet.	ML				0.25					CS = Core Sample
			1.2–9.6	1.2 - 9.6' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/6) mottling 5-15%), silt (15-30%), sand (0-5%), firm to very soft, no dilatancy, low toughness, medium plasticity, moist. 4.5' grayish brown (10YR 5/2), yellowish brown (10YR 5/6) mottling (5-15%). 5.3' - 5.8' very dark grayish brown (10YR 3/2) mottling (15-30%), roots (5-15%).	CL				0.75 1.25 0.25 0.25					
2 CS	120 86		9.6–10.8	9.6 - 10.8' **CLAYEY SAND:** SC, yellowish brown (10YR 5/4), subrounded, fine sand, gravel (5-15%), wet.	SC									
			10.8–13.5	10.8 - 13.5' **SANDY LEAN CLAY:** s(CL), grayish brown (10YR 5/2), yellowish brown (10YR 5/4) mottling (30-45%), silt (15-30%), very soft, low toughness, low plasticity, wet.	s(CL)				0.25					
			13.5–15	13.5 - 17.5' **SILT:** ML, gray (10YR 5/1), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, non-plastic to low plasticity, dry.	ML									

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

Signature: [signature]

Firm: Ramboll
234 W. Florida Street, Milwaukee,WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

Boring Number MW-27

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16 17	13.5 - 17.5' **SILT:** ML, gray (10YR 5/1), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, non-plastic to low plasticity, dry. *(continued)*	ML									
			18 19 20	17.5 - 20' **SILTY SAND:** SM, gray (10YR 5/1), rounded to subangular, fine sand, gravel (0-5%), loose, dry.	SM									
				20' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number	
Kincaid Power Station		MW-28	
Boring Drilled By: Name of crew chief (first, last) and Firm	**Date Drilling Started**	**Date Drilling Completed**	**Drilling Method**
Dave Gordon Cascade Drilling	2/2/2021	2/2/2021	Mini Sonic
Common Well Name	**Final Static Water Level**	**Surface Elevation**	**Borehole Diameter**
MW-28	Feet (NAVD88)	598.33 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,595.29 N, 2,485,010.02 E E/(W)
1/4 of 1/4 of Section 2, T 13 N, R 4 W

Lat 39° 35' 57.3"
Long -89° 29' 52.6632"

Local Grid Location
Feet ☐ N ☐ S Feet ☐ E ☐ W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 91		0–5.2	0 - 5.2' **LEAN CLAY:** CL, dark yellowish brown (10YR 4/4), dark grayish brown (10YR 4/2) mottling (0-5%), silt (15-30%), sand (0-5%), organic material (0-5%), no dilatancy, low toughness, medium plasticity, moist to wet.	CL									CS = Core Sample
			5.2–6.8	5.2 - 6.8' **SILTY CLAY:** CL/ML, dark yellowish brown (10YR 4/4), sand (5-15%), no dilatancy, low toughness, low plasticity, moist.	CL/ML									
			6.8–8.4	6.8 - 8.4' **SILT:** ML, yellowish brown (10YR 5/6), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, low plasticity, moist.	ML									
2 CS	120 103		8.4–11.2	8.4 - 11.2' **CLAYEY SILT to SILTY CLAY:** ML/CL, yellowish brown (10YR 5/6), sand (15-30%), gravel (0-5%), no dilatancy, low toughness, non-plastic to low plasticity, wet.	ML/CL									
			11.2–14	11.2 - 17.6' **SILT:** ML, yellowish brown (10YR 5/4), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, non-plastic, moist.	ML									

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

Signature	Firm	
[signature]	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

Boring Number MW-28

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			15, 16, 17	11.2 - 17.6' **SILT:** ML, yellowish brown (10YR 5/4), clay (15-30%), sand (5-15%), gravel (0-5%), no dilatancy, medium toughness, non-plastic, moist. *(continued)*	ML									
			18, 19	17.6 - 19.5' **SILT WITH SAND:** (ML)s, yellowish brown (10YR 5/4), yellowish brown (10YR 5/6) mottling (5-15%), gravel (0-5%), no dilatancy, medium toughness, non-plastic, moist.	(ML)s									
3 CS	60 60		20, 21	19.5 - 22' **SANDY SILT:** s(ML), gray (10YR 5/1), wet to moist. 21' - 21.5' layer of sand, gray (10YR 5/1) subrounded fine sand, loose, wet.	s(ML)									
			22, 23, 24	22 - 24.3' **SILTY SAND:** SM, grayish brown (10YR 5/2) to gray (10YR 5/1), subrounded, fine sand, gravel (0-5%), dense, wet.	SM									
			25	24.3 - 25' **CLAYEY SAND:** SC, grayish brown (10YR 5/2), gravel (5-15%), loose, wet.	SC									
				25' End of Boring.										

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-30

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Dave Gordon Cascade Drilling	2/3/2021	2/3/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-30	Feet (NAVD88)	616.00 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,069,336.19 N, 2,486,121.89 E E/W
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 36' 4.6044"
Long -89° 29' 19.1148"
Local Grid Location ☐ N ☐ S Feet ☐ E ☐ W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	120 120		0 – 1.5	0 - 1.5' **FILL, SILT:** ML, dark gray (10YR 4/1) to very dark gray (10YR 3/1), medium sand sized ash (5-15%), roots (5-15%), gravel (0-5%), soft, slow dilatancy, low toughness, low plasticity, wet. 1.1' - 1.2' layer of ash.	(FILL) ML									CS = Core Sample
			1.5 – 5.0	1.5 - 7.4' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2), very dark grayish brown (10YR 3/2) mottling (0-5%), dark gray (10YR 4/1) laminations (5-15%), yellowish brown (10YR 5/6) laminations (0-5%), sand (0-5%), gravel (0-5%), firm to stiff, no dilatancy, high toughness, low plasticity, dry yellowish brown (10YR 5/6 sand seams (0-5%), 1/8" thick.	CL/ML									

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

Signature [signature]

Firm Ramboll
234 W. Florida Street, Milwaukee,WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

Boring Number MW-30

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			5.5, 6.0, 6.5, 7.0	1.5 - 7.4' **SILTY CLAY:** CL/ML, grayish brown (10YR 5/2), very dark grayish brown (10YR 3/2) mottling (0-5%), dark gray (10YR 4/1) laminations (5-15%), yellowish brown (10YR 5/6) laminations (0-5%), sand (0-5%), gravel (0-5%), firm to stiff, no dilatancy, high toughness, low plasticity, dry yellowish brown (10YR 5/6 sand seams (0-5%), 1/8" thick. *(continued)*	CL/ML									
			7.5	7.4 - 7.9' **LEAN CLAY:** CL, very dark grayish brown (10YR 3/2), yellowish brown (10YR 5/6) mottling (5-15%), silt (5-15%), organic material (5-15%), slow dilatancy, low toughness, high plasticity, moist.	CL									
			8.0, 8.5	7.9 - 8.7' **SILT WITH SAND:** (ML)s, light brownish gray (10YR 6/2), gray (10YR 6/1) mottling (0-5%), clay (5-15%), gravel (0-5%), high toughness, low plasticity, dry.	(ML)s									
			9.0	8.7 - 9.5' **SILT:** ML, dark grayish brown (10YR 4/2), yellowish brown (10YR 5/6) mottling (0-5%), clay (5-15%), sand (5-15%), gravel (0-5%), stiff, no dilatancy, high toughness, low plasticity, dry.	ML									
2 CS	120 96		9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0	9.5 - 24.5' **LEAN CLAY:** CL, very dark grayish brown (10YR 3/2), silt (15-30%), sand (0-5%), gravel (0-5%), slow dilatancy, low toughness, medium plasticity. 11.3' greenish gray (GLEY2 6/10BG) mottling (5-15%), olive brown (2.5Y 4/4) mottling (5-15%), yellowish brown (10YR 5/6) mottling (0-5%). 12.5' greenish gray (GLEY2 6/10BG), very dark grayish brown (10YR 3/2) mottling (15-30%), olive brown (2.5Y 4/4) mottling (5-15%), dark yellowish brown (10YR 4/6) mottling (0-5%).	CL									

Boring Number MW-30

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13.5	9.5 - 24.5' **LEAN CLAY:** CL, very dark grayish brown (10YR 3/2), silt (15-30%), sand (0-5%), gravel (0-5%), slow dilatancy, low toughness, medium plasticity. *(continued)*										
			14.0	14' very dark grayish brown (10YR 3/2), greenish gray (GLEY2 6/10BG) mottling (5-15%), olive brown (2.5Y 4/4) mottling (5-15%), yellowish brown (10YR 5/6) mottling (0-5%).										
			14.5											
			15.0	15' very dark grayish brown (10YR 3/2) to very dark gray (10YR 3/1), dark grayish brown (10YR 4/2) mottling, organic material (0-5%), high plasticity.										
			15.5											
			16.0											
			16.5											
			17.0											
			17.5		CL									
			18.0											
			18.5											
			19.0											
			19.5											
3 CS	120 116		20.0											
			20.5											
			21.0											
			21.5											

RAMBOLL

Boring Number MW-30

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			22.0	9.5 - 24.5' **LEAN CLAY:** CL, very dark grayish brown (10YR 3/2), silt (15-30%), sand (0-5%), gravel (0-5%), slow dilatancy, low toughness, medium plasticity. *(continued)*	CL									
			22.5											
			23.0											
			23.5											
			24.0											
			24.5	24.5 - 25' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), gray (10YR 5/1) mottling (15-30%), sand (0-5%), gravel (0-5%), no dilatancy, medium toughness, low to medium plasticity, moist.	ML/CL									
			25.0	25 - 26.6' **SILT:** ML, gray (10YR 5/1), dark grayish brown (10YR 4/2) mottling (5-15%), yellowish brown (10YR 5/4) laminations (5-15%), clay (15-30%), sand (5-15%), gravel (0-5%), moist.	ML									
			25.5											
			26.0											
			26.5	26.6 - 35' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), gray (10YR 5/1) mottling (15-30%), greenish gray (GLEY2 6/10BG) mottling (0-5%), sand (0-5%), gravel (0-5%), no dilatancy, medium toughness, low to medium plasticity, moist. 27.1' - 28.5' very dark gray (10YR 3/1) to dark gray (10YR 4/1).	ML/CL									
			27.0											
			27.5											
			28.0											
			28.5											
			29.0											
			29.5											
			30.0											

RAMBOLL

Boring Number MW-30

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 CS	120 113		30.5 31.0 31.5 32.0 32.5 33.0 33.5 34.0 34.5	26.6 - 35' **CLAYEY SILT** to **SILTY CLAY:** ML/CL, dark grayish brown (10YR 4/2) to grayish brown (10YR 5/2), gray (10YR 5/1) mottling (15-30%), greenish gray (GLEY2 6/10BG) mottling (0-5%), sand (0-5%), gravel (0-5%), no dilatancy, medium toughness, low to medium plasticity, moist. *(continued)*	ML/CL									
			35.0 35.5 36.0 36.5 37.0	35 - 37.2' **SANDY LEAN CLAY:** to **CLAYEY SAND:** (CL)g, yellowish brown (10YR 5/6), grayish brown (10YR 5/2) mottling (0-10%), gravel (0-5%), low toughness, low plasticity to non-plastic, loose, wet.	(CL)g									
			37.5 38.0	37.2 - 39.2' **SILT WITH SAND:** (ML)s, yellowish brown (10YR 5/4), yellowish brown (10YR 5/6) mottling (5-15%), dark grayish brown (10YR 4/2) mottling (0-5%), gravel (0-5%), moist.	(ML)s									

Boring Number MW-30

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			38.5–39.0	37.2 - 39.2' **SILT WITH SAND:** (ML)s, yellowish brown (10YR 5/4), yellowish brown (10YR 5/6) mottling (5-15%), dark grayish brown (10YR 4/2) mottling (0-5%), gravel (0-5%), moist. *(continued)*	(ML)s									
			39.5	39.2 - 40' **SILTY SAND:** SM, yellowish brown (10YR 5/4), yellowish brown (10YR 5/6) mottling (0-5%), gravel (0-5%), moist.	SM									
5 CS	60 45.6		40.0–45.0	40 - 45' **CLAYEY SILT** ML/CL, dark grayish brown (10YR 4/2) to dark gray (10YR 4/1), sand (5-15%), gravel (0-5%).	ML/CL									
			45.0	45' End of Boring.										

SOIL BORING LOG INFORMATION

RAMBOLL

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Station		MW-32

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Adam Jochimsen Cascade Drilling	2/3/2021	2/3/2021	Mini Sonic

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-32	Feet (NAVD88)	617.20 Feet (NAVD88)	6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,069,353.90 N, 2,487,630.18 E E/Ⓦ
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 36' 4.6044"
Long -89° 29' 19.1148"
Local Grid Location ☐N ☐S Feet ☐E ☐W Feet

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 36		0–1	0 - 1.2' ASH, very dark gray (10YR 3/1), gravel to sand sized grians, loose, dry.	(FILL) ASH									CS = Core Sample Advanced 8-inch override casing to 10 feet below ground surface.
			1–4	1.2 - 4.6' **FILL, SILT WITH SAND:** (ML)s, yellowish brown (10YR 5/4), gravel (0-5%), soft, slow dilatancy, low toughness, non-plastic, moist.	(FILL) (ML)s				0.25					
2 CS	60 45		5–6	4.6 - 6.3' ASH, black (10YR 2/1) to very dark gray (10YR 3/1), sand to silt sized grains, loose.	(FILL) ASH				0.25					
			7–10	6.3 - 10.3' **SILTY CLAY:** ML/CL, pale brown (10YR 6/3), sand (5-10%), gravel (0-5%), very stiff, slow dilatancy, low toughness, low plasticity, moist.	ML/CL				3.25					
3 CS	60 43		11	10.3 - 11.7' **LEAN CLAY:** CL, pale brown (10YR 6/3), silt (15-25%), sand (0-5%), gravel (0-5%), stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				2.75					
			12–14	11.7 - 20.1' **LEAN CLAY:** CL, grayish brown (2.5Y 5/2), gray (10YR 5/1) mottling (5-15%), silt (15-25%), organic material (5-10%), sand (0-5%), stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				2.75					

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

Signature: [signature]

Firm Ramboll
234 W. Florida Street, Milwaukee,WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

Boring Number MW-32

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
4 CS	60 35		15–16	11.7 - 20.1' **LEAN CLAY:** CL, grayish brown (2.5Y 5/2), gray (10YR 5/1) mottling (5-15%), silt (15-25%), organic material (5-10%), sand (0-5%), stiff, no dilatancy, medium toughness, medium plasticity, moist. *(continued)* 14.9' layer of wood.	CL				2.75					Wood in shoe of core barrel.
			17						3					
			19						4					
5 CS	60 56		20	20.1 - 22.9' **LEAN CLAY:** CL, light yellowish brown (10YR 6/4) to light brownish gray (10YR 6/2), yellowish brown (10YR 5/6) mottling (5-10%), silt (15-25%), gravel (0-5%), sand (0-5%), stiff, slow dilatancy, low toughness, medium plasticity, moist.	CL				0.75					
			23	22.9 - 25' **LEAN CLAY:** CL, grayish brown (2.5Y 5/2), gray (10YR 5/1) mottling (5-15%), silt (15-25%), organic material (5-10%), sand (0-5%), stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				1.75					
6 CS	120 120		25	25 - 31.6' **LEAN CLAY:** CL, yellowish brown (10YR 5/4), yellowish brown (10YR 5/8) mottling, silt (10-15%), sand (0-5%), firm, slow dilatancy, low toughness, medium plasticity, moist.	CL				3					
			27						0.75					
			29						1.25					
			31						0.5					
			32	31.6 - 36.2' **SANDY LEAN CLAY WITH GRAVEL:** to **LEAN CLAY WITH SAND:** s(CL), yellowish brown (10YR 5/8), gravel (0-5%), soft, slow dilatancy, low toughness, low to medium plasticity, moist.	s(CL)				0.5					
7 CS	60 60		35						4.5					
			36–37	36.2 - 40' **SILTY CLAY:** ML/CL, gray (10YR 5/1), sand (0-10%), gravel (0-5%), hard, no dilatancy, high toughness, low plasticity, wet.	ML/CL				4.5					

RAMBOLL

Boring Number MW-32

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			38 39 40	36.2 - 40' **SILTY CLAY:** ML/CL, gray (10YR 5/1), sand (0-10%), gravel (0-5%), hard, no dilatancy, high toughness, low plasticity, wet. *(continued)*	ML/CL				4.5					
				40' End of Boring.										

SOIL BORING LOG INFORMATION

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
Kincaid Power Plant		MW-34S

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Nick Urban Geotechnology Exploration, LLC	6/6/2024	6/6/2024	Geoprobe/HSA

Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
MW-34S	Feet (NAVD88)	597.51 Feet (NAVD88)	8.3 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 1,068,407.96 N, 2,488,137.94 E E/Ⓦ
1/4 of 1/4 of Section 1, T 13 N, R 4 W
Lat 39° 35' 55.2444"
Long -89° 29' 12.7428"
Local Grid Location: Feet ☐N ☐S Feet ☐E ☐W

Facility ID	County	State	Civil Town/City/ or Village
	Christian	IL	Kincaid

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 37		0	0 - 0.5' **ORGANIC SOIL:** OL/OH, very dark gray (10YR 3/1), roots (0-5%), moist.	OL/OH									
			0.5	0.5 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) with reddish yellow (7.5YR 6/8) mottling (15-25%), very dark gray (10YR 3/1) mottling (0-5%), roots (15-25%), low plasticity, soft, moist to wet.	CL				2					
			3	3' roots end.					0.5					
2 CS	60 38		5.5	5.5' gray (10YR 6/1) and no mottling.					0.5					
			9	9' medium plasticity, trace gravel (0-5%).										Soil sample collected from 9-11 ft bgs
3 CS	60 32		10						0.5					

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

Signature	Firm	
Michael Pauie	Ramboll 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

Boring Number MW-34S

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Soil Properties: Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			13 14 15	0.5 - 15' **LEAN CLAY:** CL, pale brown (10YR 6/3) with reddish yellow (7.5YR 6/8) mottling (15-25%), very dark gray (10YR 3/1) mottling (0-5%), roots (15-25%), low plasticity, soft, moist to wet. *(continued)*	CL				0.5					
				15' End of Boring.										

WELL CONSTRUCTION FORMS

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name: MW-7S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 51.5" Long. -89° 29' 56.3" or	
Facility ID	St. Plane 1,068,011 ft. N, 2,484,728 ft. E. E /(W)	Date Well Installed: 02/02/2021
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 2, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Dave Gordon, Cascade Drilling
Distance from Waste/ Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 598.14 ft. (NAVD88)

B. Well casing, top elevation 597.64 ft. (NAVD88)

C. Land surface elevation 595.6 ft. (NAVD88)

D. Surface seal, bottom 593.6 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ________

17. Source of water (attach analysis, if required):
Distilled Water

E. Bentonite seal, top 593.6 ft. (NAVD88) or 2.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 591.6 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 589.6 ft. (NAVD88) or 6.0 ft.

I. Well bottom 584.6 ft. (NAVD88) or 11.0 ft.

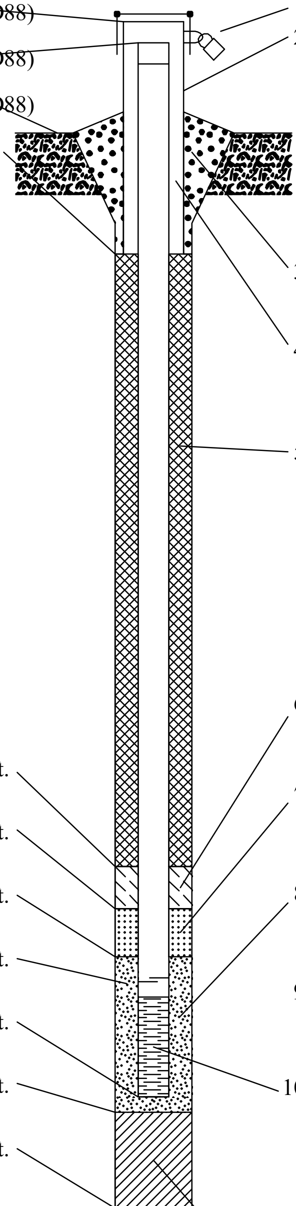
J. Filter pack, bottom 583.6 ft. (NAVD88) or 12.0 ft.

K. Borehole, bottom 580.6 ft. (NAVD88) or 15.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐
   Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.349 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ________ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ________
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.418 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
   Bentonite Chips Other ☒

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

Signature [signature]

Firm: Ramboll, 234 W. Florida Street, Milwaukee, WI 53204 Tel: (414) 837-3607 Fax: (414) 837-3608

NATURAL RESOURCE TECHNOLOGY

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Station	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 36' 0.722" Long. -89° 29' 46.969" or	MW-12
Facility ID	St. Plane 1,068,944.76 ft. N, 2,485,453.08 ft. E. E/(W)	Date Well Installed: 07/23/2015
Type of Well: mw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: (Person's Name and Firm) Chad Dutton, Bulldog Drilling
Distance from Waste/Source: ft. / State: Illinois	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☒ Downgradient; n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation ______ ft. (NAVD88)

B. Well casing, top elevation 591.44 ft. (NAVD88)

C. Land surface elevation 588.86 ft. (NAVD88)

D. Surface seal, bottom 587.9 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☒ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☒ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ Other ☐

15. Drilling fluid used: Water ☒ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required): Village of Pawnee, IL

E. Bentonite seal, top 587.9 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ______ ft. (NAVD88) or ______ ft.

G. Filter pack, top 575.9 ft. (NAVD88) or 13.0 ft.

H. Screen joint, top 573.9 ft. (NAVD88) or 15.0 ft.

I. Well bottom 563.9 ft. (NAVD88) or 25.0 ft.

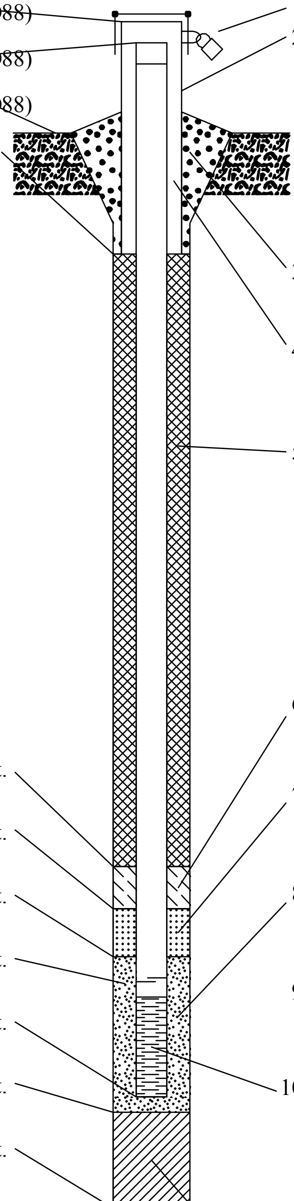
J. Filter pack, bottom 563.9 ft. (NAVD88) or 25.0 ft.

K. Borehole, bottom 563.9 ft. (NAVD88) or 25.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No. If yes, describe: Two steel bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☒ Other ☐
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. 30 % Bentonite . . . Bentonite-cement grout ☒
   e. ____ Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☒ Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Unimin Corporation, FILTERSIL
   b. Volume added ______ ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer ______
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

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

Date Modified: 11/30/2015

Signature [signature]

Firm: Natural Resource Technology, 234 W. Florida Street, Floor 5, Milwaukee, WI 53204

Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Station	______ ft. ☐ N. ☐ S. ______ ft. ☐ E. ☐ W.	MW-12D
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 36' 0.7" Long. -89° 29' 47.1" or	
Facility ID	St. Plane 1,068,940 ft. N, 2,485,443 ft. E. E /W (circled)	Date Well Installed: 01/27/2021
	Section Location of Waste/Source	
Type of Well: Well Code 72/dp	____ 1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Dave Gordon Cascade Drilling
Distance from Waste/Source ____ ft. / State: IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 591.33 ft. (NAVD88)

B. Well casing, top elevation 590.96 ft. (NAVD88)

C. Land surface elevation 589.1 ft. (NAVD88)

D. Surface seal, bottom 587.1 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ / Hollow Stem Auger ☐ / Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2 Air ☐ / Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required): Distilled Water

E. Bentonite seal, top 543.1 ft. (NAVD88) or 46.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 541.1 ft. (NAVD88) or 48.0 ft.

H. Screen joint, top 539.1 ft. (NAVD88) or 50.0 ft.

I. Well bottom 534.1 ft. (NAVD88) or 55.0 ft.

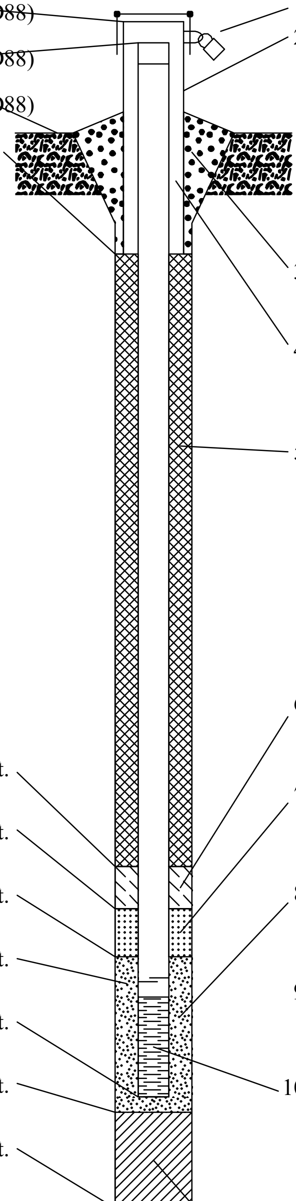
J. Filter pack, bottom 532.1 ft. (NAVD88) or 57.0 ft.

K. Borehole, bottom 489.1 ft. (NAVD88) or 100.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ / Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ / Concrete ☒ / Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ / Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☐
   b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. 9.5 Lbs/gal mud weight . . . Bentonite slurry ☒
   d. ____ % Bentonite . . . Bentonite-cement grout ☐
   e. 7.679 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ / Tremie pumped ☒ / Gravity ☐
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ / Flush threaded PVC schedule 80 ☐ / Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ / Continuous slot ☐ / Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐ / Bentonite Slurry Grout Other ☒

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

Date Modified: 5/3/2021

Signature: [signature]

Firm: Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Station	Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.	Well Name: MW-20S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 55.2" Long. -89° 29' 14.2" or	
Facility ID	St. Plane 1,068,402 ft. N, 2,488,022 ft. E. E/W (W circled)	Date Well Installed: 01/26/2021
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen Cascade Drilling
Distance from Waste/Source: ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number:	

A. Protective pipe, top elevation 601.23 ft. (NAVD88)

B. Well casing, top elevation 600.64 ft. (NAVD88)

C. Land surface elevation 598.4 ft. (NAVD88)

D. Surface seal, bottom 597.4 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐; Hollow Stem Auger ☐; Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2; Air ☐; Drilling Mud ☐ 0 3; None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required): Distilled Water

E. Bentonite seal, top 597.4 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 595.4 ft. (NAVD88) or 3.0 ft.

H. Screen joint, top 594.4 ft. (NAVD88) or 4.0 ft.

I. Well bottom 588.4 ft. (NAVD88) or 10.0 ft.

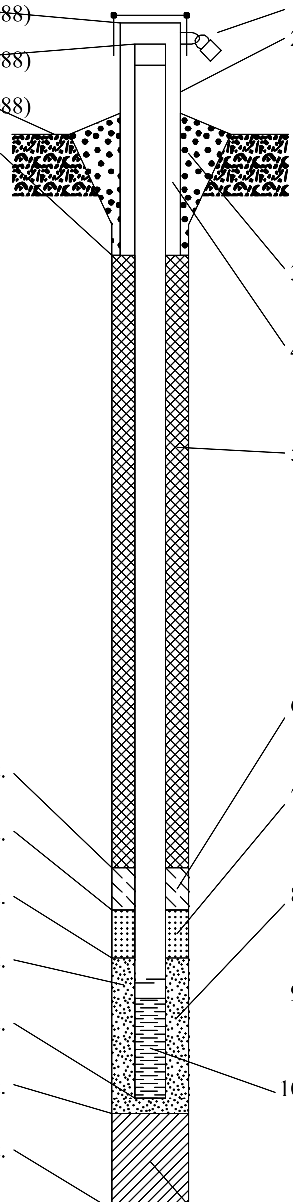
J. Filter pack, bottom 588.4 ft. (NAVD88) or 10.0 ft.

K. Borehole, bottom 588.4 ft. (NAVD88) or 10.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒; Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐; Concrete ☒; Other ☐
4. Material between well casing and protective pipe: Bentonite ☐; Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____ % Bentonite . . . Bentonite-cement grout ☐
   e. 0.349 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐; Tremie pumped ☐; Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.222 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒; Flush threaded PVC schedule 80 ☐; Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒; Continuous slot ☐; Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 6.0 ft.
11. Backfill material (below filter pack): None ☒; Other ☐

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

Date Modified: 5/3/2021

Signature: [signature]

Firm: Ramboll, 234 W. Florida Street, Milwaukee, WI 53204

Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Station	Local Grid Location of Well: ____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.	Well Name
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 48.1" Long. -89° 29' 52.5" or	MW-27
Facility ID	St. Plane 1,067,662 ft. N, 2,485,027 ft. E. E/(W)	Date Well Installed: 02/02/2021
Type of Well: Well Code 72/dp	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. 11, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Dave Gordon Cascade Drilling
Distance from Waste/Source: ft. — State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known — Gov. Lot Number	

A. Protective pipe, top elevation 600.37 ft. (NAVD88)

B. Well casing, top elevation 600.05 ft. (NAVD88)

C. Land surface elevation 597.3 ft. (NAVD88)

D. Surface seal, bottom 595.3 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
    GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
    SM ☐ SC ☒ ML ☒ MH ☐ CL ☒ CH ☐
    Bedrock ☐
13. Sieve analysis attached? ☐ Yes ☐ No
14. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ Mini Sonic Other ☒
15. Drilling fluid used: Water ☒ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☐
16. Drilling additives used? ☐ Yes ☒ No
    Describe ____
17. Source of water (attach analysis, if required):
    Distilled Water

E. Bentonite seal, top 591.3 ft. (NAVD88) or 6.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 589.3 ft. (NAVD88) or 8.0 ft.

H. Screen joint, top 587.3 ft. (NAVD88) or 10.0 ft.

I. Well bottom 582.3 ft. (NAVD88) or 15.0 ft.

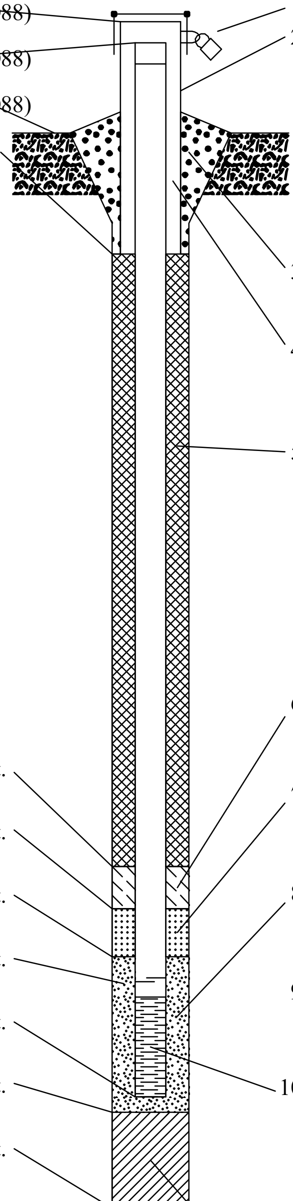
J. Filter pack, bottom 581.3 ft. (NAVD88) or 16.0 ft.

K. Borehole, bottom 577.3 ft. (NAVD88) or 20.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____ % Bentonite . . . Bentonite-cement grout ☐
   e. 0.698 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.418 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐ Bentonite Chips Other ☒

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

Date Modified: 5/3/2021

Signature [signature]

Firm: Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Station	____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	MW-28
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 57.3" Long. -89° 29' 52.7" or	
Facility ID	St. Plane 1,068,595 ft. N, 2,485,010 ft. E. E /(W)	Date Well Installed 02/02/2021
Type of Well: Well Code 72/dp	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 2, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Dave Gordon, Cascade Drilling
Distance from Waste/Source ft. / State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 601.66 ft. (NAVD88)

B. Well casing, top elevation 601.40 ft. (NAVD88)

C. Land surface elevation 598.3 ft. (NAVD88)

D. Surface seal, bottom 596.3 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☒
SM ☐ SC ☐ ML ☒ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required): Distilled Water

E. Bentonite seal, top 590.3 ft. (NAVD88) or 8.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 588.3 ft. (NAVD88) or 10.0 ft.

H. Screen joint, top 586.3 ft. (NAVD88) or 12.0 ft.

I. Well bottom 576.3 ft. (NAVD88) or 22.0 ft.

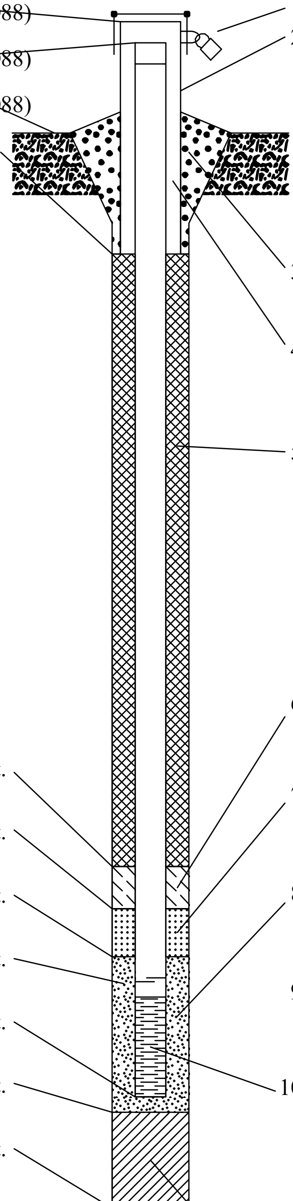
J. Filter pack, bottom 573.3 ft. (NAVD88) or 25.0 ft.

K. Borehole, bottom 573.3 ft. (NAVD88) or 25.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 1.047 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 2.683 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

I hereby certify that the information on this form is true and correct to the best of my knowledge. Date Modified: 5/3/2021

Signature [signature]

Firm Ramboll, 234 W. Florida Street, Milwaukee, WI 53204 Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Station	______ ft. ☐ N. ☐ S. ______ ft. ☐ E. ☐ W.	
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 36' 4.6" Long. -89° 29' 19.1" or	MW-30
Facility ID	St. Plane 1,069,336 ft. N, 2,486,122 ft. E. E /(W)	Date Well Installed 02/03/2021
Type of Well Well Code 72/dp	Section Location of Waste/Source ____1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Dave Gordon Cascade Drilling
Distance from Waste/ Source ft. | State IL	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known | Gov. Lot Number	

A. Protective pipe, top elevation 619.15 ft. (NAVD88)

B. Well casing, top elevation 618.47 ft. (NAVD88)

C. Land surface elevation 616.0 ft. (NAVD88)

D. Surface seal, bottom 614.0 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☒ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ______

17. Source of water (attach analysis, if required):
Distilled Water

E. Bentonite seal, top 585.0 ft. (NAVD88) or 31.0 ft.

F. Fine sand, top ______ ft. (NAVD88) or ______ ft.

G. Filter pack, top 583.0 ft. (NAVD88) or 33.0 ft.

H. Screen joint, top 581.0 ft. (NAVD88) or 35.0 ft.

I. Well bottom 576.0 ft. (NAVD88) or 40.0 ft.

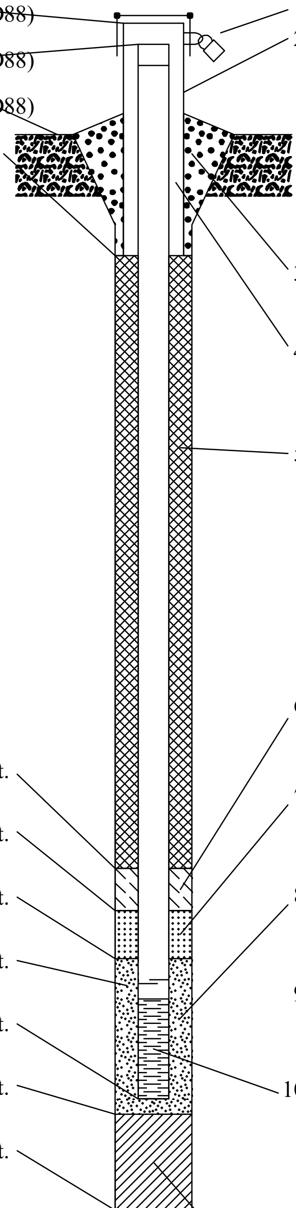
J. Filter pack, bottom 574.0 ft. (NAVD88) or 42.0 ft.

K. Borehole, bottom 571.0 ft. (NAVD88) or 45.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐
   Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ______Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ______Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ______% Bentonite . . . Bentonite-cement grout ☐
   e. 5.061 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ______ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ______
   b. Volume added ______ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.614 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
    Bentonite Chips Other ☒

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

Date Modified: 5/3/2021

Signature	Firm	
[signature]	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name	Local Grid Location of Well	Well Name
Kincaid Power Station	____ ft. ☐ N. ☐ S. ____ ft. ☐ E. ☐ W.	MW-32
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒	
	Lat. 39° 36' 4.6" Long. -89° 29' 19.1" or	
Facility ID	St. Plane 1,069,354 ft. N, 2,487,630 ft. E. E /Ⓦ	Date Well Installed 02/03/2021
	Section Location of Waste/Source	
Type of Well: Well Code 72/dp	____ 1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Adam Jochimsen
Distance from Waste/ Source ft. / State IL	Location of Well Relative to Waste/Source: u ☐ Upgradient; s ☐ Sidegradient; d ☐ Downgradient; n ☐ Not Known / Gov. Lot Number	Cascade Drilling

A. Protective pipe, top elevation 619.76 ft. (NAVD88)

B. Well casing, top elevation 619.49 ft. (NAVD88)

C. Land surface elevation 617.2 ft. (NAVD88)

D. Surface seal, bottom 615.2 ft. (NAVD88) or 2.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☒ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
Mini Sonic Other ☒

15. Drilling fluid used: Water ☒ 0 2 Air ☐
Drilling Mud ☐ 0 3 None ☐

16. Drilling additives used? ☐ Yes ☒ No

Describe ____

17. Source of water (attach analysis, if required):
Distilled Water

E. Bentonite seal, top 590.2 ft. (NAVD88) or 27.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 587.2 ft. (NAVD88) or 30.0 ft.

H. Screen joint, top 585.2 ft. (NAVD88) or 32.0 ft.

I. Well bottom 580.2 ft. (NAVD88) or 37.0 ft.

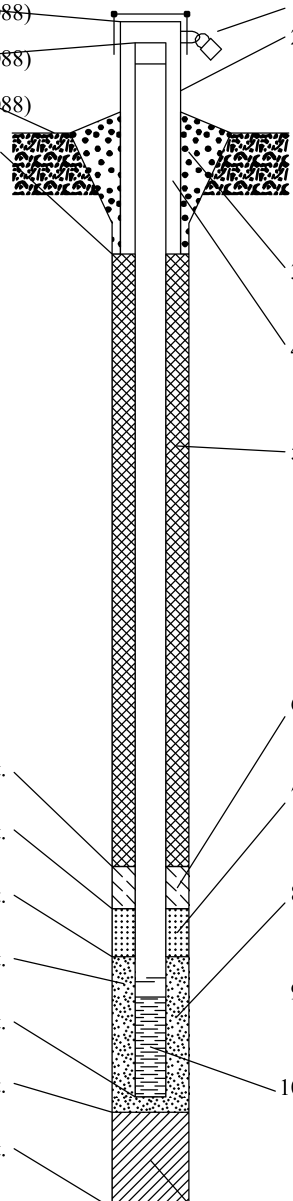
J. Filter pack, bottom 579.2 ft. (NAVD88) or 38.0 ft.

K. Borehole, bottom 577.2 ft. (NAVD88) or 40.0 ft.

L. Borehole, diameter 6.0 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: Bollards
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐
   Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____ Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____ % Bentonite . . . Bentonite-cement grout ☐
   e. 4.363 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. Filter Sil, Industrial Quartz
   b. Volume added 1.418 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒
   Flush threaded PVC schedule 80 ☐
   Other ☐
10. Screen material: Schedule 40 PVC
    a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
    b. Manufacturer Johnson Screens
    c. Slot size: 0.010 in.
    d. Slotted length: 5.0 ft.
11. Backfill material (below filter pack): None ☐
    Formation Materials Other ☒

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

Date Modified: 5/3/2021

Signature	Firm	
[signature]	Ramboll 234 W. Florida Street, Milwaukee, WI 53204	Tel: (414) 837-3607 Fax: (414) 837-3608

RAMBOLL

MONITORING WELL CONSTRUCTION

Facility/Project Name: Kincaid Power Plant	Local Grid Location of Well: ____ft. ☐ N. ☐ S. ____ft. ☐ E. ☐ W.	Well Name: MW-34S
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☒ Lat. 39° 35' 55.2" Long. -89° 29' 12.7" or	
Facility ID	St. Plane 1,068,408 ft. N, 2,488,138 ft. E. S / C / N	Date Well Installed: 06/06/2024
Type of Well: Well Code 71/dw	Section Location of Waste/Source: ____1/4 of ____ 1/4 of Sec. 1, T. 13 N, R. 4 ☐ E ☒ W	Well Installed By: (Person's Name and Firm) Nick Urban, Geotechnology Exploration, LLC
Distance from Waste/Source ft. / State: IL	Location of Well Relative to Waste/Source: u ☐ Upgradient, s ☐ Sidegradient, d ☐ Downgradient, n ☐ Not Known / Gov. Lot Number	

A. Protective pipe, top elevation 601.03 ft. (NAVD88)

B. Well casing, top elevation 600.59 ft. (NAVD88)

C. Land surface elevation 597.5 ft. (NAVD88)

D. Surface seal, bottom 596.5 ft. (NAVD88) or 1.0 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☒ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ Hollow Stem Auger ☒ ____ Other ☐

15. Drilling fluid used: Water ☐ 0 2 Air ☐ Drilling Mud ☐ 0 3 None ☒

16. Drilling additives used? ☐ Yes ☒

Describe ____

17. Source of water (attach analysis, if required):
N/A

E. Bentonite seal, top 596.5 ft. (NAVD88) or 1.0 ft.

F. Fine sand, top ____ ft. (NAVD88) or ____ ft.

G. Filter pack, top 593.5 ft. (NAVD88) or 4.0 ft.

H. Screen joint, top 592.5 ft. (NAVD88) or 5.0 ft.

I. Well bottom 582.5 ft. (NAVD88) or 15.0 ft.

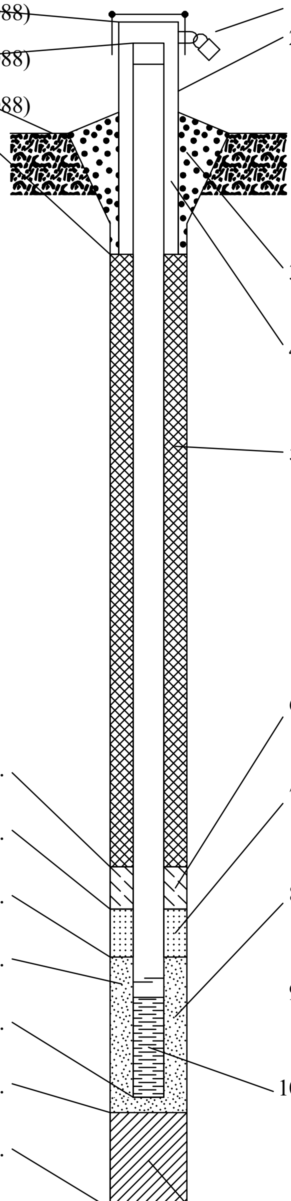
J. Filter pack, bottom 582.5 ft. (NAVD88) or 15.0 ft.

K. Borehole, bottom 582.5 ft. (NAVD88) or 15.0 ft.

L. Borehole, diameter 8.3 in.

M. O.D. well casing 2.38 in.

N. I.D. well casing 2.07 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
   a. Inside diameter: 4.0 in.
   b. Length: 5.0 ft.
   c. Material: Steel ☒ Other ☐
   d. Additional protection? ☒ Yes ☐ No
   If yes, describe: 4 Bollards and 6' visibility pole w/ flag
3. Surface seal: Bentonite ☐ Concrete ☒ Other ☐
4. Material between well casing and protective pipe: Bentonite ☐ Sand Other ☒
5. Annular space seal: a. Granular/Chipped Bentonite ☒
   b. ____Lbs/gal mud weight . . . Bentonite-sand slurry ☐
   c. ____Lbs/gal mud weight . . . Bentonite slurry ☐
   d. ____% Bentonite . . . Bentonite-cement grout ☐
   e. 0.694 Ft^3 volume added for any of the above
   f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☒
6. Bentonite seal: a. Bentonite granules ☐
   b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒
   c. ____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
   a. ____
   b. Volume added ____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
   a. P. W. Gillibrand Co., Inc. Industrial Sand
   b. Volume added 3 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ Flush threaded PVC schedule 80 ☐ Other ☐
10. Screen material: Schedule 40 PVC
   a. Screen Type: Factory cut ☒ Continuous slot ☐ Other ☐
   b. Manufacturer Johnson Screens
   c. Slot size: 0.010 in.
   d. Slotted length: 10.0 ft.
11. Backfill material (below filter pack): None ☒ Other ☐

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

Date Modified: 10/11/2024

Signature	Firm	
Michael Fanie (signature)	Ramboll, 333 W. Wacker Drive Suite 1050, Chicago IL, 60640	Tel: Fax:

APPENDIX B
35 I.A.C. § 845 Multi-Site Statistical Analysis Plan

Date
April 1, 2025

Project No.
1940110241

35 I.A.C § 845 MULTI-SITE STATISTICAL ANALYSIS PLAN

35 I.A.C § 845 MULTI-SITE STATISTICAL ANALYSIS PLAN

Project no.	**1940110241**
Recipient	**Vistra Corp**
Document type	**Statistical Analysis Plan**
Revision	**FINAL**
Date	**April 1, 2025**
Prepared by	**Rachel Banoff and Alison O'Connor**
Checked by	**Eric J. Tlachac, PE**
Approved by	**Brian G. Hennings, PG**

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

T 414-837-3607
F 414-837-3608
https://ramboll.com

Rachel A. Banoff
Environmental Engineer

Alison O'Connor
Senior Lead Consultant

Eric J. Tlachac, PE
Senior Managing Engineer

Brian G. Hennings, PG
Senior Managing Hydrogeologist

LICENSED PROFESSIONAL CERTIFICATIONS

This certification is based on the description of the statistical methods selected to evaluate groundwater as presented in the following 35 I.A.C. § 845 Multi-Site Statistical Analysis Plan. The procedures described in the plan will be used to establish background conditions and implement compliance and corrective action monitoring as necessary and required by 35 I.A.C. § 845.640, § 845.650, and § 845.680. The 35 I.A.C. § 845 Multi-Site Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in the United States Environmental Protection Agency (USEPA)'s *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance,* USEPA 2009), and is intended to provide a logical process and framework for conducting the statistical analysis of the data obtained during groundwater monitoring. In accordance with 35 I.A.C. § 845.640(f)(1), the statistical method chosen for analysis of background groundwater quality is the tolerance interval procedure for each constituent listed in 35 I.A.C. § 845.600(a)(1) at this CCR unit per 35 I.A.C. § 845.640(f)(1)(C). Groundwater Protection Standards (GWPS) will be established in accordance with 35 I.A.C. § 845.600(a) (greater of the background concentration or numerical limit specified in 35 I.A.C. § 845.600(a)(1)). The GWPS will be compared to the appropriate confidence interval for the observed concentrations for each constituent in each compliance well. Consistent with the *Unified Guidance*, the same general statistical method of confidence interval testing against a fixed GWPS is recommended in compliance and corrective action programs. Confidence intervals provide a flexible and statistically accurate method to test how a parameter estimated from a single sample compares to a fixed numerical limit. Confidence intervals explicitly account for variation and uncertainty in the sample data used to construct them.

Description of the statistical methods chosen for analysis of groundwater monitoring data and application of these methods for determining exceedances of the GWPS identified in 35 I.A.C. § 845.600(a) is provided in this 35 I.A.C. § 845 Multi-Site Statistical Analysis Plan.

35 I.A.C. § 845.640 Statistical Analysis (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the statistical methods summarized above and described in this document (35 I.A.C. § 845 Multi-Site Statistical Analysis Plan) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § 845.640.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: April 1, 2025

35 I.A.C. § 845.640 Statistical Analysis (PG)

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the statistical methods described in this document (35 I.A.C. § 845 Multi-Site Statistical Analysis Plan) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § *845.640.*

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Date: April 1, 2025

35 I.A.C. § 845.640 Statistical Analysis

I, Rachel A. Banoff, a qualified professional, certify that the statistical methods described in this document (35 I.A.C. § 845 Multi-Site Statistical Analysis Plan), are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § *845.640.*

Rachel A. Banoff, EIT
Project Statistician
Date: April 1, 2025

DOCUMENT REVISION RECORD

Issue No.	Date	Details of Revisions
Revision 0	April 1, 2025	• Original Document

DOCUMENT APPLICABILITY BY FACILITY OWNER

Table A. Document Applicability by Facility Owner

Facility & Owner	Unit ID	Unit Name
Baldwin Power Plant Dynegy Midwest Generation, LLC	601	Bottom Ash Pond
	605	Fly Ash Pond System
Coffeen Power Plant Illinois Power Generating Company	101	Ash Pond No. 1
	102	Ash Pond No. 2
	103	GMF Gypsum Stack Pond
	104	GMF Recycle Pond
Duck Creek Power Plant Illinois Power Resources Generating, LLC	201/202	Ash Pond No. 1 Ash Pond No. 2
	203	GMF Pond
	205	Bottom Ash Basin
Edwards Power Plant Illinois Power Resources Generating, LLC	301	Ash Pond
Hennepin Power Plant Dynegy Midwest Generation, LLC	802	Ash Pond No. 2
	803	East Ash Pond
	804	Old West Ash Pond
	802/805	Ash Pond No. 2 Ash Pond No. 4
Joppa Power Plant Electric Energy, Inc.	401	East Ash Pond
	403	West Ash Pond
Kincaid Power Plant Kincaid Generation, LLC	141	Ash Pond
Newton Power Plant Illinois Power Generating Company	501	Primary Ash Pond
Vermilion Power Plant Dynegy Midwest Generation, LLC	910	North Ash Pond
	911/912	Old East Ash Pond New East Ash Pond

CONTENTS

FIGURES (IN TEXT)

ACRONYMS AND ABBREVIATIONS

%	percent
35 I.A.C.	Title 35 of the Illinois Administrative Code
CCR	coal combustion residuals
CI	confidence interval
DQR	Double Quantification Rule
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
IEPA	Illinois Environmental Protection Agency
LCL	lower confidence limit
LTL	lower tolerance limit
MDL	method detection limit
PQL	practical quantitation limit
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
SAP	Sampling and Analysis Plan
SI	surface impoundment
UCL	upper confidence limit
Unified Guidance	Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance (USEPA, 2009)
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

1. INTRODUCTION

In April 2021, the Illinois Environmental Protection Agency (IEPA) issued a final rule for the regulation and management of coal combustion residuals (CCR) in surface impoundments (SIs) under the Standards for the Disposal of CCR in Surface Impoundments: Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845. Facilities regulated under 35 I.A.C. § 845 are required to develop and sample a groundwater monitoring well system to evaluate whether impounded CCR materials are impacting groundwater quality. The groundwater quality evaluation must include certification from a qualified professional engineer that the selected statistical method is appropriate for evaluating groundwater monitoring data for the CCR surface impoundment. The procedures described in the evaluation will be used to establish background conditions and implement Compliance and Corrective Action Monitoring as necessary and required by 35 I.A.C. § 845.640, § 845.650, § 845.680, and § 845.780. This Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in United States Environmental Protection Agency's (USEPA's) Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance (Unified Guidance) (USEPA, 2009).[1]

1.1 Statistical Analysis Objectives

This Multi-Site Statistical Analysis Plan provides a framework for conducting the statistical analyses of groundwater data collected during operation, post-closure care, and corrective action monitoring (if required). This Multi-Site Statistical Analysis Plan does not include procedures for groundwater sample collection and analysis conducted in accordance with the Multi-Site Sampling and Analysis Plan (SAP; Ramboll, 2022) or data quality evaluation conducted in accordance with the Multi-Site Quality Assurance Project Plan (QAPP; Ramboll, 2022).[2]

1.2 Statistical Analysis Plan Approach

The analyses described in this document are intended to support monitoring programs described in detail in the CCR unit-specific Operating Permit Groundwater Monitoring Plans (GMPs), Closure Construction Permit GMPs, and Corrective Action GMPs. When necessary and contingent upon equivalent statistical power, an alternative test consistent with the performance standards in 35 I.A.C. § 845.640(g), not included in this Statistical Analysis Plan, may be chosen due to site-specific data requirements.

35 I.A.C. § 845 outlines three phases of groundwater monitoring:

- Baseline Monitoring in accordance with 35 I.A.C. § 845.650(b)(1)
- Compliance Monitoring in accordance with 35 I.A.C. § 845.650 and 35 I.A.C. § 845.780(b)
- Corrective Action Monitoring in accordance with 35 I.A.C. § 845.680(a)

Each phase of the groundwater monitoring program requires specific statistical procedures to accomplish the intended purpose. During the first phase, background groundwater quality will be established, utilizing upgradient and background wells. Compliance Monitoring, which

[1] Despite being currently archived on USEPA's website, the Unified Guidance remains a valid reference for developing a statistical analysis plan (personal communication with Alison O'Connor, February 11, 2025).

[2] The Multi-Site Sampling and Analysis Plan and Multi-Site Quality Assurance Project plan are living documents which are subject to routine evaluation and updates in accordance with USEPA recommended best practices (USEPA 2020; USEPA 2023).

encompasses data collection and statistical evaluation conducted during unit operation and the post-closure care period, will then evaluate whether exceedances occur for 20 required constituents (per 35 I.A.C. § 845.600(a)(1)) relative to the groundwater protection standard (GWPS) established by 35 I.A.C. § 845.600. Corrective Action Monitoring evaluates remedy progress and completion and will be initiated upon implementation of the Corrective Action GMP.

2. GROUNDWATER DATA EVALUATION AND STATISTICAL ASSUMPTIONS

The following subsections outline the statistical tests and procedures utilized to evaluate data collected for consistency with statistical assumptions and evaluate data distribution. These methods may be used in any phase of groundwater monitoring.

2.1 Sample Independence

Independence of sample results is a major assumption for most statistical analyses. To ensure physical independence of groundwater sampling results, the minimum time between sampling events must be longer than the time required for groundwater to move through the monitoring well. Therefore, the minimum time interval between sampling events is a function of the groundwater velocity and well bore volume (diameter of the well and surrounding filter pack). The sampling schedules for Baseline Monitoring, Compliance Monitoring, and Corrective Action Monitoring are specified in 35 I.A.C. § 845 and may conflict with the statistical assumption of independence of sample results.

2.2 Non-Detect Data Processing

Groundwater sample analysis results below the reporting limit (RL), also referred to as the practical quantitation limit (PQL), will not be used in statistical calculations due to the inherent uncertainty in results that are estimated between the method detection limit (MDL) and RL/PQL, and error assumptions inherent to the statistical calculations. Results below the RL/PQL will be considered non-detect data. For statistical characterization evaluations (*e.g.*, distribution testing, and trend analysis), non-detects were replaced with the half of the RL for the analysis. For statistical test procedures that involve the calculation of a mean and standard deviation (as described in **Section 3**):

- If the frequency of non-detect data are less than or equal to 15 percent (%), half of the RL will be substituted for these data.
- If the non-detect frequency is greater than 15% and less than or equal to 50% and the data are normally or log-normally distributed (**Section 2.3**), the Kaplan-Meier method will be used to estimate the mean and standard deviation adjusted for the presence of left-censored values.
- If the non-detect frequency is greater than 50% or data are not normally or log-normally distributed (**Section 2.3**), a non-parametric test or calculation will be used.

2.3 Testing for Normality

In accordance with 35 I.A.C. § 845.640(g)(1), "the statistical method used to evaluate groundwater monitoring data must be appropriate for the distribution of constituents". The Unified Guidance document recommends the Shapiro-Wilk normality test for sample sizes of 50 or less, and the Shapiro-Francia normality test for sample sizes greater than 50. Log-transformation of datasets to achieve normal distributions is preferred to using non-parametric methods. However, if data normality cannot be achieved through log transformation, a non-parametric method is used.

2.4 Outlier Evaluation and Management

Groundwater analytical data may be screened for the existence of outliers using methods described by the Unified Guidance. Outliers are extreme data points that may represent an anomaly or erroneous data point. To test for outliers, one or more of the following outlier tests will be utilized:

- Dixon's test, for well-constituent pairs with less than 25 samples, assumes normally distributed data.
- Rosner's test, for well-constituent pairs with more than 20 samples, assumes normally distributed data.
- Grubb's test for well-constituent pairs with seven or more samples, assumes normally distributed data.

In addition, time series, box-whisker plots, and probability plots will be used to provide visual tools to identify potential outliers, and evaluation of seasonal, spatial, or temporal variability for both normally and non-normally distributed data.

When necessary, a confirmatory sample will be collected to allow the facility to distinguish between an outlier and a true release from the facility (35 I.A.C. § 845.650(d)). If re-sampling is necessary, this sample will be collected within 60 days following outlier identification. Rigorous data validation and review is preferred to formal outlier testing and exclusion to ensure that all data used in statistical evaluations is representative of field conditions. Quality control/quality assurance data are collected and data verification is completed in accordance with the QAPP. Project staff familiar with the site and historical data will review the data generated each quarter and facilitate additional validation as needed. Data quality control, groundwater geochemistry, and sampling procedures will be evaluated as potential sources of error leading to an outlier result. Exclusion of potential outliers without an identified source of error may be considered only for data that could cause extremely elevated background concentrations.

2.5 Trend Analysis

Statistical analyses confirming the lack of trend are a fundamental step to confirm the assumption that groundwater quality values (*i.e.,* constituent means) are stationary or constant over time. These analyses allow for evaluation of variation in the background and compliance data for each constituent over time. A statistically significant increasing trend in the background data could indicate an existing release from the CCR unit or alternative source, requiring further investigation. In addition, statistically significant trending background data can result in increased standard deviation and, therefore, greater prediction or tolerance limits. Consequently, the increased prediction or tolerance limit will have less statistical power or ability to identify a release from a CCR unit.

A linear regression, coupled with a t-test for slope significance at a 95% confidence level (or 0.05 significance level), may be used on datasets for each constituent with few non-detects and a normally distributed variance of the mean to evaluate time trends. The Theil-Sen trend line, coupled with the Mann-Kendall test for slope significance at a 95% confidence level (or 0.05 significance level), may be used for datasets with frequent non-detects or non-normal variance. Similarly, trend analyses could also be used on compliance data to evaluate a possible release from the CCR unit.

2.6 Spatial Variation

Spatial trends and/or variation between background wells could indicate an existing release from a CCR unit. If the spatial variability is not due to an existing release, intrawell comparisons in compliance wells may be used to account for spatial variability and monitor for a future release. However, the CCR units being monitored have been placed into service prior to the start of groundwater monitoring and it is unknown whether a previous release has occurred. Accordingly, intrawell comparisons in compliance wells cannot be used to determine the occurrence of a future release, and interwell comparisons between compliance wells and background wells will be used.

2.7 Temporal Variation

Time series plots can be used to identify temporal dependence. Potentially significant temporal components of variability can be identified by graphing single constituent data from multiple wells together on a time series plot. With temporal dependence, the time series plot has a pattern of parallel traces, in which the individual wells will tend to rise and fall together across the sequence of sampling dates. Time series plots can be helpful by plotting multiple constituents over time for the same well, or averaging values for each constituent across wells on each sampling event and then plotting the averages over time. In either case, the plots can signify whether the general concentration pattern over time is simultaneously observed for different constituents. If so, it may indicate that a group of constituents is highly correlated in groundwater or that the same artifacts of sampling and/or lab analysis impacted the results of several monitoring parameters.

2.8 Updating Background

Updating the background dataset periodically by adding recent results to an existing background dataset can improve the statistical power and accuracy of the statistical analysis, especially for non-parametric prediction intervals. The Unified Guidance recommends updating statistical limits (background) when at least four to eight new measurements (every 2 to 4 years under a semiannual monitoring program or 1 to 2 years under a quarterly monitoring program) are available for comparison to historical data. Methods discussed in **Section 2.4** and professional judgement will be used to evaluate whether any individual data points appear to drive an anomalously high background level. A t-test for equal means (if normal data distribution) or a Mann-Whitney or Wilcoxon test for equal medians (if non-normal data distribution) will be conducted to verify that the two groups of background sample populations are statistically different prior to updating any background datasets. A 0.05 significance level will be utilized when evaluating the two populations, with the null hypothesis that the two populations have equal means or medians. In addition, time series graphs or other trend evaluation statistics (such as a Mann-Kendall test) will be conducted on the new background dataset to verify the absence of a release or changing groundwater quality. If the tests indicate that there are no statistical differences between the two background populations, the new data will be combined with the existing dataset. If the two populations are found to be different, the data will be reviewed to evaluate the cause of the difference. If the differences appear to be caused by a release (*i.e.,* if the new data are significantly higher, or lower for pH), then the previous background dataset may continue to be used. Furthermore, verified outliers will not be added to an existing background dataset. Spatial variability among background wells will also be assessed when background datasets are updated to determine whether pooling data is appropriate.

3. COMPLIANCE MONITORING PROGRAM

Compliance Monitoring encompasses data collection and statistical evaluation conducted during unit operation (35 I.A.C. § 845.640 and 845.650) and the post-closure care period (35 I.A.C. § 845.780). Compliance Monitoring is designed to evaluate whether concentrations of constituents listed in 35 I.A.C. § 845.600(a)(1) in compliance wells exceed GWPS or background in a statistically significant manner.

3.1 Monitoring Program Outline

3.1.1 Establish Background and GWPS

A site-specific GWPS will be established for constituents listed in 35 I.A.C. § 845.600(a)(1) for each CCR unit. The GWPS will be the concentration specified in 35 I.A.C. § 845.600(a)(1), unless the background concentration is greater. For this exception, background concentrations will be used to define the GWPS. Background concentrations will be calculated using a parametric or non-parametric upper tolerance limit (UTL), depending on the data distribution, consistent with 35 I.A.C. § 845.640(f)(1)(C). The procedure for calculating a UTL is outlined in **Figure 1** and described in **Section 3.2**. If only one background result is detected, that value will be used as the UTL.

3.1.2 Evaluate Background and GWPS Exceedances

Per 35 I.A.C. § 845.610(b)(3), groundwater monitoring data from compliance monitoring wells will be evaluated for statistically significant exceedances over background and the site-specific GWPS. In accordance with recommendation in the Unified Guidance for compliance monitoring, exceedances are evaluated by comparing a confidence interval (CI) to a fixed standard. The null hypothesis of this comparison is that compliance well groundwater concentrations do not exceed the standard unless the statistical test indicates otherwise.

GWPS exceedances will be determined by comparing the lower confidence limit (LCL) of the compliance well concentrations to the GWPS, except for pH where the LCL will be compared to the upper end of the GWPS range, and the upper confidence limit (UCL) compared to the low end of the GWPS range. A GWPS exceedance is determined if the LCL is greater than the GWPS, and, for pH, either the LCL is greater than the upper end of the GWPS range or the UCL is less than the low end of the GWPS range. The method of calculating the CI (outlined in **Figure 2** and described in **Section 3.3**) will be determined by sample size, trends in the data, and data normality. The significance level (alpha) for this calculation will be fixed at 0.01 (99% confidence) as recommended by Unified Guidance. If there are too few data points to calculate an LCL (a minimum of four data points is typically required), the most recent data point will be compared to the GWPS.

In the event that statistical analyses identify an exceedance of the GWPS for one or more parameters, the exceedance parameters and wells of concern may be immediately re-sampled. Compliance Monitoring statistics will be updated using the verification resample. If the Compliance Monitoring statistics using the compliance verification resample data result in an exceedance of the GWPS, the exceedance is confirmed.

Comparison of groundwater monitoring data to background is required by 35 I.A.C. § 845.610(3)(B), but these background "exceedances" do not carry any compliance implications.

Background exceedances will be determined by comparing the LCL of the compliance well concentrations to the background UTL, with the exception of pH where the UCL of the compliance well concentrations will also be compared to the background lower tolerance limit (LTL). A background exceedance is determined if the LCL is greater than the background UTL, or, for pH, either the LCL is greater than the UTL or the UCL is less than the LTL. If there are too few data points to calculate an LCL (a minimum of four data points is required), the most recent data point will be compared to the background UTL (and LTL for pH).

Additionally, an exceedance of either background or GWPS will be identified if the constituent monitored was not detected in all previous samples at a compliance well and the two most recent samples have both detections and exceed the GPWS (or are less than the low end of the GWPS range for pH) or background UTL (or are less than the LTL for pH).

3.2 Upper Tolerance Limit

The method for calculating a UTL depends primarily on the proportion of non-detects and the data distribution (**Figure 1**). A parametric UTL will be used to calculate the GWPS when the background data are normally distributed and have a non-detect frequency of 50% or less. The Unified Guidance recommends 95% confidence level and 95% coverage (95/95 tolerance interval). When the non-detect frequency is 15% or less, half the RL will be substituted for non-detects (simple substitution), and the normal mean and standard deviation will be calculated. The Kaplan-Meier method will be used when the detection frequency is between 15% and 50%. The Kaplan-Meier method assesses the linearity of a censored probability plot to determine whether the background sample can be approximately normalized. If so, then the Kaplan-Meier method will be used to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. The Kaplan-Meier estimate of the mean and standard deviation will be substituted for the sample mean and standard deviation.

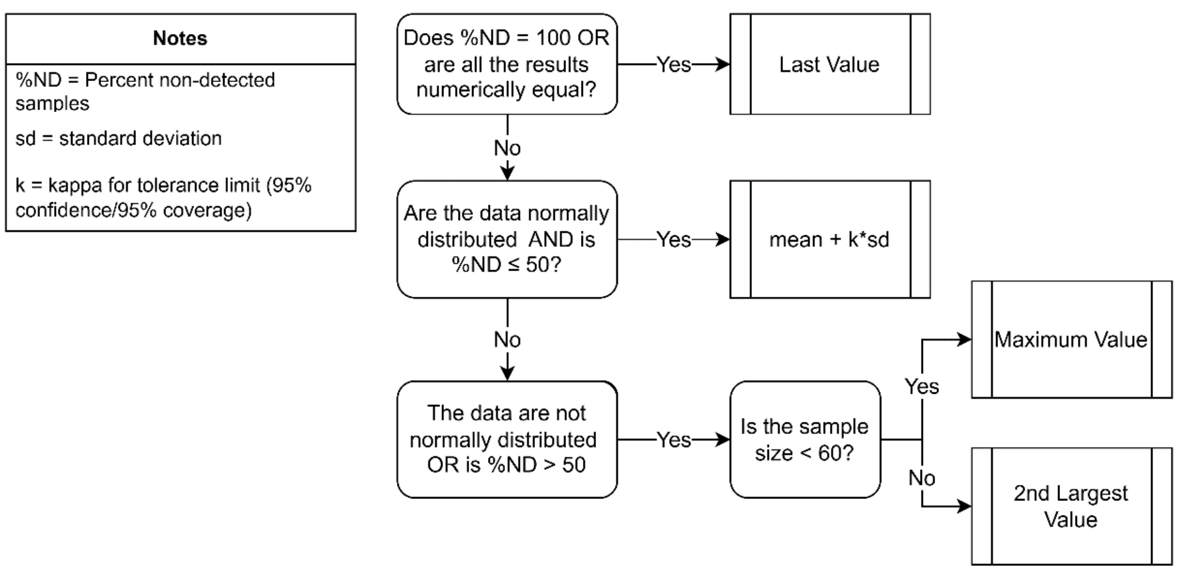


Figure 1. Flow chart illustrating the statistical methods used for calculating background under Compliance Monitoring.

The parametric UTL on a future mean will be calculated from the background dataset as follows:

$$UTL = \overline{x} + \kappa\,(n, \gamma, \alpha - 1) \cdot s$$

$\overline{x}$ = background sample mean

s = background sample standard deviation

$\kappa\,(n, \gamma, \alpha - 1)$ = one-sided normal tolerance factor based on the chosen coverage (γ) and confidence level (α -1) and the size of the background dataset (n). Values may be calculated per Millard (2013) or looked up in Table 17-3 in Appendix D of the Unified Guidance.

If the UTL is constructed on the logarithms of original observations to achieve normality, where $\overline{y}$ and s_y are the log-mean and log-standard deviation, the limit will be exponentiated for back-transformation to the concentration scale as follows:

$$TL = \exp\left[\overline{y} + \kappa\,(n, \gamma, \alpha - 1) \cdot s_y\right]$$

$\overline{y}$ = background sample log-mean

s_y = background sample log-standard deviation

If the background data set is non-parametric or has a non-detect frequency greater than 50%, a non-parametric UTL is used. The maximum concentration is used as the non-parametric UTL for sample sizes less than 60 and the second largest concentration is used as the non-parametric UTL for sample sizes greater than or equal to 60. As described in the Unified Guidance, the advantages include the resulting UTL reflecting actual concentration magnitudes, and the UTL more likely representing a detected concentration (unless all the data were non-detect).

3.3 Confidence Intervals

The method for calculating a CI depends on whether or not there is a trend in the data, the proportion of non-detects, and the data distribution (**Figure 2**). The following sections describe the procedure for calculating the CI in each case.

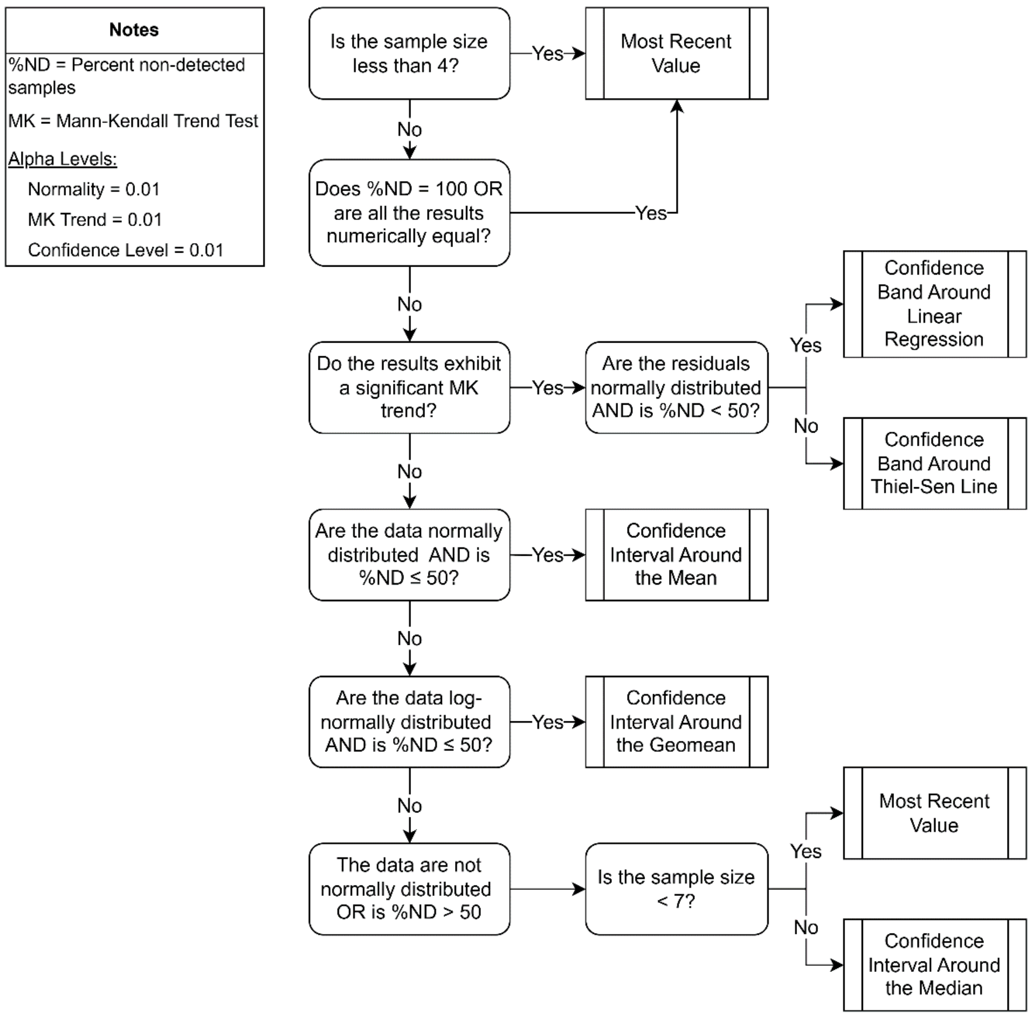


Figure 2. Flow chart illustrating the statistical methods used for calculating confidence intervals in Compliance Monitoring.

3.3.1 Confidence Intervals Around Trending Data

If compliance data exhibit a statistically significant trend based on results from a Mann-Kendall trend test and consists of a sufficient sample size (see below), CIs accounting for trends will be constructed to account for the trend-induced variation. If this is not accounted for, a wider CI will inevitably be calculated for a given confidence level and sample size (*n*). A wider CI will result in less statistical power, or ability to demonstrate an exceedance or return to compliance. When a linear trend line has been estimated, a series of CIs is estimated at each point along the trend. This creates a simultaneous confidence band that follows the trend line. As the underlying population mean increases or decreases, the confidence band also increases to reflect this change at that point in time.

Linear regression will be used when the compliance data set consists of at least eight samples, the frequency of non-detects is below 50%, and residuals around the trend line are normally distributed. The linear regression of concentration against sampling date (time) will be computed as follows:

$$\hat{b} = \sum_{i=1}^{n} (t_i - \bar{t}) \cdot x_i / (n-1) \cdot s_t^2$$

x_i = i^{th} concentration value and

t_i = i^{th} sampling date

$\bar{t}$ = sampling mean date

s_t^2 = variance of the sampling dates

This estimate leads to the following regression equation:

$$\hat{x} = \bar{x} + \hat{b} \cdot (\mathrm{t} - \bar{t})$$

$\bar{x}$ = mean concentration level

$\hat{x}$ = estimated mean concentration at time t

The regression residuals will also be computed at each sampling event to ensure uniformity and lack of significant skewness. Regression residuals will be computed at each sampling event as follows:

$$r_i = x_i - \hat{x}_i$$

The estimated variance around the regression line, or mean squared error, will be computed as follows:

$$s_e^2 = \frac{1}{n-2} \sum_{i=1}^{n} r_i^2$$

The CI around a linear regression trend line given confidence level (1-α) and a point in time (t_0), will be computed as follows:

$$LCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-1} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2}\right]}$$

$$UCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-2} \cdot \left[\frac{1}{n} + \frac{(t_0 - \bar{t})^2}{(n-1) \cdot s_t^2}\right]}$$

$\hat{x}_0$ = estimated mean concentration from the regression equation at time t_0

$F_{1-2\alpha,2,\mathrm{n}-2}$ = upper $(1\text{-}2\alpha)^{th}$ percentage point from an *F*-distribution with 2 and (*n*-2) degrees of freedom

If the compliance data set consists of at least seven samples but has a non-detect frequency greater than 50% or the residuals are not normally distributed, the Thiel-Sen trend line will be used as a non-parametric alternative to linear regression for calculation of the CI. The Thiel-Sen trend line estimates the median concentration over time by combining the median pairwise slope with the median concentration value and the median sample date. To compute the Thiel-Sen line, the data will first be ordered by sampling event x_1, x_2, x_n. All possible distinct pairs of measurements (x_i, x_j) for $j > i$ will be considered and the simple pairwise slope estimate will be computed for each pair as follows:

$$m_{ij} = (x_j - x_i)/(j - i)$$

With a sample size of n, there will be a total of $N = n(n\text{-}1)/2$ pairwise estimates m_{ij}. If a given observation is a non-detect, half the RL will be substituted. The N pairwise slope estimates (m_{ij}) will be ordered from least to greatest (renamed $m_{(1)}$, $m_{(2)}$,..$m_{(N)}$). The Thiel-Sen estimate of slope (Q) will be calculated as the median value of the list depending on whether N is even or odd as follows:

$$Q = \begin{cases} m_{([N+1]/2)} \ if\ N\ is\ odd \\ (m_{(N/2)} + m_{([N+2]/2)})/2\ if\ N\ is\ even \end{cases}$$

The sample concentration magnitude will be ordered from least to greatest, $x_{(1)}$, $x_{(2)}$, to $x_{(n)}$ and the median concentration will be calculated as follows:

$$\tilde{x} = \begin{cases} x_{([n+1]/2)} \ if\ n\ is\ odd \\ (x_{(n/2)} + x_{([n+2]/2)})/2\ if\ n\ is\ even \end{cases}$$

The median sampling date ($\tilde{t}$) with ordered times ($t_{(1)}$, $t_{(2)}$, to $t_{(n)}$) will also be determined in this way. The Thiel-Sen trend line will then be computed for an estimate at any time (t) of the expected median concentration (x) as follows:

$$x = \tilde{x} + Q \cdot (\mathrm{t} - \tilde{t}) = (\tilde{x} - Q \cdot \tilde{t}) + Q \cdot \mathrm{t}$$

To construct a confidence band around the Thiel-Sen line, sample pairs (t_i, x_i) will be formed with a sample date (t_i) and the concentration measurement from that date (x_i). Bootstrap samples (B) will be formed by repeatedly sampling n pairs at random with replacement from the original sample pairs. This will be repeated 500 times. For each bootstrap sample, a Thiel-Sen trend line will be constructed using the equation above. A series of equally spaced t_j values will be identified along the range of sampling dates represented in the original sample, j=1 to m. The Thiel-Sen trend line associated with each bootstrap replicate will be used to compute an estimated concentration ($\hat{x}_j^B$). A CI will be constructed for the lower α^{th} percentile $\hat{x}_j^{[\alpha]}$from the distribution of estimated concentrations at each time point (t_j). For a UCL, compute the upper $(1\text{-}\alpha)^{th}$ percentile, $\hat{x}_j^{[1-\alpha]}$ at each t_j; for an LCL, compute the lower α^{th} percentile, $\hat{x}_j^{[\alpha]}$ at each t_j.

3.3.2 Parametric Confidence Intervals around a Mean

If compliance data do not show a trend and are normal or log-normal, one-sided parametric CIs around a sample mean will be constructed for each constituent and well pair. The LCL will be calculated as:

$$LCL_{1-\alpha} = \overline{x} - t_{1-\alpha,n-1} \cdot \frac{s}{\sqrt{n}}$$

The UCL will be calculated as:

$$UCL_{1-\alpha} = \overline{x} + t_{1-\alpha,n-1} \cdot \frac{s}{\sqrt{n}}$$

$\overline{x}$ = compliance sample mean

s = compliance sample standard deviation

n = compliance sample size

$t_{1-\alpha,n-1}$ = obtained from a Student's *t*-table with (*n*–1) degrees of freedom at the chosen alpha level (0.01) (Table 16-1 in Appendix D of the Unified Guidance)

If compliance data are distributed lognormally, the LCL will be computed around the lognormal geometric mean as:

$$LCL_{1-\alpha} = \exp\left(\overline{y} - t_{1-\alpha,n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

The UCL will be computed around the lognormal geometric mean as:

$$UCL_{1-\alpha} = \exp\left(\overline{y} + t_{1-\alpha,n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

$\overline{y}$ = compliance sample log-mean

s_y = compliance sample log-standard deviation

3.3.3 Non-Parametric Confidence Intervals around a Median

Non-parametric confidence intervals around the median will be computed if the compliance data do not show a trend and contain greater than 50% non-detects or are non-normally distributed. The mathematical algorithm used to construct non-parametric CIs is based on the probability *p* that any randomly-selected measurement in a sample of *n* concentration measurements will be less than an unknown *p* x 100th percentile of interest (where *P* is between 0 and 1). Then the probability that the measurement will exceed the *p* x 100th percentile is (1–*p*). The number of sample values falling below the *p* x 100th percentile out of a set of *n* should follow a binomial distribution with parameters *n* and success probability *p*, where 'success' is defined as the event that a sample measurement is below the *p* x 100th percentile. The probability that the interval formed by a given pair of order statistics will contain the percentile of interest will then be determined by a cumulative binomial distribution *Bin(x;n,p)*, representing the probability of *x* or fewer successes occurring in *n* trials with success probability *p*. *P* will be set to 0.50 for an interval around the median. In accordance with the Unified Guidance, a confidence interval around the median will only be calculated if at least seven data points are available.

The sample size *n* will be ordered from least to greatest. Given *p* = 0.50, candidate interval endpoints will be chosen by ordered data values with ranks rounded upward to the next higher integers. The ranks of the endpoint will be denoted *L** and U* and are calculated using the following equations (Conover, 1999, p. 144):

$$L^* = np - Z_{1-\alpha}\sqrt{np(1-p)}$$

$$U^* = np + Z_{1-\alpha}\sqrt{np(1-p)}$$

4. CORRECTIVE ACTION MONITORING PROGRAM

Corrective Action Monitoring is performed after a corrective action remedy has been selected and implemented. 35 I.A.C. § 845.680(a)(1) specifies that the corrective action groundwater monitoring program must meet the requirements listed in 35 I.A.C. § 845.650 (*i.e.*, Compliance Monitoring), document the effectiveness of the selected remedy, and demonstrate compliance with the GWPS. Post-Closure Care monitoring as described in **Section 3** will operate concurrently with Corrective Action Monitoring, fulfilling the requirements of 35 I.A.C. § 845.650. This document describes the statistical methods used to document the progress of the selected remedy and demonstrate compliance with the GWPS.

Evaluation of corrective action remedy effectiveness will occur in three phases: remedy progress evaluation, stability evaluation, and attainment evaluation (USEPA, 1992).

1. Remedy progress evaluation occurs after implementation of corrective actions to assess if the remedy is functioning as anticipated.
2. The stability evaluation, which occurs after treatment has been concluded and a re-equilibration period has elapsed, assesses if a new post-treatment steady state in the groundwater has been reached.
3. Attainment evaluation occurs after a new steady state has been achieved and assesses if COC concentrations are below the GWPS.

In accordance with the Unified Guidance, these evaluations only apply to constituents which have previous exceedances of the GWPS. Constituents without previous GWPS exceedances continue to be evaluated according to Compliance Monitoring (per **Section 3**). The Corrective Action GMP for each unit describes the detailed approach to remedy effectiveness evaluation and reporting. Statistical evaluations used in each of these three phases are described below.

4.1 Remedy Progress Evaluation

The goal of remedy progress evaluation is to determine if a groundwater remedy is on track to achieve cleanup standards within the proposed time frame and to inform adaptive management decisions if performance metrics are not achieved. Evaluations of remedy effectiveness include:

- Comparison of the central tendency (*i.e.*, mean or median) of data from corrective action monitoring wells to the GWPS
- Trend analysis of average concentrations in individual wells and in a plume

Unlike Compliance Monitoring, remedy progress evaluation does not result in the determination of exceedances. Instead, the results from these analyses are used to evaluate performance metrics described in the site-specific Corrective Action GMP.

4.1.1 Central Tendency

The two most common central tendency measures of a data set are the sample mean and sample median. The sample mean best represents the central tendency of normally-distributed data; therefore, the mean will be used to represent the tendency if the data are approximately normally distributed and the frequency of non-detects is below 50%. The sample mean is given by the arithmetic average of each value in the sample:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

$\bar{x}$ = sample mean

n = sample count

x_i = i^{th} observation of x

The sample median is the 50th percentile of values in a sample and represents the midpoint of the ordered list of values. Because it is based on rank-order, the sample median is insensitive to data distribution; therefore, the median will be used if the data are not normally distributed or the frequency of non-detects is 50% or greater. The sample median is determined by arranging all values in order and selecting the middle value (or, if an even number of values exists, the mean of the two middle values).

4.1.2 Trend of Average Concentration in Individual Wells and in a Plume

Insight into remedy progress can be gained by evaluating changes in concentration at both the individual well and plume levels.

Trends at the individual well level are evaluated according to **Section 2.5**. To evaluate trends at the plume level, the trend on quarterly average concentrations is evaluated (per **Section 4.1.1**). Quarterly average concentrations in the plume are generated by calculating the mean or median as appropriate based on distribution (**Section 4.1.1**) of concentrations collected during a single sample event. Trend is then evaluated as described in **Section 2.5**. The magnitude of the trend (*i.e.*, slope) may be evaluated according to methods in **Section 3.3.1**.

4.2 Stability Evaluation

In order to evaluate ultimate effectiveness of the remedy, it is critical to evaluate if a new stable equilibrium has been reached after the implementation of corrective action (e.g., completion of source control or conclusion of groundwater extraction). Stability evaluation will be completed using trend analysis as described in **Section 2.5**.

4.3 Attainment Evaluation

Per 35 I.A.C. § 845.680(c), corrective action is considered complete when compliance with the GWPS has been demonstrated "at all points within the plume of contamination that lies beyond the waste boundary […] for a period of three consecutive years". Accordingly, attainment of the GWPS will be evaluated for well-constituent pairs previously determined to exceed the GWPS. This evaluation will include data collected after groundwater conditions have stabilized (**Section 4.2**).

The Unified Guidance recommends comparing a CI to the fixed GWPS to evaluate attainment of corrective action. The null hypothesis of this test is the reverse of that in Compliance Monitoring: corrective action well groundwater concentrations are assumed to exceed the GWPS unless the statistical test indicates otherwise. The CI will be calculated according to methods presented in **Section 3.3**. For pH, the only parameter with an upper and lower background and GWPS, the GWPS will be attained (*i.e.*, the null hypothesis rejected) when the CI falls within the range of the GWPS (*i.e.*, if the LCL of the CI is above the lower limit and the UCL is below the upper limit). For all other parameters, the GWPS will be attained when the UCL is below the GWPS. Once this statistical evaluation indicates that GWPS has been met for three years (*i.e.*, that the null hypothesis is rejected), corrective action will be concluded.

5. REFERENCES

Conover, W. J., 1999. Practical Nonparametric Statistics (3rd ed.). John Wiley & Sons, Inc.

Illinois Administrative Code, Title 35, Subtitle G, Chapter I, Subchapter J, Part 845: Standards for The Disposal Of Coal Combustion Residuals In Surface Impoundments, effective April 21, 2021.

Millard S. P., 2013. EnvStats: An R Package for Environmental Statistics. Springer. ISBN 978-1-4614-8455-4

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022. *Multi-Site Sampling and Analysis Plan*. https://www.luminant.com/documents/ccr/il-ccr/Newton/2023/Multi-Site%20Sampling%20Analysis%20Plan-Newton-W0798070001%E2%80%9001.pdf. December 28.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022. *Multi-Site Quality Assurance Project Plan.* https://www.luminant.com/documents/ccr/il-ccr/Newton/2023/Multi-site%20Quality%20Assurance%20Project%20Plan-Newton-W0798070001%E2%80%9001.pdf. December 28.

United States Environmental Protection Agency (USEPA), 1992. Methods for Evaluating the Attainment of Cleanup Standards Volume 2: Groundwater. EPA 230-R-92-014. Office of Policy, Planning, and Evaluation. July.

United States Environmental Protection Agency (USEPA), 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530-R-09-007. March.

United States Environmental Protection Agency (USEPA), 2020. EPA QA Field Activities Procedure. IT/IM Directive Procedure. https://www.epa.gov/system/files/documents/2022-09/epa_qa_field_activities_procedure.pdf. June 9.

United States Environmental Protection Agency (USEPA), 2023. Quality Assurance Project Plan Standard. IT/IM Directive Procedure. https://www.epa.gov/system/files/documents/2024-04/quality_assurance_project_plan_standard.pdf. August 21.