REPORT

Monitored Natural Attenuation Evaluation for Molybdenum

Sioux Energy Center

Submitted to:

Ameren Missouri
1901 Chouteau Ave
St. Louis, Missouri 63103

Submitted by:

WSP USA Inc.

Rocksmith Geoengineering, LLC

July 2, 2024

MNA Checklist

Elements of MNA Evaluation	Characterization	Applicable Section(s)
Pre-Tier 1 - Site Background Information		
Site Layout	Identify potential source(s)	2.0, 2.1, 2.2, 4.1
	Identify potential exposure points/receptors	2.0, 2.1, 2.2, 3.0
Site History	History and Inventory of contaminants released	1.0, 2.0, 2.1, 2.2
	Mode of contaminant release	2.0, 2.1, 2.2, 4.1
	Chemistry of CCR source and release	4.1, 5.0
Tier 1 - Demonstrate Active Contaminant Removal from Groundwater		
Hydrogeologic Elements	Potential migration pathways identified	3.0, 6.0, 7.2
	Nature and extent of contaminant plume	5.0, 7.2, 8.0
	Basic groundwater flow direction and aquifer hydrostratigraphy	3.0, 6.0
General Site Chemistry	General chemistry (groundwater, surface water, and/or aquifer solids) for preliminary evaluation of contaminant degradation	5.1, 5.2
	Trend evaluation of groundwater data	5.1, 7.3
	Distribution of contaminants between aqueous and solid phases	5.1, 5.2, 7.3
Tier 2 - Determine Mechanisms and Rate of Attenuation		
Define Contaminant/Aquifer Solid Interactions	Identify aquifer mineralogy, attenuation mechanisms, and microbiological processes (if applicable)	5.2, 7.1, 7.2, 9.0
Chemistry and Spatial Distribution of Contaminants	Groundwater characteristics for source(s) and contaminant plume, including field parameters, Appendix III parameters, Appendix IV parameters, major cations and anions, and speciation data (if applicable)	2.0, 2.1, 2.2, 4.1, 5.1, 7.2, 9.0
Detailed Hydrogeology	Groundwater flow regime, including direction, velocity, potentiometric surface, gradients, etc.	3.0, 6.0, 9.0
Tier 3 – Determine System Capacity and Stability of Attenuation		
Measurement of Attenuation Capacity	Determination of contaminant and dissolved reactant fluxes (concentration data and water flux)	5.1, 7.3, 8.0, 10.0
	Determination of mass of available solid phase reactant(s)	5.2, 7.0, 7.3, 10.0
Stability of Attenuated Contaminated Mass	Laboratory testing of immobilized contaminant stability	5.2, 7.0, 10.0
	Model analyses to characterize aquifer capacity and evaluation of immobilized contaminant stability	7.2, 7.3, 10.0
Tier 4 - Design of Performance Monitoring Program and Identify Alternative Remedy		
Long-Term Monitoring Program	Selection of monitoring locations and sampling frequency based on site conditions	Not applicable - provided in separate report.
	Selection of key monitoring parameters used to assess effectiveness of the remedy	
	Selection of monitoring criteria that would trigger re-evaluation of adequacy of the monitoring program and the remedy selected	

Table of Contents

Tables

Figures

Appendices

1.0 INTRODUCTION

Based on the results of the Corrective Measures Assessment (Haley and Aldrich, 2019; CMA) conducted under 40 CFR § 257.96, groundwater, Coal Combustion Residual (CCR) porewater, and solid materials were characterized and evaluated to determine the effectiveness and help predict the attenuation rate of Monitored Natural Attenuation (MNA) as a component of remedial strategy for Ameren Missouri's (Ameren) SCPA bottom ash surface impoundment (SCPA or CCR Unit) located at Sioux Energy Center (SEC) in St. Charles, County, Missouri (the Site). The structure of this evaluation closely follows the United States Environmental Protection Agency (USEPA) guidance on using MNA as a remedial strategy (USEPA 2007a, b) and considers best practices from the Interstate Technology Regulatory Council (ITRC) document: "A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater" (ITRC 2010). This MNA evaluation was completed using the following tiers (USEPA 2007a, b):

1) Demonstrate active constituent removal from groundwater and dissolved plume stability (Tier I)
2) Determine the mechanism(s) and rate(s) of the operative attenuation processes (Tier II)
3) Determine the long-term capacity for attenuation and the stability of immobilized constituents (Tier III)

Following the completion of this multi-tier evaluation, the fourth and final tier (Tier IV) of an MNA program, which involves the design of a performance monitoring program and the development of a contingency plan, will be updated as needed based on the findings of this evaluation.

2.0 SITE BACKGROUND AND CCR RULE COMPLIANCE

The SEC is located approximately 20 miles northwest of downtown St. Louis in St. Charles, County, Missouri. The Facility encompasses approximately 1,025 acres and is situated within the floodplain between the Mississippi and Missouri Rivers. The Facility is bounded to the north by wooded areas associated with the Mississippi River, to the south by railroad, and to the east and west by agricultural fields. Figure 1 shows the CCR Unit, along with Site monitoring wells and the Mississippi River.

The Detection and Assessment monitoring Well Network for the SCPA includes four background monitoring wells and six compliance monitoring wells adjacent to the CCR Unit. There is also a Corrective Action Monitoring Well Network for the SCPA which consists of 17 monitoring wells. The well networks are summarized in Table 1 and shown on Figure 2.

Table 1 – SCPA Monitoring Well Networks

Monitoring Well Network	Well IDs
Background (Compliance Monitoring Network)	BMW-1D, BMW-3D, BMW-1S, and BMW-3S
Compliance Monitoring Network Wells	UMW-1D, UMW-2D, UMW-3D, UMW-4D, UMW-5D, and UMW-6D
Corrective Action Monitoring Wells	PZ-1S, PZ-9D, LMW-1S, LMW-2S, LMW-4S, LMW-5S, LMW-6S, UG-3, TP-2D, TP-3D, TP-4D, TP-5D, TP-6S, TP-6D, TP-8D, AM-1S, and AM-1D

Statistical analysis of the November 2023 SCPA detection monitoring results has identified the following statistically significant increases (SSIs) of Appendix III constituents over background:

- Boron – UMW-1D, UMW-2D, UMW-3D, UMW-4D, UMW-5D, UMW-6D
- Calcium - UMW-2D, UMW-3D
- Chloride – UMW-1D, UMW-2D, UMW-3D, UMW-4D, UMW-5D
- Fluoride – UMW-2D
- pH – UMW-2D, UMW-3D
- Sulfate – UMW-1D, UMW-2D, UMW-3D, UMW-4D
- Total Dissolved Solids (TDS) - UMW-2D, UMW-3D, UMW-4D

Assessment monitoring of the SCPA in accordance with §257.95 was initiated on April 15th, 2018. Assessment monitoring identified statistically significant levels (SSLs) at the SCPA as follows:

- Molybdenum – UMW-2D, UMW-3D, UMW-4D, and UMW-5D

On January 9, 2019, Ameren initiated its Corrective Measures Assessment (CMA) and posted the CMA report on May 20, 2019. A public meeting was held on May 31, 2019, and responses to public comments are posted on Ameren's CCR website. On August 30, 2019, Ameren published its “Remedy Selection Report – 40 CFR § 257.97 Rush Island, Labadie, Sioux and Meramec CCR Basins” (Remedy Selection Report) that identified source control through installation of a low permeability cover system, use of Monitored Natural Attenuation (MNA), and installation of Supplemental Corrective Measures as its chosen corrective action remedial plan. The Remedy Selection Report’s remedial plan consists of two phases as follows:

1) Source control, stabilization, and containment of CCR by installation of a low permeability geomembrane cap (a minimum 1 x 10^{-7} centimeters per second (cm/sec) versus 1 x 10^{-5} cm/sec required by the CCR Rule).
2) Once source control is achieved, monitor the natural attenuation of groundwater concentrations to address limited and localized CCR-related impacts. Ongoing monitoring and modeling evaluations will document that concentrations are decreasing as modelled. MNA occurs due to naturally occurring processes within the aquifer.

In addition to MNA as a Corrective Measure, Ameren has also initiated a supplemental corrective measure at the SCPA consisting of groundwater extraction, treatment, and re-injection using ex-situ treatment technologies with chemical precipitation and selective-ion exchange which is discussed further in Section 2.1.

The first phase of the remedial plan commenced on January 20, 2021, and was substantially completed on April 10, 2022, with the installation of a low permeability cover system on the SCPA. The SCPA unit was certified closed on October 14, 2022, and the SCPA has transitioned into the post-closure care requirements of the CCR Rule effective October 2022, and second phase of the remedial plan has begun. The initial Corrective Action groundwater sampling event was completed in April 2020, and a total of nine sampling events have been completed to-date for Corrective Action monitoring at the SCPA. Three sampling events have been completed after closure of the SCPA.

As of November 2023, the wells with constituents exceeding the site Groundwater Protection Standard (GWPS) are as follows:

- Cobalt at S-LMW-6S
- Lithium at S-LMW-5S, S-TP-2D, and S-TP-6S
- Molybdenum at S-LMW-1S, S-LMW-2S, S-LMW-5S, S-AM-1D, S-AM-1S, S-TP-5D, and S-PZ-1S

Cobalt and lithium have not historically been identified as an SSL in Assessment Monitoring and a review of the data determined that the statistical exceedances at wells LMW-6S (cobalt) as well as LMW-5S, TP-2D, and TP-6S (lithium) are not caused by the SCPA CCR unit. Alternative Source Demonstrations (ASDs) have been prepared and are included in the Annual Reports provided on Ameren's publicly available website. The ASDs concluded that the low concentration statistical exceedances for cobalt and lithium are not a result of impacts from the SCPA and appear to result from natural geochemical variability within the alluvial aquifer.

Based on the evaluations completed at the SCPA, molybdenum is the only Appendix IV parameter statistically exceeding the groundwater protection standard, therefore, molybdenum is the focus of this MNA evaluation and is considered the Constituent of Concern (COC).

2.1 Supplemental Corrective Measures

As outlined in Ameren's Remedy Selection Report, once source control is achieved, Ameren planned to monitor natural attenuation of groundwater and complete supplemental corrective measures using groundwater treatment. In 2021, Ameren began implementing the supplemental corrective measure for CCR groundwater compliance using ex-situ treatment technologies of chemical precipitation and selective-ion exchange by completing a pilot study at the Rush Island Energy Center. The results of this groundwater treatment pilot study displayed significant reductions in key CCR indicator concentrations. Due to the success, Ameren expanded this technology to the Sioux Energy Center and operation of the treatment system at the SCPA began in February 2023. After a period of optimization, the system achieved target run-time and flow rate beginning in September 2023. The groundwater treatment system was developed to successfully capture the CCR impacted groundwater from the SCPA, treat the water by removing contaminants, and return treated water to the same hydrogeologic horizon.

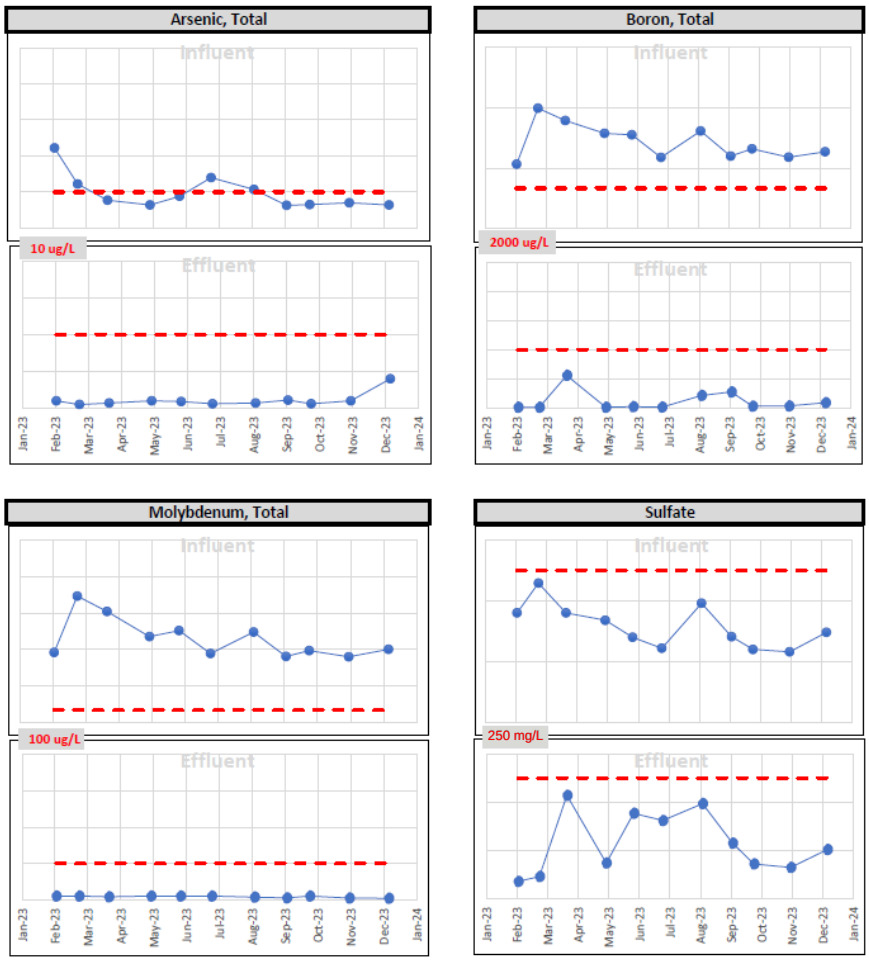
The design of the treatment system was completed by XDD Environmental, LLC (XDD, now Loureiro Engineering Associates, Inc (Loureiro)) and is based on groundwater monitoring and annual estimates of net groundwater velocities averaging approximately 11 ft/year as documented in the 2018 Annual Groundwater Monitoring and Corrective Action Report. This represents an average net movement of a water molecule in all directions over a given calendar year and it accounts for movement during normal, stagnant, flood and low-level river stages throughout a calendar year (More details on the groundwater flow at the site is provided in Section 3.0). The treatment system uses a combination of extraction and injection wells to capture and control movement. Typical gradients at the Sioux Energy Center are low and result in low groundwater velocities with little net movement.

As discussed in Ameren's 2024 List of Requested Information, available on Ameren's publicly available website (section 4.a.i) the treatment system is designed for internal capture with injection radially along the ash pond perimeter. While some areas in the SCPA's interior experience reverse flow towards an extraction point, the volume treated is re-introduced along the perimeter, resulting in no change in overall flow conditions a short

distance from the injection points. The well spacing and locations provide for placement of treated water along the SCPA perimeter. This design resulted in 9 extraction wells and 23 injection wells.

Inset 1 shows the influent (top) and effluent (bottom) data from the SCPA groundwater treatment system collected over the optimization period through initial, full-scale operation from Loureiro (2024). The figure illustrates that after a few months of optimization, the system effluent concentrations have consistently been below the discharge target concentrations for groundwater (indicated in red). The discharge concentrations meet drinking water standards for the applicable constituents.

Inset 1: SCPA Groundwater Treatment System Influent and Effluent Concentrations – System Optimization Period and Full-Scale Operation



Notes:
Figure from Loureiro Engineering Associates (LEA).
mg/L – miligrams per liter.
µg/L – micrograms per liter.

The treatment system as currently operated is intended to prevent further CCR impacts from migrating downgradient of the SCPA in the alluvial aquifer.

2.2 Remedial Strategy for the SCPA

Currently, the remedial strategy for the SCPA consists of the following:

1) Cap and close the SCPA with a low-permeability geomembrane cover system. This effectively eliminates precipitation infiltration into the SCPA.
2) Installation of an active remedy (groundwater treatment system) that captures and treats porewater of the SCPA and prevents it from leaving the footprint of the CCR waste boundary and migrating downgradient in the alluvial aquifer. This system also targets the areas of highest boron, sulfate, and molybdenum concentrations on the southern side of the SCPA, reducing concentrations below the GWPS.
3) Use of MNA to address CCR-related impacts outside of the influence of the treatment system. The effectiveness of MNA as a remedy for the distal portions of the plume is documented in this evaluation.

This MNA evaluation documents the physical and chemical attenuation present within the alluvial aquifer for the constituents of concern listed below in Section 2.3. While both physical and chemical attenuation are occurring for these constituents, physical attenuation of dilution and dispersion appears to be a significant factor, especially at distal portions of the plume. Although physical attenuation (dilution and dispersion) is not typically appropriate as the primary mechanism, EPA has acknowledged that it can be appropriate as a "polishing step" if active remedies are in place in its 2015 report titled *"Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites*" where it states the following (page 14):

"Dispersion and dilution resulting from mixing with influent precipitation, up- or cross-gradient groundwater or leakage from overlying surface water bodies may be elements of an MNA response action for inorganic contaminants. However, dilution and dispersion generally are not appropriate as primary MNA mechanisms because they reduce concentrations through dispersal of contaminant mass rather than destruction or immobilization of contaminant mass. Dilution and dispersion may be appropriate as a "polishing step" for distal portions of a plume when an active remedy is being used at a site, source control is complete and appropriate land use and ground water use controls are in place. Results of conservative tracer studies can be used to estimate the contribution of dilution and dispersion to contaminant attenuation rates."

3.0 SUMMARY OF SITE HYDROGEOLOGIC CONDITIONS

A detailed discussion of the Site Hydrogeology is presented in the Corrective Measures Assessment (Haley and Aldrich, 2019), the Groundwater Monitoring Plan (GMP, Golder 2017), and the Corrective Action Groundwater Monitoring Plan (CAGMP, Golder, 2020). In summary, geological and hydrogeological units present at the Site include two different geologic terrains: (1) floodplain deposits of the Mississippi and Missouri River Valleys and (2) older sedimentary bedrock formations. The alluvial floodplain deposits are typically comprised of sands and gravels with varying amounts of silts and clays, generally resulting in an overall fining-upward sequence. The bedrock formations are comprised of relatively flat-lying Mississippian-aged limestones, dolomites, and shales.

The alluvial deposits form the uppermost aquifer at the Site and are influenced by the nearby Mississippi and Missouri Rivers. Site groundwater conditions are directly controlled by river stages of the Mississippi and Missouri Rivers. Under typical alluvial aquifer conditions, groundwater flows slowly to the east and southeast, but fluctuates in direction due to river levels. Groundwater potentiometric surface maps indicate that groundwater flow direction is variable, and gradients are generally flat.

Prior to closure of the SCPA, the surface impoundment ponded water at elevations higher than the static groundwater levels in the underlying alluvial aquifer resulting in mounding and localized radial groundwater flow. Since closure of the SCPA was completed, the mounding has been eliminated and groundwater flow has returned to natural conditions.

4.0 TIER I EVALUATION

This evaluation was performed to further evaluate the mechanisms, rates, and stability of MNA as a remedy for groundwater impacts for the SCPA. To conduct this evaluation, a review of available groundwater, CCR porewater, and soil samples was completed. Data collection and evaluation in support of MNA included:

- Groundwater characterization (including major cations and anions) to identify water types and temporal and geographical trends, where present.

- Mineralogical analysis of aquifer soil materials to identify and quantify the major mineral components.
- Chemical analysis of aquifer soil materials to quantify the total metal content and identify the environmentally available fraction of metals.
- Geochemical modeling to identify the major aqueous species and evaluate saturation indices of minerals relevant to attenuation of molybdenum.

The results generated by this supplemental assessment were used by WSP and Rocksmith to complete the Tier I, Tier II, and Tier III evaluations in accordance with USEPA (2007a, b; USEPA 2015). The results of the Tier I, Tier II, and Tier III are summarized in the subsequent sections.

4.1 Groundwater and Porewater Sampling

Numerous groundwater samples have been collected at the Site as a part of CCR Rule, NPDES Permitting process, and State Utility Waste Landfill (UWL) monitoring programs. For this evaluation, monitoring wells from the compliance, corrective action, and NPDES site characterization networks as well as porewater from the CCR Unit piezometers were evaluated. The network sampling locations and designations are presented on Figure 2 and in Table 2.

Table 2: Sampling Locations Used for the MNA Assessment

Monitoring Network	Background Monitoring Wells	SCPA Compliance Monitoring Network Wells	SCPA Corrective Action (Performance) Monitoring Well Network	SCPA Nature and Extent Monitoring Network	CCR Unit Porewater Piezometers
Years Data Is Available	**2016 – Present**	**2016 – Present**	**April 2020 – Present**	**November 2018 – August 2019**	**January 2018**
Well IDs	BMW-1D, BMW-3D, BMW-1S, and BMW-3S	UMW-1D, UMW-2D, UMW-3D, UMW-4D, UMW-5D, and UMW-6D	PZ-1S, PZ-9D, LMW-1S, LMW-2S, LMW-4S, LMW-5S, LMW-6S, UG-3, TP-2D, TP-3D, TP-4D, TP-5D, TP-6S, TP-6D, TP-8D, AM-1S, and AM-1D	TP-1D, TP-1M, TP-1S, TP-2D, TP-2M, TP-2S, TP-3D, TP-3M, TP-3S, TP-4D, TP-4M, TP-4S, TP-5D, TP-5M, TP-5S, TP-6D, TP-6M, TP-6S, TP-7D, TP-7M, TP-7S, TP-8D, TP-8M, and TP-8S	SCPA-1S, SCPA-1D, SCPA-2, SCPA-3D, and SCPA-3S

Notes: Monitoring wells TP-2D, TP-3D, TP-4D, TP-5D, TP-6S, TP-6D, TP-8D are included in both the SCPA Corrective Action and Nature and Extent Networks. For this evaluation, they will be analyzed with the SCPA Corrective Action Monitoring Well Network.

4.1.1 Groundwater and Porewater Analysis

Geochemical analysis of groundwater and porewater samples included the determination of field parameters and the concentrations of total metals and major cations and anions. The rationale and methods used were as follows:

- **Field Parameters:** Parameters measured in the field included pH, dissolved oxygen, oxidation reduction potential (ORP), conductivity, and temperature. These parameters were used to determine general geochemical conditions in the groundwater and support geochemical modeling.
- **Metals:** Analysis of Appendix III and IV metals concentrations was conducted to understand the geochemical composition of groundwater and CCR Unit porewater. Metals analysis allows for the delineation of a potential plume, evaluation of mineral saturation indices through geochemical modeling, and evaluation of contributions from natural or anthropogenic sources.
- **Major Cations and Anions:** Geochemical modeling of mineral solubility, metals attenuation, and background contributions requires analysis of major cations and anions because they affect and participate in sorption and mineral dissolution or precipitation reactions.

The groundwater and porewater samples were analyzed and the results and methods are provided in the Annual Reports for the SCPA, SCPB, SCPC, SCPD, and SCL4A from 2017 to 2023, which are available on Ameren's publicly available website at https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion/ccr-compliance-reports.

4.2 Soil Sampling and Analysis

4.2.1 Sample Collection

In May 2021, ten soil samples were collected from three boreholes to evaluate geochemical properties of the alluvial aquifer materials at the Site. Samples were obtained from a boring (S-BH-01) at a background location as well as at IW-2 and EW-3 (Figure 1) located near the SCPA. Three depth intervals were selected in each boring: shallow, intermediate, and deep. Sample intervals are shown in Table 3 and soil sample analyses are described in Section 4.2.2.

Table 3: Boring Sample ID and Descriptions

Boring ID	Sample ID (Depth in Feet Below Ground Surface)	Geologic Material
IW-2 (Downgradient)	IW-2S (40-48)	Poorly Graded Sand
	IW-2M (75-80)	Poorly Graded Sand
	IW-2D (125-129)	Poorly Graded Sand
EW-3 (Downgradient)	EW-3S (35-40)	Poorly Graded Sand
	EW-3M (70-80)	Poorly Graded Sand
	EW-3D (120-125)	Well Graded Sand
S-BH-01	S-BH-01S (20-27)	Poorly Graded Sand
	S-BH-01M (45-54)	Well Graded Sand

Boring ID	Sample ID (Depth in Feet Below Ground Surface)	Geologic Material
(Background)	S-BH-01 (93-96)	Fine Poorly Graded Sand
	S-BH-01D (100-110)	Well Graded Sand

4.2.2 Soil Analyses

Multiple geochemical analytical methods were used to assess the mineralogical and chemical composition of the shallow, intermediate, and deep intervals at the three alluvial aquifer borehole locations across the Site. The selected geochemical test methods included:

- **Mineralogical composition**: The purpose of the mineralogical analysis was to identify and quantify the crystalline mineral phases in each sample. This information is required for geochemical modeling as the release or attenuation of molybdenum is influenced by the mineral phase(s) present in the aquifer (Hem 1985). The mineralogical analysis was performed using quantitative (Rietveld) X-ray diffraction (XRD) (ME-LR-MIN-MET-MN-DO5) and a Bruker AXS D8 Advance Diffractometer.
- **Sequential extraction (SEP):** This test consists of a seven-step metals extraction from solids as per Tessier et al. (1979) to identify the provenance of trace metals such as arsenic (i.e., the operationally defined fraction that contains the metal)[1] and determine their potential environmental mobility. For instance, metals bound in the carbonate fraction, or that are exchangeable, are much more likely to become mobile due to changes in groundwater conditions than metals bound within a sulfide or silicate fraction. The total concentration of a metal measured from all seven steps can be compared to the concentration determined from the total metal analysis for compositional accountability. Metals extracted in Steps 1 through 5 are considered environmentally available, whereas metals extracted in Steps 6 and 7 are not environmentally available under typical groundwater conditions (Tessier et al. 1979). The term environmentally available is used to describe steps 1 through 5 combined and implies the fraction available to participate in environmental reactions such as adsorption, desorption, ion exchange and other reactions that facilitate removal or attenuation of specific constituents. Acid/sulfide and residual fraction combines step 6 and 7, and generally

[1] Sequential extraction of metals from aquifer materials consisted of seven discrete steps for this investigation:

Step 1 - Exchangeable Fraction: This extraction includes trace elements that are reversibly adsorbed to aquifer minerals, amorphous solids, and/or organic material by electrostatic forces.

Step 2 - Carbonate Fraction: This extraction targets trace elements that are adsorbed or otherwise bound to carbonate minerals.

Step 3 - Non-Crystalline Materials Fraction: This extraction targets trace elements that are complexed by amorphous minerals (e.g., iron).

Step 4 - Metal Hydroxide Fraction: Trace elements bound to hydroxides of iron, manganese, and/or aluminum.

Step 5 - Organic Fraction: This extraction targets trace elements strongly bound via chemisorption to organic material.

Step 6 - Acid/Sulfide Fraction: The extraction is used to identify trace elements precipitated as sulfide minerals.

Step 7 - Residual Fraction: Trace elements remaining in the solids after the previous extractions will be distributed between silicates, phosphates, and refractory oxides.

reflect the natural abundance of target constituents in silicates and sulfides, which do not readily interact with groundwater on short time scales.

- **Cation exchange capacity (CEC):** The CEC represents the total number of negative charge sites in a given amount of solid at which reversible cation adsorption and desorption can occur (Hem 1985). The CEC of a material also commonly refers to the replacement of one cation by another in a selective series or preferred adsorption. In this case, the sorption selectivity increases with the ionic radius of the ion, for instance in the following series: $K^+ > Na^+ > Li^+$ and $Ba^{2+} > Sr^{2+} > Ca^{2+} > Mg^{2+}$ (Smith 1999). This information is used for geochemical modeling as the release or attenuation of many trace metals is affected by the CEC of soil in the aquifer. The laboratory analyzed the CEC of soil samples (Table 4) using the method USEPA SW-846 9081 “Cation-Exchange Capacity of Soils (Sodium Acetate)”, (September 1986).

5.0 GROUNDWATER AND POREWATER

5.1 Geochemical Evaluation

The water quality monitoring data used for the geochemical evaluation were obtained from Site monitoring wells and CCR Unit piezometers. The results discussed in this section apply to the Compliance Monitoring Network, the Corrective Action Monitoring Network, and porewater piezometers. Data used are provided in the CCR Rule Annual Reports which are available on Ameren’s Public website.

- **pH** (Figure 3)**:** The pH of samples collected from the SCPA Compliance Monitoring Network in November 2023 ranged from 7.1 to 8.5. Historically, the pH in the Compliance Monitoring Network has ranged from 6.5 to 8.6 from March 2016 to May 2023. The pH of samples collected from the SCPA Corrective Action Monitoring Network in November 2023 ranged from 6.7 to 7.5. Historically, the pH in the Corrective Action Monitoring Network has ranged from 6.0 to 7.6 (with a high outlier of 9.0 at TP-3D on 8/7/2019) from March 2016 to May 2023. The pH of samples collected from the SCPA Nature and Extent Monitoring Network between August 2018 to November 2023 had pH values ranging from 6.2 to 9.9. The pH of samples collected from the CCR Unit porewater piezometers in January 2018 ranged from 6.9 to 8.9. The pH of the background monitoring wells in November 2023 ranged from 7.0 to 7.3.

- **ORP (Oxidation/Reduction Potential)** (Figure 4)**:** The ORP of groundwater samples collected from SCPA Compliance Monitoring Network ranged from -151.8 to +112.8 millivolts (mV) in November 2023. Historically, the ORP in the Compliance Monitoring Network has ranged from -231.4 to +230.5 mV between March 2016 to May 2023. The ORP of groundwater samples collected from SCPA Corrective Action Network ranged from -102.5 to +175.5 millivolts (mV) in November 2023. Historically, the ORP in the Compliance Monitoring Network has ranged from –460.7 to +281.3 mV between March 2016 to May 2023. Between August 2018 to November 2023, the SCPA Nature and Extent Monitoring Network redox values ranged from -147.1 to +212.2 mV. The ORP samples collected from the CCR Unit porewater piezometers in January 2018 ranged from -191.8 to +148 mV. In November 2023 the ORP of groundwater in the background monitoring wells ranged from -27.2 to +181.7 mV.

- **Total Dissolved Solids (TDS)** (Figure 5)**:** Groundwater TDS concentrations ranged from 345 to 1,440 mg/L in the SCPA Compliance Monitoring Network in November 2023. Historically, TDS values have ranged from 268 to 1,660 mg/L in the Compliance Monitoring Network from March 2016 to May 2023. Groundwater TDS concentrations ranged from 346 to 1,290 mg/L in the SCPA Corrective Action Monitoring Network in

November 2023. Historically, TDS values have ranged from 7.5 to 2,490 mg/L in the Corrective Action Monitoring Network from March 2016 to May 2023. Between August 2018 to November 2023 the SCPA Nature and Extent Monitoring Network's TDS concentrations ranged from 199 to 1,140 mg/L. The TDS of groundwater samples collected from the CCR Unit porewater piezometers in January 2018 ranged from 320 to 3,440 mg/L. The TDS of the background monitoring wells ranged from 398 to 475 mg/L in November 2023.

- **Major ion chemistry** (Figure 6, Table 5)**:** A Piper plot was generated for groundwater and porewater samples to facilitate the identification of water types and source contributions from the well network. The wells that are water type Ca-HCO_3 are the majority of the Corrective Action and SCPA Nature and Extent Monitoring Network wells, the background wells, SCPA Compliance Monitoring Network wells UMW-1D, UMW-5D, and UMW-6D, and CCR Unit porewater piezometer SCPA-2. The remainder of the samples had a water type of Ca-SO_4 and had a similar major ion relative abundance to the high TDS (>2,000 mg/L) porewater samples. Samples from the SCPA Nature and Extent Monitoring Network were similar to samples collected from the background monitoring wells, with the exception of some samples whose geochemical signature were generally closer to the signatures of the high TDS porewater and Compliance Monitoring wells. The Corrective Action samples signatures were similarly distributed to all other samples, apart from the background wells.

- **Molybdenum** (Figures 7 to 20)**:** Molybdenum concentrations in groundwater samples collected from the SCPA Compliance Monitoring Network have ranged from 0.02 mg/L to 9.04 mg/L. Monitoring wells UMW-2D, UMW-3D, UMW-4D, and UMW-5D have exceeded the GWPS (0.1 mg/L) since March 2016. However, based on Mann-Kendall tests, molybdenum is no statistically significant increase at these wells, rather trends are currently stable or decreasing. It is anticipated that molybdenum concentrations at the Site will continue to decrease based on the closure strategy at the SCPA (Section 2.1).

  Molybdenum concentrations in the Corrective Action Monitoring Network ranged from 0.0003 mg/L to 9.3 mg/L. Based on Mann-Kendall tests, molybdenum concentrations are not increasing at a statistically significant rate with trends currently stable or decreasing in the Compliance Monitoring Network and in Corrective Action Monitoring Network wells LMW-2S and AM-1D. However, wells LMW-5S and LMW-8S show a statistically significant increasing trend.

  Molybdenum in groundwater in the SCPA Nature and Extent Monitoring Network has been historically lower than or within same range of the SCPA Compliance Monitoring Network concentrations, with a range of 0.0004 to 0.59 mg/L. Molybdenum concentrations appear to be generally stable or decreasing, with the exception of well TP-5D. The visual increase at TP-5D however is not statistically significant. Molybdenum levels in the porewater samples ranged from 0.027 mg/L to 56.6 mg/L within the SCPA, with a mean molybdenum concentration of 22.1 mg/L. However, with the water treatment facility on site that is actively recovering and treating the groundwater within the footprint of the SCPA, preventing porewater from impacting groundwater. Along with the completion of closure activities, the water treatment should assist in decreasing the concentrations of molybdenum in groundwater over time. See Section 2.2 for specific details.

  Molybdenum is expected to be predominately present in the form of the divalent anionic molybdate (MoO_4^{-2}) species under the pH and redox conditions present in groundwater.

5.1.1 Mineralogical Controls in Groundwater and Porewater

The results of saturation index modeling for minerals potentially relevant to molybdenum attenuation in background, Compliance Monitoring, Nature and Extent, and Corrective Action Monitoring Network wells are presented in Table 5. Minerals can play an important role in attenuation of COCs directly by their removal through mineral precipitation or by providing sorptive surfaces or opportunities for co-precipitation. The results of the saturation index modeling can be summarized as follows:

- Iron-bearing minerals: Ferrihydrite was indicated to be at equilibrium with groundwater or oversaturated in the majority of the monitoring well and porewater samples, indicating a strong potential for ongoing precipitation of solid-phase iron oxides. Thus, it is assumed that iron (hydr)oxides are ubiquitous in the Site aquifer.
- Other minerals: All groundwater and porewater samples were simulated to be in equilibrium or oversaturated with respect to calcite [$CaCO_3$] and barite ([$BaSO_4$], with the exceptions of UMW-5D and AM-1S. Other carbonate minerals, i.e., rhodochrosite [$MnCO_3$] and siderite [$FeCO_3$], were oversaturated or in equilibrium in most groundwater samples. Gypsum [$CaSO_4$:H_2O] was simulated to be in equilibrium or oversaturated in several porewater samples (SCPA-1S, SCPA-3S, SCPA-3D) and SCPA Compliance Monitoring Network well UMW-3D. Magnesite [$MgCO_3$] was simulated to be in equilibrium or oversaturated in several porewater samples (SCPA-1S, SCPA-3D) and SCPA Nature and Extent Monitoring Network wells (TP-2M, TP-2S, TP-3M, TP-3S). Fluorite was simulated to be in equilibrium or oversaturated in porewater sample SCPA-3D.

In summary, several mineral phases likely control groundwater composition at some or all wells: barite, calcite, ferrihydrite, fluorite, magnesite, rhodochrosite, siderite, and gypsum. In the case of ferrihydrite, the dissolved concentrations of molybdenum can be attenuated through sorption.

5.2 Compositional Analysis of Alluvial Aquifer Soil

5.2.1 Mineralogical Composition

Quantitative X-ray diffraction (XRD) with Rietveld refinement was used to identify and quantify minerals in ten soil samples collected during the drilling activities – multiple samples from at least three depths (shallow, middle, and deep) from each of the soil borings (BH-01, IW-2, EW-3), as described in Section 4.2. These samples were obtained to determine the mineralogical composition of the aquifer system and identify any minerals that would potentially influence attenuation of molybdenum. In contrast, the presence of certain minerals could also indicate a potential for a naturally occurring release of molybdenum into groundwater, such as molybdenite [MoS_2].

The mineralogical analysis identified the aquifer materials to predominately consist of quartz, with varying amounts of the silicate minerals plagioclase, potassium feldspar, and muscovite (Table 6). Laboratory analytical reports for the XRD samples, including the XRD patterns, are provided in Appendix B.

5.2.2 Chemical Composition and Sequential Extraction

Chemical analysis and sequential extractions were used to determine the chemical composition of the alluvial aquifer soils and the distribution of molybdenum over various operationally defined fractions. As described in Section 4.2, this testing was conducted on ten soil samples from three borehole locations. Select results are presented in Table 7 and the laboratory data are included in Appendix C.

A description of the individual fractions determined by sequential extraction is presented in Footnote 1, Section 4.2.2. Metals extracted in steps 1 through 5 are considered environmentally available, whereas metals extracted

in steps 6 and 7 are present in refractory fractions and are not expected to be released under conditions typically encountered in aquifers (Tessier et al. 1979). The sum of the sequential extraction steps is also presented for comparison but does not represent an analytically determined value.

The results from the chemical analysis and sequential extraction can be summarized as follows:

General Chemistry Parameters

- **Aluminum** (Figure 21): Aluminum is not a constituent of interest (COI) at the Site, but it has been well studied as a potential sorbing medium in soils (e.g., Karamalidis and Dzombak 2010). Total aluminum in soils ranged from 13,872 to 31,555 mg/kg, and the environmentally available fraction ranged from 340 (IW-2D) to 839 mg/kg (IW-2S). Aluminum in the soil at the site is, therefore, largely (> 95%) present in the residual, or silicate-bound fraction. The environmentally available fraction is likely partially represented by hydrous aluminum phyllosilicate minerals or clays intermixed in the silica sand matrix. Clays can represent an important sorptive reservoir for numerous trace metals and metalloids, including molybdenum at this site (Uddin 2017).
- **Iron** (Figure 22): While not a COI, iron and its minerals commonly represent one of most abundant reservoirs for metal/metalloid attenuation in soils (Dzombak and Morel 1990; Smith 1999). Iron was present in all ten core samples analyzed, varying from 4,886 (EW-3M) to 12,903 mg/kg (EW-3D). In all ten soil borings, the non-environmentally available (sulfide and residual) fractions accounted for the largest proportion of total iron (55 to 76%) and, as such, most of the iron is not environmentally available. The remainder of iron in the samples is present in either the carbonate, amorphous, metal hydroxide fractions and to a very limited extent the amorphous and organic phases also. These phases, part of the labile fraction in steps 1 through 5, can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be important for attenuation of molybdenum under certain conditions.

Metals identified as an SSL

- **Molybdenum** (Figure 23): Total molybdenum in soil ranged from 0.17 to 1.64 mg/kg, of which up to 100% (IW-2S and L-EW-3M) was present in the environmentally available fraction. Environmentally available molybdenum was contained in the amorphous and metal hydroxide fractions. In boring EW-3D, of the small amount of molybdenum identified, all was present in the residual fraction. These results indicate that attenuation of molybdenum by amorphous and metal hydroxide minerals is occurring at the Site.

The results of the SEP analysis confirm both the natural occurrence of molybdenum in the aquifer materials and that attenuation of molybdenum is occurring by aquifer materials through adsorption/co-precipitation onto/with amorphous and metal hydroxide minerals.

6.0 GROUNDWATER MODELING

In 2019, a groundwater model and draft report was prepared by Golder (Golder 2019a) to provide a predictive analysis for groundwater flow at the SEC for the Corrective Measures Assessment. In 2021, this groundwater model was updated by XDD, to provide predictive analysis for groundwater flow at the SEC for the design of a pump, treat, and re-injection system for SCPA Corrective Action.

The numerical computer code MODFLOW – developed by the United States Geological Survey (USGS) – was selected for the groundwater modeling because it is well suited to represent a wide range of hydrologic and hydrogeologic conditions, has been widely tested and accepted in the professional hydrology community and by regulatory agencies, and has been scrutinized closely in a number of legal proceedings over the past 20 years. In total, five software packages were used for the groundwater investigation:

- Groundwater flow: USGS software package MODFLOW (McDonald and Harbaugh 1988, Harbaugh and McDonald 1996, Harbaugh et al. 2000, Harbaugh 2005). MODFLOW-2005 was the version used in the analyses presented here.
- Groundwater transport: USGS software package MT3DMS (Zheng and Wang, 1999).
- Particle tracking: USGS software package MODPATH (Pollock 2012)
- Parameter estimation: PEST (Doherty 2010 and 2016)
- Graphical user interface: Groundwater Vistas (Environmental Simulations 2020, Rumbaugh and Rumbaugh 2011).

The groundwater model simulates steady-state and transient flow conditions for the site area. The groundwater model was developed and updated based on the following:

- Natural hydrologic boundaries wherever possible.
- Ground surface topography and CCR unit geometries.
- Geologic layers with representative hydrogeological properties based on boring logs.
- Hydraulic properties of geologic layers based on aquifer tests conducted at the site.
- Historical groundwater elevation measurements.

7.0 GEOCHEMICAL ANALYSIS AND MODELING

7.1 Empirical Attenuation Rates

To evaluate the attenuation of molybdenum in groundwater at the Site and to assess the rate of attenuation, WSP applied the point decay method (Newell et al. 2002). The point decay method is used to determine the rate at which a constituent's concentrations are increasing or decreasing in groundwater at a single well between sampling events and this method can thus be used to predict when the constituent's concentrations will fall back below regulatory limits.

Equation 1 describes first-order decay for a constituent:

$$Ln(C_t) = k_t + Ln(C_0) \text{ (Equation 1)}$$

where C_0 is the initial constituent concentration, Ct is the constituent concentration at time t, t is the amount of time in years that has passed since the initial concentration measurement, and k is the first-order decay rate constant (1 per year). Equation 2 shows Equation 1 reorganized to solve for the decay rate constant:

$$k = (Ln(C_t) - Ln(C_0))/t \quad \text{(Equation 2)}$$

Groundwater water quality data from the Site wells collected between March 2016 and November 2023 were used to determine the mean first-order decay rate for each constituent of interest. Due to variable detection limits, results that were reported as below detection limits were not used in the point decay analysis. Using Equation 1 and the mean first-order decay rate, WSP calculated the approximate number of years that it would take for molybdenum concentrations higher than their respective GWPS to decline below these values and these results are provided in Section 7.3.

7.2 Geochemical Modeling

Geochemical modeling was conducted to evaluate general groundwater and porewater quality, determine the potential for precipitation of sorbent media, evaluate the potential for mineral precipitation or adsorption in the aquifer, and determine the speciation of metals of interest. The geochemical computer code developed by the USGS, PHREEQC, was used for these simulations (Parkhurst and Appelo 2013). PHREEQC version 3.7 is a general-purpose geochemical modeling code used to simulate reactions in water and between water and solid mineral phases (e.g., rocks and sediments). Reactions include aqueous equilibria, mineral dissolution and precipitation, ion exchange, surface complexation, solid solutions, gas-water equilibrium, and kinetic biogeochemical reactions. The widely accepted thermodynamic database Minteq.v4, 2017 edition (USEPA 1998, as amended), was used as a basis for the thermodynamic constants required for modeling, with additions and modifications from recent literature as required.

The Geochemist's Workbench (Release 17; Bethke et al. 2024) was used to generate graphical representations of geochemical modeling outputs in the form of predominance, or Pourbaix diagrams (also known as Eh-pH diagrams) for the species of interest (i.e., molybdenum) and trilinear plots (also known as Piper plots) displaying the relative abundance of major ions. The Minteq.v4 database was used as the basis for the Pourbaix diagrams.

7.2.1 Surface Complexation Modeling

Adsorption is an important mechanism by which constituents in groundwater can be attenuated. The adsorptive partitioning between dissolved and solid phases was simulated using a two-layer surface complexation model (SCM). The SCM approach is described in Davis and Kent (1990), with additional parameterization based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2010) utilizing iron (hydrous ferric oxide [Hfo]) as ferrihydrite [$Fe(OH)_{3(am)}$], and aluminum (hydrous aluminum oxide [Hao]) as gibbsite [$Al(OH)_{3(am)}$], as adsorbing surfaces.

The amounts of Hfo and Hao available at the site for attenuation were based on the amorphous and metal hydroxide phase iron and aluminum concentrations measured in the SEP as described in Section 5.2.2. The minimum, mean, and maximum concentrations in soil borings were used in the adsorption models to capture the range of expected site concentrations. The Hfo and Hao surface properties (i.e., surface area, site density, and types of sites) from Dzombak and Morel (1990) and Karamalidis and Dzombak (2010) were used to quantify the iron and aluminum adsorption sites per mole of mineral.

The calculation methodology of Appelo and Postma (2010) was used to determine the specific quantity of sites on each mineral surface type as a function of the amount of mineral available to participate in these reactions. The methodology assumes the number of surface sites (sites) equals the product of the moles of iron ([Fe]) and the moles of surface sites per mole of iron ([sites]/[Fe]= 0.2 moles of sites per mole of iron). For the amount of

ferrihydrite available for sorption, the Appelo and Postma methodology further assumes the mass of ferrihydrite (mHfo) in grams (g) available equals the product of the [Fe] and the molecular weight of ferrihydrite (mwHfo = 88.85 g/mole). The same approach was used to calculate the number of sites from gibbsite, assuming the [sites]/[Al] is 0.41 moles of sites per mole of aluminum and the molecular weight of gibbsite is 78.003 g/mole.

The geochemical thermodynamic database Minteq V.4 was used to conduct adsorption modeling. However, new and updated thermodynamic data have been released in scientific literature. These new data are important to include in the geochemical modeling exercises for certain elements or minerals as they allow further refinement of potential reactions, or for correction of previous data that may have been less accurate or more broadly defined. For groundwater modeling at the Site, WSP made numerous updates to the Minteq V.4 database, including the addition of data relating to partitioning coefficients for metals on gibbsite, developed by Karamalidis and Dzombak (2010).

To quantify current levels of adsorption of molybdenum, its adsorbed concentration (as milligram (mg) of constituent/kilogram (kg) of soil) was modeled for the minimum, maximum, and mean Hfo and Hao contents when equilibrated with the range of groundwater qualities observed at the Site. To quantify the capacity of soil to adsorb additional molybdenum, a stepwise increase in molybdenum concentrations was simulated, similar in concept to a titration. This was accomplished using the mean concentration of molybdenum observed in porewater, as well as the concentrations of other constituents present in porewater, allowing for site competition. This simulated "titration" took place into the range of observed groundwater qualities while allowing equilibration with the sorption surfaces in soils as shown in Table 8 (minimum, maximum and mean Hfo and Hao). The model was then used to predict the quantity of each constituent that would adsorb due to this titration of additional molybdenum and other porewater constituents.

Table 8: Calculation of Ferrihydrite and Gibbsite Surface Parameters for Geochemical Modeling

Parameter	Unit	Ferrihydrite			Gibbsite		
		Minimum	Mean	Maximum	Minimum	Mean	Maximum
Geometric Mean of Aquifer Solids Composition	mg/kg X	1,170	2,270	4,600	295	484	745
	mol X	2.1E-02	4.1E-02	8.2E-02	1.1E-02	1.8E-02	2.8E-02
Surface Site Concentration	mol weak sites / mol X	0.2	0.2	0.2	0.41	0.41	0.41
	mol strong sites / mol X	0.005	0.005	0.005	---		
Surface Sites	mol weak	4.2E-03	8.1E-03	1.6E-02	4.5E-03	7.4E-03	1.1E-02
	mol strong	1.0E-04	2.0E-04	4.1E-04	---		
Mass of Ferrihydrite or Gibbsite	grams	1.86	3.61	7.32	0.85	1.4	2.15

Note: Gibbsite only has one site type

7.2.2 Mineral Precipitation and Co-precipitation

The potential for mineral precipitation was assessed in PHREEQC using a saturation index (SI) calculated according to Equation 4.

$$SI = \log (IAP/Ksp) \quad \text{(Equation 4)}$$

The saturation index is the ratio of the ion activity product (IAP) of a mineral to the solubility product (Ksp). An SI value greater than zero indicates that the solution is supersaturated with respect to a particular mineral phase and, therefore, precipitation of this mineral may occur. An evaluation of precipitation kinetics is then required to determine whether the supersaturated mineral will indeed form. An SI value less than zero indicates the solution is undersaturated with respect to a particular mineral phase. An SI value close to zero indicates equilibrium conditions exist between the mineral and the solution. SI values between -0.5 and 0.5 are considered to represent 'equilibrium' in this report to account for the uncertainties inherent in the analytical methods and geochemical modeling.

In addition to adsorption, co-precipitation, or the direct incorporation of trace metals such as molybdenum into precipitated iron oxide-oxyhydroxides, has been previously identified as a process of potential importance in trace metal sequestration (e.g., Butt et al. 2000; Dzombak and Morel 1990; Smith 1999). Molybdenum may also be attenuated during the formation of ferrihydrite in addition to following its formation (Tebo et al. 2004).

7.2.3 Long-Term Stability of Attenuated Constituents

Three sensitivity analyses were performed to assess the long-term stability of attenuated molybdenum under variable pH, redox, and ionic strength conditions (Figures 24 to 26). Variations in pH, redox, and ionic strength are the most likely types of changes that will occur in an aquifer over time, thereby potentially affecting the stability of molybdenum (ITRC 2010). The sensitivity analyses were conducted applying the minimum, mean, and maximum Hfo and Hao contents determined for the Site soils, equilibrated with the groundwater qualities observed at the Site at the measured pH and redox conditions. For each sensitivity analysis, a single parameter was varied:

- **pH** - Hydrochloric acid or sodium hydroxide addition was used in the modeling simulations to vary the pH between 4 and 12. A pH range of 4 to 10 is the typical range considered for evaluating metal speciation, but at a pH lower than 5, Hfo tends to become unstable, limiting attenuation/adsorption, which causes an observed decrease in modeled attenuation at lower pH values. Hao remains stable until a pH range of approximately 3.5 and, as such, may provide attenuation capacity under more acidic conditions.
- **Redox** – Addition of dissolved oxygen (DO) was simulated to adjust redox (Eh) values between -200 and +700 millivolts (mV) based on the historical and anticipated range of Eh in the region.
- **Ionic Strength** - Total dissolved solids (TDS) concentrations were increased by titrating in calcium, magnesium, sodium, potassium, chloride, and sulfate in the proportions observed in porewater. TDS concentrations up to ~3,849 mg/L were evaluated, which is approximately 4-5 times the average TDS concentration observed in groundwater at the CCR Monitoring Network (765 mg/L).

7.2.4 Geochemical Modeling Assumptions and Data Handling

Geochemical modeling assumptions and data handling included the following:

- **Groundwater continuity:** Groundwater quality samples were collected from each well during sampling events conducted in November 2023. Samples from this period were selected for the geochemical modeling because all wells within the compliance and corrective action monitoring well Networks were sampled and analyzed for the full suite of parameters required and the resulting data are assumed to provide a comprehensive overview of groundwater conditions. Temporal trend analysis for molybdenum made use of all available sampling events between March 2016 and November 2023.
- **Porewater chemistry:** Porewater samples collected in January 2018 were assumed to be representative of porewater found in the CCR Unit.
- **Redox values:** ORP values measured in the field were converted to Eh by adding +200 mV to the field-measured values as per YSI Tech Note (YSI 2015).
- **Non-detect values:** Constituents with concentrations less than their respective method reporting limits were assumed to have a concentration one half the minimum detection limit in model simulations.
- **Total recoverable concentrations:** Total recoverable fraction results were used for geochemical modeling.
- **Charge balance:** Groundwater and porewater compositions with charge balance errors less than 10% were considered valid. Compositions with charge balance errors greater than 10% were flagged as potentially less reliable, but still included in the geochemical modeling effort.

7.3 Results

7.3.1 Empirical Attenuation Rate

The results of the point decay analysis (Section 7.1) for the background, monitoring, and downgradient wells between March 2016 and November 2023 are provided in Table 9. Results are presented as mean, site-wide attenuation rates. This decay rate analysis does **NOT** consider the effects of treatment or groundwater flow direction/velocity.

This evaluation demonstrates that, in the Compliance Monitoring Network, a net decrease in the concentration of molybdenum at downgradient monitoring wells has been occurring, as indicated by negative point decay constants. Compliance wells are typically downgradient of the groundwater treatment zone and the effects of treatment are beginning to be observed at certain well locations (i.e. UMW-5D) where concentration levels have reduced by up to approximately 91.5% since the implementation of corrective measures[2]. The effects of treatment should become more prevalent over the next few years as the treatment system has only been in operation since 2023.

[2] UMW-5D has decreased 91.5% in molybdenum concentrations since the implementation of corrective measures at the SCPA (closure and treatment) from 2,240 µg/L in April 2020 to 191 µg/L November 2023. UMW-4D has decreased 55% in molybdenum concentrations in the same timeframe from 8,860 to 3,990 µg/L.

Table 9: Empirical Attenuation Rate of Molybdenum in the Compliance Monitoring Network

Constituents	Units	Average Point Decay Rates			
		Background Wells	Compliance Monitoring Network Wells	All Downgradient Wells	Time to Compliance (years)
March 2016 to November 2023					
Molybdenum	yr^{-1}	-0.31	-0.11	-0.08	48

The mean downgradient decay rates can be used to estimate the number of years it would take for elevated groundwater molybdenum concentrations to decrease to its GWPS for the Compliance Monitoring Network. At the maximum concentration of molybdenum observed in downgradient wells in November 2023 (3.99 mg/L), this would require approximately 48 years based on the site decay rate, which, as noted above, does not yet consider the effects of treatment or groundwater flow direction/velocity. In addition, the estimate does not account for various attenuation processes (e.g., dilution, dispersion, or sorption).

7.3.2 Model Predicted Attenuation Rate

Attenuation rates for molybdenum in groundwater were modeled using fate and transport modeling techniques as discussed in section 5.0 in combination with a 1-Dimensional geochemical reactive transport model. Groundwater concentrations were modeled to decrease in concentration in wells both adjacent to the SCPA (Detection and Assessment Network) and within the molybdenum plume (Corrective Action Network). Additionally, it was predicted that the plume of molybdenum would not exceed the GWPS at the property boundary within the timeframe modeled (50 years). However, these models are unable to account for the influences and the complex dynamics of the treatment system that is discussed in Section 2.2. Thus, the calculated empirical first order decay rates determined in Section 7.1 and the current trend in concentration in molybdenum across the monitoring network (Figures 3,4,5,7); Appendix A), based on empirical data, are the best representation of the attenuation rate for the constituents across the site. The geochemical models for the transects are included (Figures 27-28) to further support that molybdenum will not exceed at the property boundary as the degree in source concentrations decrease based on treatment system operations and to estimate future decreasing concentrations of molybdenum taking into account groundwater flow.

7.3.3 Capacity of Attenuation Mechanisms

Attenuation modeling was conducted in PHREEQC as a function of the amount of attenuating substrate present (minimum, mean and maximum from soil analyses). The modeling revealed a large range of attenuation capacities for molybdenum. Figure 29 displays the predicted trajectories of aqueous molybdenum concentrations in the Compliance Monitoring and Corrective Action Monitoring Networks, respectively, before and after attenuation, as additional molybdenum is titrated into solution. The bold lines display the geometric means for all groundwater scenarios within each soil scenario and the grey area represents the range for the 5th to 95th percentile of all soil scenarios.

The predicted trajectories are compared against the GWPS and porewater concentrations. On the plots, the further the predicted trajectories are to the right of the diagonal 1:1 line, the larger the amount of molybdenum that is attenuated in soils and is no longer predicted to reside in the aqueous phase.

For the minimum adsorption cases, the trajectories run nearly parallel to the 1:1 line, indicating that sorption capacity is directly proportional to the concentration before adsorption as sites become filled. The modeling results suggest that adsorption has the capacity to reduce molybdenum concentrations of up to originally 1.0 mg/L down to below the GWPS of 0.1 mg/L in the Compliance Monitoring Network once wells reach around that level. The Corrective Action Monitoring Network currently demonstrates decreased capacity for molybdenum attenuation as evidenced by molybdenum concentrations in multiple wells that are currently above the GWPS. In this case, the closure of SCPA in combination with active treatment is expected to result in no contribution from porewater to the alluvial aquifer for future loading. The future increase in capacity is demonstrated by the decreasing molybdenum concentrations across the network in response to closure of the SCPA (Section 7.3.2).

7.3.4 Long-Term Stability of Attenuated Constituents

To determine the long-term stability of sequestered molybdenum, simulations were conducted varying three variables known to affect its attenuation: pH, redox, and TDS. The modeled variations in dissolved molybdenum concentration as a function of changes in pH, Eh, and TDS are shown in Figures 24, 25, and 26 respectively. Results are presented along with the GWPS value and the range of pH, Eh, or TDS values (5th percentile to 95th percentile) observed at the Site.

The results of the attenuation stability modeling for molybdenum as a function of changes in pH, Eh and TDS can be summarized as follows:

- **Molybdenum** (Figures 24-26)**:** Lower pH values (more acidic conditions) are generally more favorable for adsorption. Under more alkaline conditions (pH greater than 9), molybdenum desorbs and is present in the dissolved phase in concentrations potentially to exceed the GWPS. It is expected that pH values across the Site will decrease post closure, benefiting molybdenum attenuation. Notably the range of groundwater pH across the site has typically been <7.5 (Section 3.0). Over the range of Eh values at the Site, molybdenum sorption is generally stable. Even highly reducing and oxidizing conditions are predicted to have minimal impact on molybdenum concentrations, which remain below the GWPS. Molybdenum adsorption is moderately affected by increases in TDS concentrations. Molybdenum is modeled to desorb at TDS concentrations comparable to the maximum observed porewater concentration which would not account for any dilution as pore water left the SCPA (3,440 mg/L). However, these simulations do not account for decreases in porewater flux that will likely result from capping and the current active treatment that is in place, so it is not expected or likely that TDS levels will increase in the future.

8.0 TIER I EVALUATION SUMMARY

The evaluation of natural attenuation of molybdenum was completed in accordance with recommended practices and guidance promulgated by the USEPA and the ITRC (USEPA 2007a, b; USEPA 2015; ITRC 2010). According to USEPA (USEPA 2007a), the purpose of the Tier 1 evaluation is to “Demonstrate that the groundwater plume is not expanding and that sorption of the contaminant onto aquifer solids is occurring where immobilization is the predominant attenuation process.” Based on this definition, the following observations support further MNA for the

CCR Unit in coordination with other closure and corrective measure efforts (treatment) that are currently being undertaken:

- **Plume Stability:** Based on the water quality monitoring data presented in this assessment, groundwater concentrations of molybdenum at the Site appear to be stable or decreasing due likely in part to the closure treatment plan. Alkaline conditions (pH > 9) result in desorption of molybdenum from solids and can contribute to molybdenum levels above the GWPS at the Site. But the pH of groundwater in the SCPA Compliance Monitoring Network are neutral or slightly above neutral, and, consequently, molybdenum concentrations are anticipated to continue decline. All downgradient wells across the site show a decreasing trend in concentrations in molybdenum based on a 1st order decay constant. This trend should continue as treatment also continues. In combination, these observations indicate that overall, concentrations of molybdenum in the aquifer are stable or decreasing across the site.
- **Magnitude of Exceedances:** The highest molybdenum concentration (since monitoring began) in the Compliance Monitoring Network was observed at downgradient well UMW-4D in November 2020 at 9.04 mg/L. However, results from the most recent sampling have indicated that the concentration in this well has decreased to 4.0 mg/L. Wells UMW-2D, UMW-3D, UMW-4D, and UMW-5D continue demonstrating a molybdenum GWPS exceedance since closure efforts began in September 2019. These concentrations are expected to decrease with the input from the water treatment facility in tandem with closure activities.
- **Porewater:** Historical records are not available for ash additions or porewater concentrations over the lifespan of the SCPA surface impoundment. However, based on 2018 porewater data, molybdenum concentrations in porewater ranged from 0.026 mg/L to 56.6 mg/L. This indicates variable concentrations of molybdenum in the CCR Unit. While in the past the SCPA may have been a source for molybdenum in groundwater, it is currently not considered to be an active source due to the leaching characteristics of CCR, groundwater predominantly flowing around instead of into the SCPA after closure, and the installation of a clean injection wells from the treatment system encircling the SCPA. As demonstrated by decreasing site-wide concentrations of all three constituents the SCPA is no longer an active source of porewater at the site.
- **Groundwater Chemistry:** Groundwater monitoring results and the findings of the geochemical modeling support the potential for natural attenuation of molybdenum. The groundwater was modeled to be in equilibrium with the mineral phase ferrihydrite for all monitoring wells included in this assessment. This is consistent with the results from the sequential extraction analysis that indicate amorphous and metal hydroxide fractions sequester molybdenum.
- **Confirmation of Attenuation/Immobilization:** Based on both mineralogical and chemical analysis, it is demonstrated that attenuation of molybdenum by aquifer materials is occurring. Iron and aluminum, capable of forming (hydr)oxide phases that facilitate metals attenuation (Dzombak and Morel 1990; Karamalidis and Dzombak 2011), was identified in all samples. This indicates that it is likely aquifer solids have been and are actively attenuating molybdenum. Additional attenuation is expected after closure due to a reduced contribution from porewater and an accompanying decrease in groundwater pH around the SCPA, which will only be further aided by the groundwater treatment system. As discussed previously, molybdenum attenuation by soils is enhanced under moderately acidic conditions.

Based on these findings, molybdenum is confirmed to be viable for an MNA remedy application due to the aquifer response observed from closure activities and is, therefore, deemed to meet the criteria for Tier I MNA in accordance with USEPA guidance (USEPA 2007a, b; USEPA 2015).

9.0 TIER II EVALUATION

The purpose of the Tier II evaluation is to "Identify mechanisms and rates of the operative attenuation process." Based on this definition, the following modeling results and observations support MNA as a viable corrective measure for the CCR Unit:

- **Attenuation Mechanisms:** PHREEQC modeling results (supported by results of SEP analysis) indicate that adsorption is attenuating molybdenum downgradient of the CCR Unit. This is concluded based on equilibration of site-specific groundwater compositions with the range of Hfo and Hao concentrations observed in SEP results of Site soils. The attenuation capacity of Hfo and Hao surface sites is partially dependent on the concentrations of molybdenum in groundwater. In addition to metal oxyhydroxides, clay minerals and/or particulate organics can also act as a substrate for attenuation (Goldberg and Forster 1996). Although likely present, these mechanisms were not directly addressed in the current evaluation.
- **Estimated Site Attenuation Rates:** Concentrations of molybdenum are decreasing at downgradient Compliance Monitoring Network wells, resulting in negative calculated point decay rates. Using the mean empirical decay rate, the maximum 2023 concentrations of molybdenum observed in downgradient monitoring wells would take approximately 48 years to attenuate to below GWPS based on the current trend in concentrations (without considering the effects of treatment or groundwater flow direction/velocity). Modeling additionally indicated that molybdenum would not exceed the GWPS at the property boundary based on the current closure strategy and treatment plan.

Based on these findings, molybdenum is viable as an MNA remedy application in combination with closure activities and deemed to meet the criteria for Tier II MNA in accordance with USEPA guidance (USEPA 2007a, b; USEPA 2015).

10.0 TIER III EVALUATION

According to USEPA (USEPA 2007a), the purpose of the Tier III evaluation is to eliminate sites for an MNA remedy where (1) "Capacity of the aquifer is insufficient to attenuate the COC mass to regulatory standards" and/or (2) "Stability of the immobilized COC is insufficient to prevent remobilization due to future changes in groundwater chemistry". Based on this definition, the following observations support MNA as a viable corrective measure for the CCR Unit:

- **Adsorption Capacity Modeling** (Figure 29)**:** For molybdenum, modeling results suggest that adsorption has the capacity to reduce molybdenum concentrations from 1.0 mg/L down to the GWPS of 0.1 mg/L. The titration modeling demonstrates the soil's capacity to attenuate molybdenum if concentrations of molybdenum were to increase above current levels. The Compliance Monitoring Network (located immediately adjacent to the SCPA) shows reduced capacity for attenuation currently because levels of molybdenum currently exceed the GWPS. However, the Nature and Extent Network, which is more distant from the SCPA, demonstrates additional capacity for molybdenum attenuation. As concentrations of molybdenum decrease from closure and treatment, capacity for attenuation will return immediately adjacent to the SCPA. The 95th percentiles of modeled trajectories show that most pH conditions at the Site are

favorable for attenuating molybdenum and will become more conductive to attenuation as the groundwater pH reverts to natural background levels post closure.

- **Stability Modeling for Adsorbed Constituents** (Figures 24-26)**:** Stability modeling indicates that over the ranges of pH, Eh, and TDS observed in groundwater at the Site, the adsorbed molybdenum is relatively stable and will likely remain attenuated. The modeling results further suggest that the adsorption of molybdenum could be reversed if conditions become sufficiently alkaline, but there is no historical basis to expect such an occurrence and, in fact, the opposite (decreasing pH at wells) is expected to continue post closure. Generally, site groundwater is circumneutral and has remained stable across the sampling period which supports continued molybdenum attenuation or increased attenuation as pH decreases. Changes in redox conditions are modeled to have little to no impact on aqueous molybdenum concentrations and molybdenum attenuation efficiency. Modeling results also indicate that increasing TDS concentrations could result in a very slight increase in aqueous concentrations of molybdenum due to competition for sorption sites. However, this effect is predicted to be minor over the range of TDS concentrations observed at the Site and the risk will be lessened over time as closure causes a decrease in porewater flux and greater mixing of ambient groundwater in the aquifer, especially from the groundwater treatment system. Based on the closure and treatment strategy, no additional impacts are foreseen that will affect the alluvial aquifer outside of the treatment system and once concentrations decrease below the GWPS, they are predicted to remain stable or decrease further.

Based on these findings, molybdenum is a candidate for MNA and deemed to meet the criteria for Tier III MNA in accordance with USEPA guidance (USEPA 2007a, b; USEPA 2015).

11.0 CONCLUSIONS

This evaluation has been completed in accordance with guidance and best practices promulgated by the USEPA (USEPA 2007a, b; USEPA 2015) and the ITRC (ITRC 2010). Based on the results of this evaluation, the following is concluded for molybdenum in Site groundwater:

- Molybdenum concentrations across the site are decreasing based on measured groundwater data.
- Physical and chemical attenuation is occurring, and concentrations are stable or declining across the site.
- Modeling indicates that molybdenum attenuation will be stable in the long term.
- Molybdenum meets the USEPA requirements (Tiers I, II, and III) to be viable as an MNA remedy application in combination with the capping and closure of the SCPA.

12.0 REFERENCES

Ameren, 2019. Remedy Selection Report – 40 CFR § 257.97 – Rush Island, Labadie, Sioux and Meramec CCR Basins.

Appelo, C.A.J. and Postma, D., 2010. Geochemistry, Groundwater and Pollution. 2nd Edition. Boca Raton, FL.

Bethke, C., Farrell, B., and Sharifi, M., 2021. The Geochemist's Workbench® Release 15 (five volumes). Aqueous Solutions LLC, Champaign, IL.

Butt, C., Lintern, M. and Anand, R., 2000. Evolution of regoliths and landscapes in deeply weathered terrain—implications for geochemical exploration. Ore geology reviews, 16(3-4), pp.167-183.

Davis, J.A., and Kent, D.B., 1990. Surface Complexation Modeling in Aqueous Geochemistry, Eds. M.F. Hochella and A.F. White, Mineral-Water Interface Geochemistry, Min. Soc. Am. Reviews in Minerology, 23, pp.177-260.

Doherty, J., and Hunt, R., 2010, Approaches to highly parameterized inversion—A guide to using PEST for groundwater-model calibration: U.S. Geological Survey Scientific Investigations Report 2010–5169, 59 p.

Doherty, J. 2016. PEST model-independent parameter estimation user manual part I: PEST, SENSAN and Global Optimizers, 6th Edition. Watermark Numerical Computing.

Dzombak, D. and Morel, F., 1990. Surface complexation modeling: hydrous ferric oxide. John Wiley & Sons.

Environmental Simulations Inc. (ESI), 2020. Groundwater Vistas version 7.24 Build 189.

Golder Associates Inc., 2019. Groundwater and Geochemical Modeling Summary for Ameren Sioux Energy Center Corrective Measures Assessment.

Gredell and Reitz & Jens, Inc., 2014 Groundwater Detection Monitoring Wells Installation Report. Ameren Missouri Sioux Energy Center Utility Waste Landfill (UWL) Solid Waste Disposal Area. St. Charles County, Missouri, USA.

Hem, J., 1985. Study and interpretation of the chemical characteristics of natural water (Vol. 2254). US Geological Survey.

Harbaugh, A. and McDonald, M., 1996. User's Documentation for MODFLOW-96, An Update to the U.S. Geological Survey Modular Finite-Difference Ground-water Flow Model. (Open File Report 96- 485). U.S. Geological Survey, 56 p.

Harbaugh, A., 2005, MODFLOW-2005; The U.S. Geological Survey Modular Ground-water Model-The Ground-water Flow Process. (U.S. Geological Survey Techniques and Methods 6-A16).

Harbaugh, A., Banta, E., . Hill, M., and McDonald, M., 2000. MODFLOW-2000; The U.S. Geological Survey Modular Ground-water Model—User Guide to Modularization Concepts and the Ground-water Flow Process. (Open File Report 00-92). U.S. Geological Survey, 121 p.

Haley and Aldrich Inc. 2019. Corrective Measures Assessment, Ameren Missouri, Sioux Energy Center, St. Charles County, Missouri.

ITRC, 2010. A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater. Technical/Regulatory Guidance.

Karmalides, A., and Dzombak, D., 2010. Surface Complexation Modeling: Gibbsite. John Wiley and Sons, New Jersey.

Loureiro 2022. Presentation on Sioux Design as of 4/14/2021. Provided as Ameren_00003214 at ameren_00003214-ameren_00003217.ashx.

Loureiro 2023. Effective Coal Combustion Residual (CCR) Groundwater Compliance at CCR Sites.

McDonald, M. and Harbaugh, A.,1988. A Modular Three-dimensional Finite-Difference Groundwater Flow Model. (Techniques of Water-Resources).

Newell, C.J., Rifai, H.S., Wilson, J.T., Connor, J.A., Aziz, J.A. and Suarez, M.P., 2002. Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies. Ground Water Issue.

Parkhurst, D. and Appelo, C., 2013. Description of input and examples for PHREEQC version 3: a computer program for speciation, batch-reaction, one-dimensional transport, and inverse geochemical calculations (No. 6-A43). US Geological Survey.

Pollock, D., 2012. User Guide for MODPATH Version 6 - A Particle-Tracking Model for MODFLOW: U.S. Geological Survey Techniques and Methods 6–A41, 58 p.

Rumbaugh, J., and Rumbaugh, D., 2011. Guide to Using Groundwater Vistas Version 6. Environmental Simulations, Inc., Reinholds, Pennsylvania.

Smith, K., 1999. Metal sorption on mineral surfaces: an overview with examples relating to mineral deposits.

Stenge, 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).

Tebo, B., J.R. Bargar, B., Clement, G., Dick, K., Murray, D., Parker, R., Verity, and Webb, S., 2004. Biogenic Manganese Oxides: Properties and Mechanisms of Formation. Annual Review of Earth and Planetary Sciences 32:287-328.

Tessier, A., Campbell, P., and Bisson, M., 1979. Sequential extraction procedure for the speciation of particulate trace metals. Analytical chemistry, 51(7), pp.844-851.

Uddin, M. 2017. A review on the adsorption of heavy metals by clay minerals, with special focus on the past decade. Chemical Engineering Journal, 308, pp.438-462.

USEPA, 1998. MINTEQA2/PRODEFA2, A geochemical assessment model for environmental systems—User manual supplement for version 4.0: Athens, Georgia, National Exposure Research Laboratory, Ecosystems Research Division, 76 p. Revised September 2006.

USEPA, 2007a. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Volume 1. Technical Basis for Assessment. EPA/600/R-07/139.

USEPA, 2007b. Monitored Natural Attenuation of Inorganic Contaminants in Ground Water. Volume 2. Assessment for Non-Radionuclides Including Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Nitrate, Perchlorate, and Selenium. EPA/600/R-07/140.

USEPA, 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. OSWER Directive 9283.1-36

USEPA, 2016. 40 CFR 257, Subpart D, 80 Fed. Reg. 21468 (April 17, 2015, revised August 2016).

Zheng, C., and Wang, P.,1999, MT3DMS, A modular three-dimensional multi-species transport model for simulation of advection, dispersion and chemical reactions of contaminants in groundwater systems; documentation and users guide, U.S. Army Engineer Research and Development Center Contract Report SERDP-99-1, Vicksburg

YSI, 2015. Tech Note, Measuring ORP on YSI 6-Series Sondes: Tips, Cautions and Limitations

Signature Page

WSP USA Inc.

PJ Nolan, PhD
Senior Technical Principal & Assistant Vice President, Geochemist

Rocksmith Geoengineering, LLC.,

Mark Haddock, P.E., R.G.
Principal Engineer and Senior Partner

Jeff Ingram, R.G.
Senior Geologist and Partner

TABLES

Table 4
Cation Exchange Capacity of Soils from Select Borings
Monitored Natural Attenuation Evaluation
Sioux Energy Center, St. Charles County, MO

Sample Location	L-BH-01S	L-BH-01M	L-BH-01D	L-BH-02S	L-BH-02M	L-BH-02D	L-BH-03S	L-BH-03M	L-BH-03D
Sample Depth (ft bgs)	23 - 30	65 - 70	100 - 114	40 - 50	67.5 - 70	80 - 87	22.5 - 30	70 - 80	108 - 114
Cation Exchange Capacity (cmol/Kg	6.3	6.5	3.5	6.6	47.9	4.8	5.2	3.3	3.1

Notes:
mg/L = milligrams per liter.
cmol/Kg = centimole per kilogram.
ft bgs = feet below ground surface

Table 5
Relevant Mineral Phases – Saturation Indices and Water Types
Monitored Natural Attenuation Evaluation
Sioux Energy Center, St. Charles County, MO

MINERAL PHASES - Saturation Indices		S-BMW-1D	S-BMW-3D	S-BMW-1S	S-BMW-3S	S-UMW-1D	S-UMW-2D	S-UMW-3D	S-UMW-4D	S-UMW-5D	S-UMW-6D	S-TP-1D	S-TP-1M	S-TP-1S	S-TP-2D	S-TP-2M	S-TP-2S	S-TP-3D	S-TP-3M	S-TP-3S	S-TP-4D
Water Type		Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-SO4	Ca-SO4	Ca-SO4	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-SO4	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3
Charge Balance	%	3.14	0.92	-2.46	-0.59	-0.73	-0.17	0.29	1.07	1.74	2.13	-2.11	**-5.25**	-2.15	1.82	**-6.40**	-2.90	2.07	-2.19	1.20	1.37
Otavite	$CdCO_3$				-2.76		-1.33	-1.27	-1.72	-2.48										-1.62	
Ferrihydrite	$Fe(OH)_3$	**0.23**	**3.20**	**-0.42**	**-0.43**	**2.24**	**1.28**	**0.13**	**0.09**	-0.62	-1.20	**2.49**	**1.49**	-1.92	**1.16**	**4.41**	**3.18**	**-0.18**	**3.47**	**3.89**	**0.71**
Siderite	$FeCO_3$	**0.77**	**0.47**	-1.61	-1.56	**-0.39**	**-0.17**	**0.16**	**0.38**	**0.54**	**0.51**	**-0.19**	**0.01**	**0.93**	**0.51**	**1.16**	**2.38**	**0.60**	**2.11**	**1.99**	**0.25**
Melanterite	$FeSO_4{:}7H_2O$	-5.70	-5.64	-7.57	-8.07	-6.27	-6.13	-5.44	-4.83	-7.07	-5.61	-5.81	-5.46	-5.61	-4.36	-6.22	-5.27	-5.17	-5.38	-5.96	-5.20
Rhodochrosite	$MnCO_3$	**0.22**	**-0.20**	**-0.27**	-0.58	-0.70	**0.06**	**0.38**	**0.20**	**0.10**	**-0.05**	-0.73	-0.88	**0.93**	**-0.16**	**2.25**	**2.36**	**-0.04**	**1.50**	**2.26**	-0.51
Birnessite	MnO_2	-21.19	-14.91	-18.02	-18.60	-16.39	-19.21	-21.55	-21.26	-23.04	-23.74	-16.12	-18.29	-25.07	-18.74	-14.72	-18.00	-21.98	-18.01	-16.44	-19.80
Manganite	MnOOH	-9.15	-6.29	-7.95	-8.28	-7.21	-7.44	-8.54	-8.99	-9.98	-10.65	-7.26	-8.57	-11.21	-8.28	-3.33	-5.74	-9.63	-6.04	-4.73	-8.85
Gypsum	$CaSO_4{:}2H_2O$	-2.13	-2.00	-1.73	-2.33	-1.71	-0.84	**-0.45**	-0.99	-3.25	-1.98	-1.96	-1.83	-2.11	-0.68	-0.93	-1.70	-1.55	-1.70	-1.89	-1.49
Calcite	$CaCO_3$	**0.34**	**0.12**	**0.22**	**0.19**	**0.10**	**1.10**	**1.14**	**0.21**	**0.34**	**0.13**	**-0.44**	**-0.44**	**0.30**	**0.21**	**2.45**	**1.95**	**0.24**	**1.77**	**2.04**	**-0.01**
Magnesite	$MgCO_3$	-0.94	-1.13	-1.13	-1.18	-1.15	-1.19	-0.93	-1.28	-0.95	-1.14	-1.78	-1.77	-1.02	-0.95	**1.29**	**0.82**	-0.98	**0.52**	**0.76**	-1.23
Barite	$BaSO_4$	**0.28**	**0.78**	**0.26**	**-0.25**	**0.52**	**0.77**	**1.09**	**0.58**	-0.57	**0.16**	**0.14**	**0.41**	**0.02**	**0.73**	**1.12**	**0.52**	**1.16**	**0.95**	**0.51**	**1.16**
Witherite	$BaCO_3$	-2.59	-2.44	-3.13	-3.07	-2.99	-2.63	-2.66	-3.55	-2.31	-3.07	-3.64	-3.51	-2.87	-3.72	-0.84	-1.17	-2.40	-0.91	-0.88	-2.71
Fluorite	CaF_2	-3.35	-3.38	-3.34	-3.36	-3.55	-1.14	-2.03	-2.30	-2.70	-3.41	-2.10	-2.09	-1.83	-3.25	-2.27	-2.06	-3.39	-2.12	-1.84	-3.40
CoCO3	$CoCO_3$	-3.80	-3.98	-3.96	-3.90	-3.79	-3.15	-3.32	-3.91	-3.58	-3.93	-4.34	-4.48	-3.63	-3.90	-2.85	-1.96	-3.87	-2.76	-2.68	-4.08
Carbon Dioxide	pCO2(g)	-1.64	-1.49	-1.41	-1.59	-1.99	-3.38	-3.13	-2.13	-2.04	-1.54	-1.72	-1.37	-1.21	-1.24	-4.79	-3.20	-1.71	-3.48	-3.76	-1.56

		S-TP-4M	S-TP-4S	S-TP-5D	S-TP-5M	S-TP-5S	S-TP-6D	S-TP-6M	S-TP-6S	S-TP-7D	S-TP-7M	S-TP-7S	S-TP-8D	S-TP-8M	S-TP-8S	S-SCPA-1D	S-SCPA-1S	S-SCPA-2	S-SCPA-3D	S-SCPA-3S	S-AM-1D
Water Type		Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-SO4	Ca-HCO3	Ca-SO4	Ca-SO4	Ca-HCO3
Charge Balance	%	0.08	-0.03	0.76	1.51	**7.18**	-0.04	-1.16	0.71	-2.53	0.27	1.08	1.19	-3.78	4.12	**-6.32**	**-13.96**	0.92	**-7.65**	-4.02	-0.95
Otavite	$CdCO_3$			-2.72					-2.69							-1.50	**0.11**	-2.89	-0.72	-1.15	-2.50
Ferrihydrite	$Fe(OH)_3$	-0.60	**-0.10**	**0.79**	**1.69**	**1.92**	-0.62	**1.76**	**0.13**	-1.40	-1.57	-1.53	**-0.24**	**-0.43**	-1.45	-0.83	**1.86**	-1.53	**3.20**	**2.61**	**3.57**
Siderite	$FeCO_3$	**0.54**	-0.52	**0.41**	**0.27**	**0.52**	**0.64**	**0.33**	-1.01	**0.61**	**0.84**	-1.18	**0.42**	**0.55**	-2.61	**0.31**	-2.77	-0.57	-1.71	-2.86	**0.33**
Melanterite	$FeSO_4{:}7H_2O$	-5.32	-6.93	-4.69	-4.91	-6.23	-5.32	-5.35	-7.14	-4.75	-5.34	-7.01	-5.62	-5.89	-8.69	-5.78	-8.87	-6.12	-6.87	-8.29	-6.69
Rhodochrosite	$MnCO_3$	**-0.09**	**0.47**	**-0.08**	-0.65	**0.09**	**-0.10**	**-0.49**	**-0.41**	**-0.19**	**-0.21**	**-0.23**	**-0.29**	**-0.29**	-1.44	**-0.14**	-1.74	-1.26	**-0.37**	-1.16	**-0.03**
Birnessite	MnO_2	-22.75	-19.30	-19.70	-18.01	-17.22	-23.07	-17.85	-18.47	-24.78	-25.42	-21.08	-21.91	-22.75	-19.37	-23.91	-14.80	-23.64	-12.38	-13.36	-14.38
Manganite	MnOOH	-10.16	-8.03	-8.58	-8.20	-7.43	-10.19	-7.99	-8.16	-11.17	-11.59	-9.56	-9.76	-10.27	-9.25	-10.07	-6.01	-11.37	-4.39	-4.58	-5.73
Gypsum	$CaSO_4{:}2H_2O$	-1.64	-2.09	-1.06	-1.18	-2.55	-1.68	-1.61	-1.82	-1.21	-1.87	-1.69	-1.92	-2.20	-2.00	-1.23	**0.13**	-1.88	**-0.03**	**-0.12**	-2.69
Calcite	$CaCO_3$	**0.20**	**0.30**	**0.03**	**-0.04**	**0.17**	**0.29**	**0.05**	**0.31**	**0.12**	**0.28**	**0.11**	**0.13**	**0.21**	**0.04**	**0.88**	**2.20**	**-0.41**	**1.11**	**1.31**	**0.31**
Magnesite	$MgCO_3$	-1.11	-1.04	-1.19	-1.42	-1.13	-0.92	-1.25	-0.99	-1.10	-0.97	-0.80	-1.13	-1.08	-1.25	**-0.35**	-0.63	-1.68	**-0.48**	-1.03	-1.01
Barite	$BaSO_4$	**0.87**	**0.14**	**1.09**	**1.03**	**0.03**	**0.88**	**0.94**	**0.50**	**1.27**	**0.59**	**0.49**	**0.60**	**0.05**	**0.22**	**0.72**	**1.04**	**0.36**	**1.27**	**0.83**	**-0.17**
Witherite	$BaCO_3$	-2.62	-2.80	-3.16	-3.15	-2.58	-2.50	-2.74	-2.70	-2.73	-2.59	-3.04	-2.69	-2.88	-3.06	-2.52	-2.22	-3.47	-2.92	-3.08	-2.50
Fluorite	CaF_2	-1.87	-2.06	-3.40	-1.79	-2.35	-3.40	-1.94	-3.36	-2.16	-1.88	-1.77	-3.38	-1.87	-2.00	-0.87	-0.74	-2.43	**0.23**	-1.06	-3.51
CoCO3	$CoCO_3$	-4.07	-3.37	-3.82	-3.82	-3.74	-3.79	-4.23	-3.84	-4.14	-4.00	-3.76	-3.44	-3.99	-4.21	-3.35	-3.04	-3.78	-3.82	-3.60	-3.59
Carbon Dioxide	pCO2(g)	-1.61	-1.85	-1.65	-1.40	-1.34	-1.76	-1.45	-1.60	-1.76	-1.58	-1.32	-1.62	-1.66	-1.44	-2.84	-3.57	-1.48	-3.07	-4.40	-2.04

		S-AM-1S	S-LMW-1S	S-LMW-2S	S-LMW-4S	S-LMW-5S	S-LMW-6S	S-PZ-1S	S-PZ-9D	S-UG-3
Water Type		Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-HCO3	Ca-SO4	Ca-SO4	Ca-HCO3	Ca-HCO3	Ca-HCO3
Charge Balance	%	-1.30	-0.69	-1.24	**-8.32**	-2.38	-4.08	1.12	-0.90	1.37
Otavite	$CdCO_3$		-2.75	-2.34	-2.67	-2.45	-2.13	-2.23		-2.43
Ferrihydrite	$Fe(OH)_3$	**3.36**	**2.39**	**1.75**	**3.88**	**0.92**	**0.95**	**3.03**	**1.98**	**1.36**
Siderite	$FeCO_3$	-0.74	-3.78	-4.03	-1.13	-1.71	-1.85	**0.23**	**0.43**	-3.00
Melanterite	$FeSO_4{:}7H_2O$	-8.36	-9.57	-9.14	-6.92	-6.35	-6.53	-5.20	-4.73	-8.72
Rhodochrosite	$MnCO_3$	**0.53**	-0.94	-0.54	**-0.10**	**-0.29**	-0.74	**-0.26**	**-0.07**	**0.00**
Birnessite	MnO_2	-12.02	-9.34	-9.14	-9.75	-15.17	-15.12	-15.39	-17.36	-11.59
Manganite	MnOOH	-4.41	-3.86	-3.68	-3.99	-6.58	-6.83	-6.36	-7.33	-4.59
Gypsum	$CaSO_4{:}2H_2O$	-3.43	-1.46	-1.06	-1.73	-0.63	-0.63	-1.52	-1.06	-1.67
Calcite	$CaCO_3$	**0.15**	**0.27**	**0.04**	**0.04**	**0.00**	**0.05**	**-0.11**	**0.11**	**0.03**
Magnesite	$MgCO_3$	-1.21	-1.04	-1.27	-1.19	-1.31	-1.19	-1.44	-1.11	-1.33
Barite	$BaSO_4$	-1.21	**0.74**	**0.73**	**0.37**	**0.87**	**0.70**	**0.55**	**0.76**	**0.62**
Witherite	$BaCO_3$	-2.95	-2.85	-3.51	-3.19	-3.84	-3.96	-3.37	-3.41	-3.02
Fluorite	CaF_2	-3.51	-3.44	-3.32	-3.38	-3.35	-3.31	-3.50	-3.38	-3.43
CoCO3	$CoCO_3$	-2.96	-3.44	-3.38	-4.17	-3.70	-3.22	-4.01	-4.04	-2.90
Carbon Dioxide	pCO2(g)	-1.88	-1.83	-1.39	-0.93	-1.37	-1.23	-1.98	-1.71	-1.51

Notes:
Charge balances greater than 5% shown in red
Saturation indices >=-0.5 shown in bold and gray
Blank cells represent the absense of that mineral in the sample
Most recent sampling data used to calculate saturation indicies
pCO2(g) values presented at $10^{\wedge value}$ atm
atm = atmospheres
CA-HCO3 = water sample with calcium as the dominant cation and bicarbonate as the dominant anion
Ca-SO4 = water sample with calcum as the dominant cation and sulfate as the dominant anion

Table 6
Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results
Monitored Natural Attenuation Evaluation
Sioux Energy Center, St. Charles County, MO

Mineral	Mineral Formula	Sample Location									
		IW-2S	IW-2M	IW-2D	EW-3S	EW-3M	EW-3D	S-BH-01-S	S-BH-01-M	S-BH-01-D	S-BH-01
		Sample Interval (ft bgs)									
		40-48	75-80	125-129	35-40	70-80	120-125	20-27	45-54	100-110	93-96
Quartz	SiO_2	68.7	63.4	60.7	61.8	66.5	40.1	72.4	58.2	68.5	60.4
Plagioclase	$(NaSi,CaAl)AlSi_2O_8$	13.8	17.4	15.6	16.5	12.7	8.3	13.8	19.6	13.5	15.8
K-Feldspar	$KAlSi_3O_8$	7.1	6.8	8.4	10.1	12.6	7.0	6.5	10.4	5.4	11.1
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	3.2	3.8	1.8	4.5	3.9	3.9	2.1	3.6	3.2	2.7
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$	2.1	1.7	3.2	2.1	-	1.6	1.9	2.3	1.9	1.5
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$	1.4	1.7	2.5	0.8	1.1	1.2	0.8	0.3	1.3	0.6
Diopside	$CaMgSi_2O_6$	1.4	2.9	2.6	2.6	2.8	-	1.2	2.5	2.2	3.1
Pyrite	FeS_2	0.1	0.1	-	0.2	-	-	0.1	0.3	0.1	-
Hematite	Fe_2O_3	0.6	-	-	-	-	2.7	0.3	0.2	0.3	-
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot nH_2O$	1.6	-	-	-	-	-	0.9	1.1	-	-
Baryte	$BaSO_4$	-	0.2	-	-	-	-	-	-	-	-
Rhodochrosite	$MnCO_3$	-	0.4	-	0.6	0.4	0.4	-	-	0.6	0.1
Calcite	$CaCO_3$	-	1.7	2.7	1.0	-	25.8	-	1.5	3.1	1.9
Dolomite	$CaMg(CO_3)_2$	-	-	2.5	-	-	7.4	-	-	-	2.8
Grossular	$Ca_3Al_2Si_3O_{12}$	-	-	-	-	-	1.6	-	-	-	-
Maghemite	$\gamma^{-}Fe_2O_3$	-	-	-	-	-	-	-	-	-	-
Paragonite	$NaAl_2(AlSi_3O_{10})(OH)_2$	-	-	-	-	-	-	-	-	-	-
Anhydrite	$CaSO_4$	-	-	-	-	-	-	-	-	-	-
Andalusite	Al_2SiO_5	-	-	-	-	-	-	-	-	-	-
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes:
Results provided in wt% - percent by weight of each mineral.
ft bgs - feet below ground surface.
Non-detect minerals within a sample are represented by "-".
Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.
Samples were collected by Golder Associates between May 5, 2021 and May 22, 2021.

Table 7
Summary of Sequential Analysis of Metals in Soils from Borings
Monitored Natural Attenuation Evaluation
Sioux Energy Center, St. Charles County, MO

Analyte	SEP Step	Sample Location									
		IW-2S	IW-2M	IW-2D	EW-3S	EW-3M	EW-3D	S-BH-01-S	S-BH-01-M	S-BH-01-D	S-BH-01
		Sample Interval (ft bgs)									
		40-48	75-80	125-129	35-40	70-80	120-125	20-27	45-54	100-110	93-96
Aluminum	SEP Step 1	< 49 U	< 52 U	< 42 U	< 50 U	< 48 U	< 43 U	< 50 U	< 47 U	< 45 U	< 44 U
Aluminum	SEP Step 2	6.1 J	10 J	7.4 J	< 37 U	11 J	19 J	< 37 U	7.8 J	8.8 J	19 J
Aluminum	SEP Step 3	55	49	25	42	30	83	38	48	51	110
Aluminum	SEP Step 4	690	470	270	520	330	270	530	530	420	450
Aluminum	SEP Step 5	88 J	31 J	38 J	40 J	73 J	100 J	70 J	99 J	76 J	44 J
Aluminum	SEP Step 6	1100	690	1500	780	300	1400	700	870	710	540
Aluminum	SEP Step 7	27000	19000	29000	30000	24000	12000	21000	30000	21000	28000
Aluminum	SEP SUM	29000	21000	30000	32000	24000	14000	22000	31000	22000	30000
Aluminum	SEP Total[1]	2100	1800	1200	1400	900 F1	3200	1700	2000	1500	1600
Aluminum	SEP Total[2]	31000 B	37000 B	14000 B	29000 B	28000 B	22000 B	29000	45000	30000	41000
Iron	SEP Step 1	< 25 U	< 26 U	< 21 U	< 25 U	< 24 U	13 J	< 25 U	< 23 U	< 22 U	< 22 U
Iron	SEP Step 2	14 J	170.0	300	100	99	290	13 J	110	370	86
Iron	SEP Step 3	1400	680	890	450	170	1100	590	390	1200	800
Iron	SEP Step 4	3200	1500	1600	1600	1000	1700	2000	1200	1300	1300
Iron	SEP Step 5	< 92 U	< 97 U	< 79 U	< 93 U	84 J B	< 81 U	< 93 U	< 88 U	< 84 U	< 83 U
Iron	SEP Step 6	3800	2000	5000	1900	800	5900	2600	2000	2500	1400
Iron	SEP Step 7	3100	3000	3600	3500	1000	3900	2500	2700	6200	1300
Iron	SEP SUM	12000	7400	11000	7500	3200	13000	7700	6400	12000	4900
Iron	SEP Total[1]	11000	7900	11000	5700	4700	10000	5300	4400	6400	4000
Iron	SEP Total[2]	8100	5300	5500	3700	2100	9400	7500	7200	10000	6200
Molybdenum	SEP Step 1	< 9.8 U	0.99 J	< 8.4 U	0.92 J	0.86 J	< 8.6 U	< 9.9 U	< 9.3 U	< 8.9 U	< 8.9 U
Molybdenum	SEP Step 2	< 7.4 U	< 7.8 U	< 6.3 U	< 7.4 U	< 7.2 U	< 6.4 U	< 7.5 U	< 7.0 U	< 6.7 U	< 6.7 U
Molybdenum	SEP Step 3	0.35 J	0.32 J	0.16 J	0.32 J	0.21 J	< 2.1 U	< 2.5 U	< 2.3 U	< 2.2 U	0.25 J
Molybdenum	SEP Step 4	< 2.5 U	0.22 J	< 2.1 U	0.23 J	0.18 J	< 2.1 U	< 2.5 U	< 2.3 U	< 2.2 U	0.12 J
Molybdenum	SEP Step 5	< 37 U	< 39 U	< 31 U	< 37 U	< 36 U	< 32 U	< 37 U	< 35 U	< 33 U	< 33 U
Molybdenum	SEP Step 6	< 2.5 U	< 2.6 U	0.13 J	< 2.5 U	< 2.4 U	0.17 J	< 2.5 U	< 2.3 U	< 2.2 U	< 2.2 U
Molybdenum	SEP Step 7	< 2.5 U	0.12 J	< 2.1 U	0.17 J	< 2.4 U	< 2.1 U	< 2.5 U	< 2.3 U	< 2.2 U	0.13 J
Molybdenum	SEP SUM	0.35 J	1.7 J	0.30 J	1.6 J	1.2 J	0.17 J	< 2.0 U	< 2.0 U	< 2.0 U	0.50 J
Molybdenum	SEP Total[1]	0.54 J	2.0 J	0.37 J	1.5 J	3.1	0.38 J	< 4.6 U	< 4.3 U	< 4.1 U	0.91 J
Molybdenum	SEP Total[2]	0.46 J	2.1 J	0.47 J	1.3 J	1.1 J	0.15 J	0.12 J	0.31 J	0.11 J	0.90 J

Notes:

All Results displayed in milligram per kilogram (mg/kg).

ft bgs - feet below ground surface.

1 = result using SEP_Tot_Prep method

2 = result using 3050B method

U= The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ= The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit, the quantitation limit is considered estimated.

J= The analyte was positively identified. The associated numerical value is the approximate concentration.

J+= The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample and biased high.

B= Compound was found in the blank and sample.

Table 7
Summary of Sequential Analysis of Metals in Soils from Borings
Monitored Natural Attenuation Evaluation
Sioux Energy Center, St. Charles County, MO

SEP: Sequential Extraction Procedure.

Step 1 - Exchangeable Phase: This extraction includes trace elements that are reversibly adsorbed to soil minerals, amorphous solids, and organic material by electrostatic forces.

Step 2 - Carbonate Phase: This extraction targets trace elements that are adsorbed or otherwise bound to carbonate minerals.

Step 3 - Non-Crystalline Materials Phase: This extraction targets trace elements that are complexed by amorphous minerals (e.g. iron).

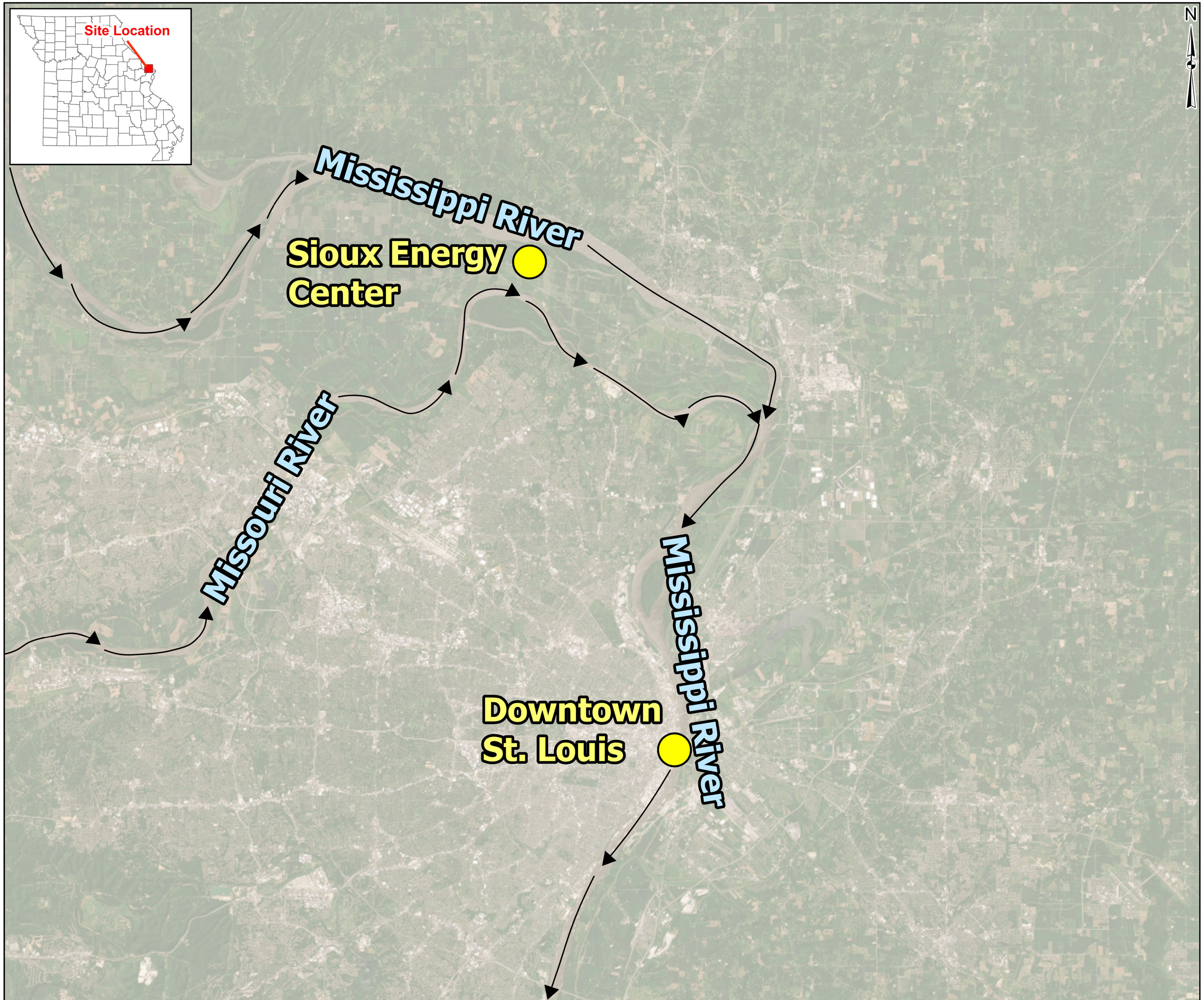
Step 4 - Metal Hyrdoxide Phase: This extraction targets trace elements bound to hydroxides of iron, manganese, and/or aluminum.

Step 5 - Organic Phase: This extraction targets trace elements strongly bound via chemisorption to organic material.

Step 6 - Acid/Sulfide Fraction: The extraction is used to identify trace elements precipitated as sulfide minerals.

Step 7 - Residual Fraction: Trace elements remaining in the soil aftrer the previous extractions will be distributed between silicates, phosphates, and refractory oxides.

FIGURES



TITLE

SITE LOCATION MAP

→ River Flow Direction

NOTES

1. All boundaries and locations are approximate.

REFERENCES

1. Ameren Missouri Sioux Energy Center, Sioux Property Control Map, February 2011.

0 2.5 5 10 Miles

PROJECT
CCR RULE GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

Ameren

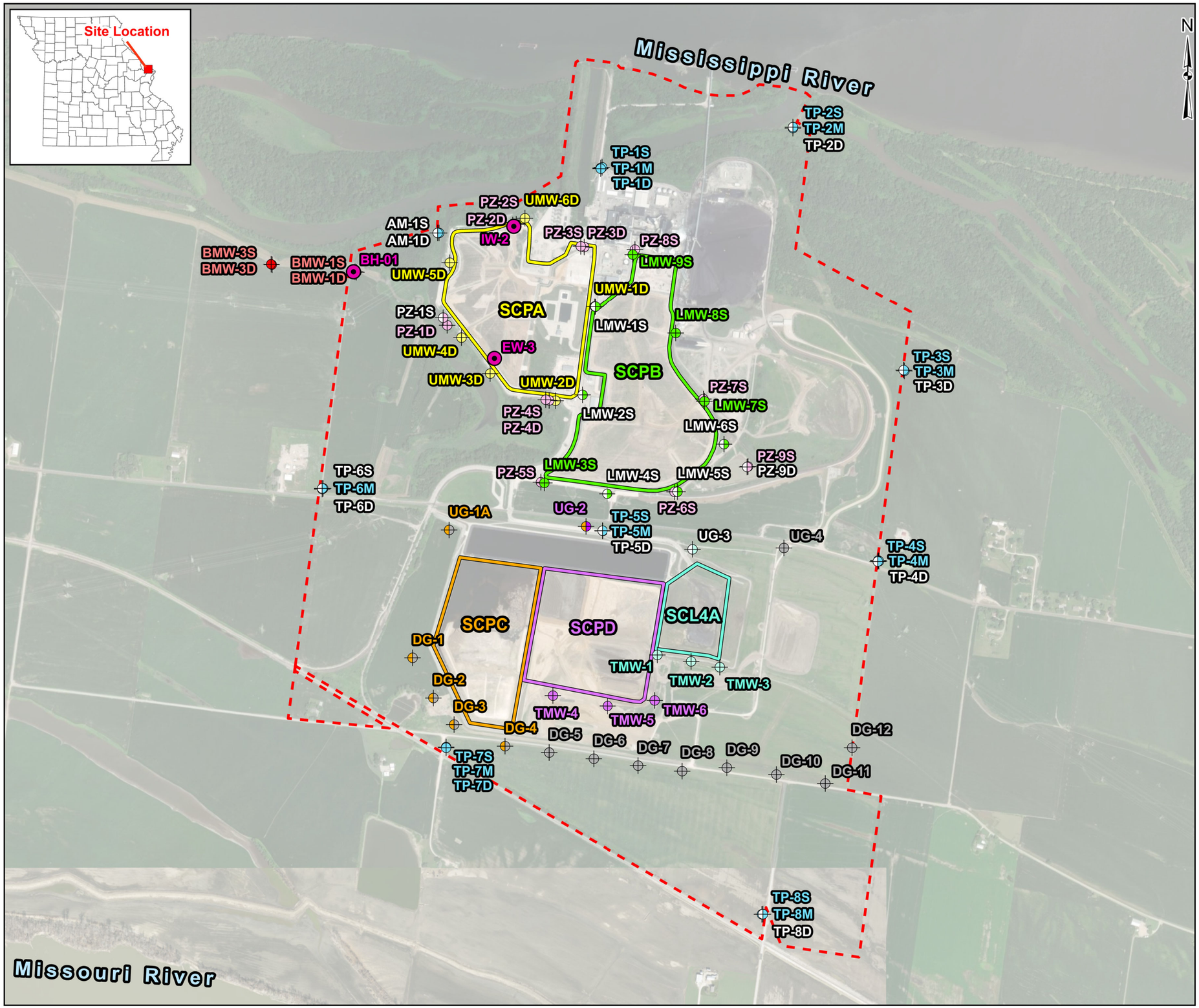
ROCKSMITH GEOENGINEERING

DESIGN	JSI	YYYY-MM-DD	2024-05-31
PREPARED	JSI	PROJECT No.	23009-24MNA
REVIEW	AMT		
APPROVED	MNH		

FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

Path: C:\Users\jsi\Rocksmith Geoengineering LLC\23007 - Ameren GW - Documents\400 - Drawings, Figures\4.3-SEC\4.3.2 - Production\MNA Eval\20240531_Figure1-SEC.aprx



TITLE

SIOUX ENERGY CENTER GROUNDWATER MONITORING PROGRAMS AND SAMPLE LOCATION MAP

Legend

- Sioux Energy Center Property Boundary

Groundwater and Porewater Sampling Locations

- Background Monitoring Well
- SCPA Monitoring Well
- Nature and Extent Monitoring Well
- SCPA Corrective Action and Nature and Extent Monitoring Well
- NPDES Site Characterization Report Monitoring Well
- SCPA Corrective Action and NPDES Site Characterization Report Monitoring Well
- SCL4A Monitoring Well
- SCL4A, State UWL, and SCPA Corrective Action Monitoring Well
- SCPB Monitoring Well
- SCPB and SCPA Corrective Action Monitoring Well
- SCPC, SCPD, and State UWL Monitoring Well
- SCPC and State UWL Monitoring Well
- SCPD Monitoring Well
- State UWL Monitoring Well
- MNA Soil Samples

Sioux Energy Center CCR Units

- SCPA - Closed Bottom Ash Surface Impoundment
- SCPB - Closed Fly Ash Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- SCPC - Closing FGD Surface Impoundment
- SCPD - FGD Surface Impoundment

NOTES

1. All boundaries and locations are approximate.
2. FGD - Flue Gas Desulfurization.
3. CCR - Coal Combustion Residuals.
4. UWL - Utility Waste Landfill.
5. MNA - Monitored Natural Attenuation.
6. NPDES - National Pollutant Discharge Elimination System.

REFERENCES

1. Ameren Missouri Sioux Energy Center, Sioux Property Control Map, February 2011.

0 500 1,000 2,000 3,000 Feet

PROJECT
CCR RULE GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

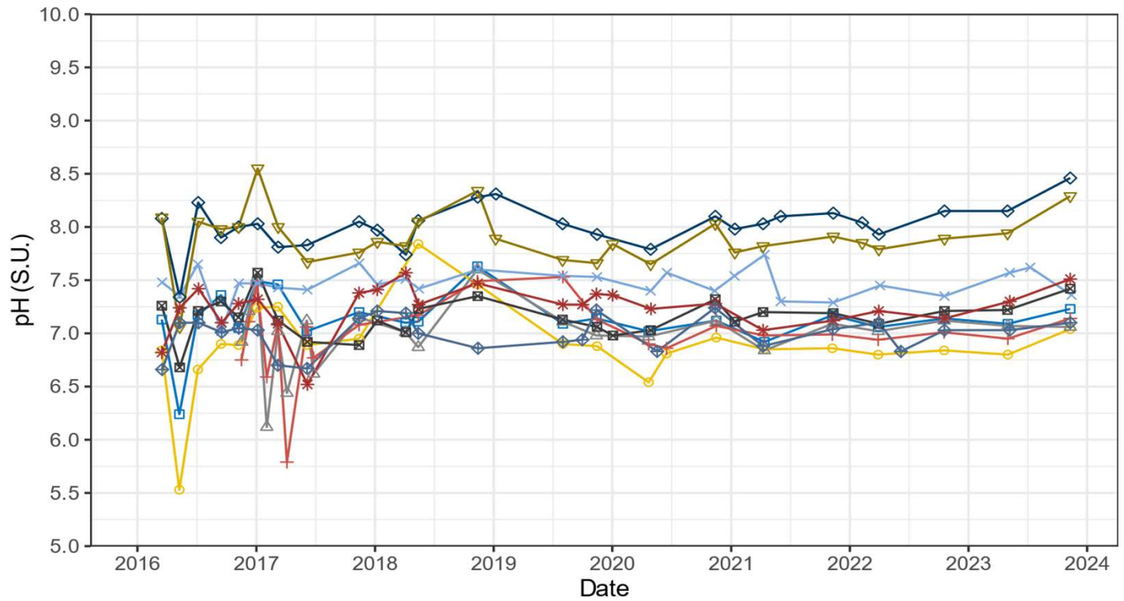
ROCKSMITH GEOENGINEERING

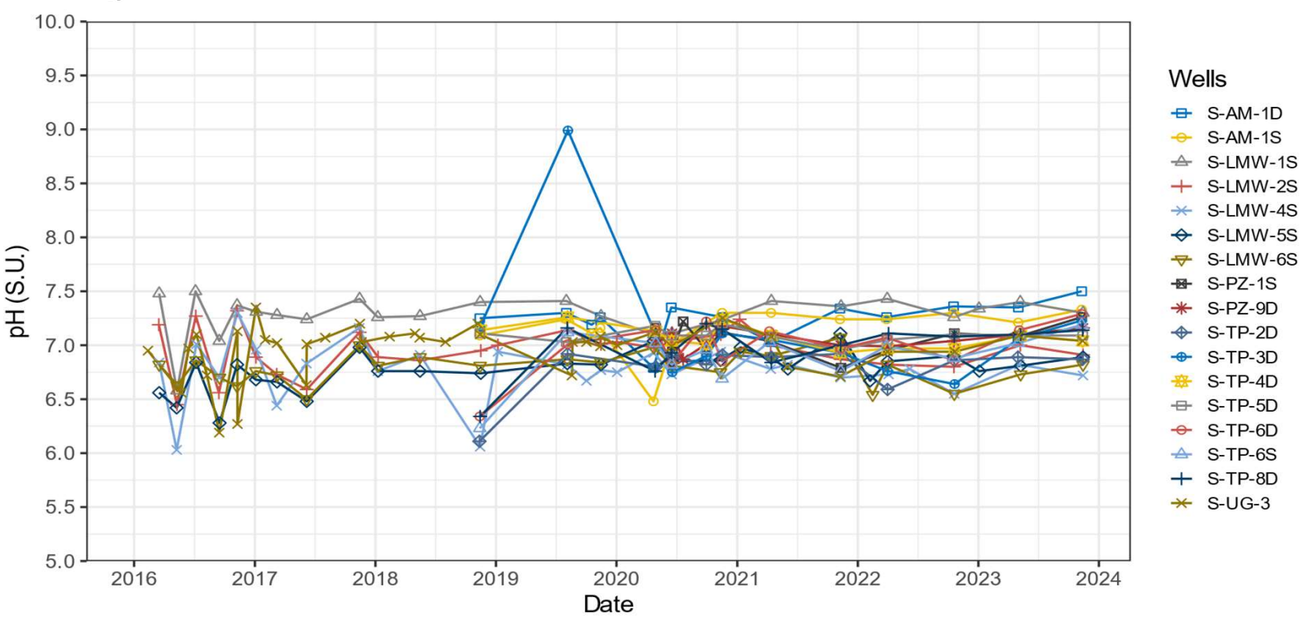
DESIGN	JSI	YYYY-MM-DD	2024-05-31
PREPARED	JSI	PROJECT No.	23009-24MNA
REVIEW	ANT/GTM		
APPROVED	MNH		

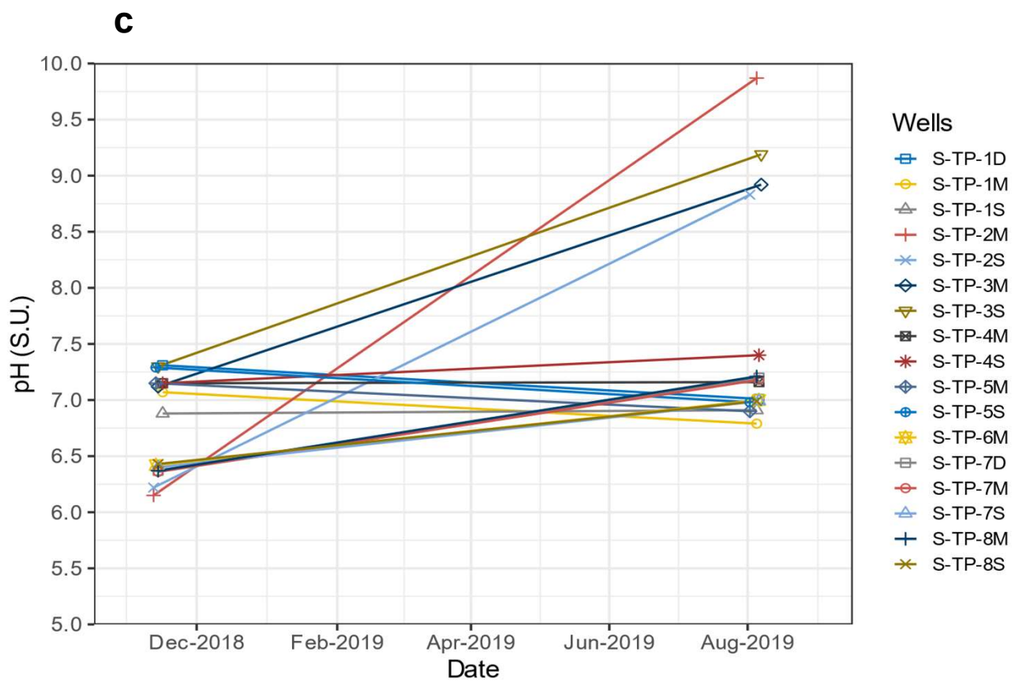
FIGURE 2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

Path: C:\Users\jsi6ff\Rocksmith Geoengineering LLC\23007 - Ameren GW - Documents\400 - Drawings\ Figures\4.3-SEC\4.3.2 - Production\MNA Eval\20240531_Figure2-SampleLocations.aprx







CLIENT
Ameren Missouri

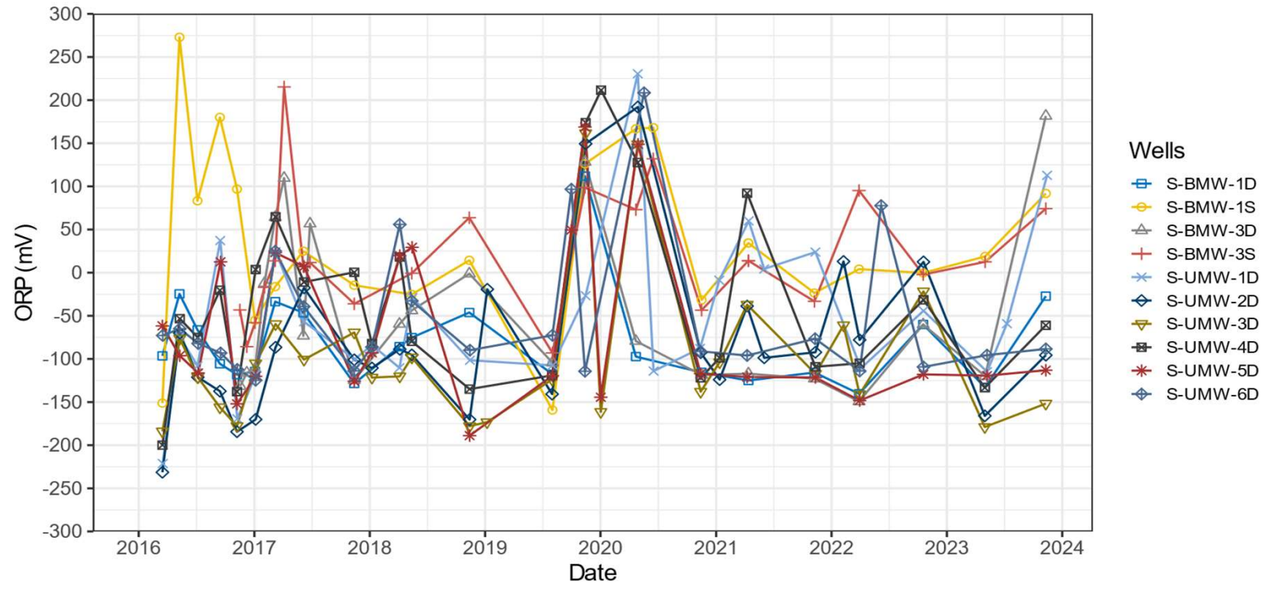
PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

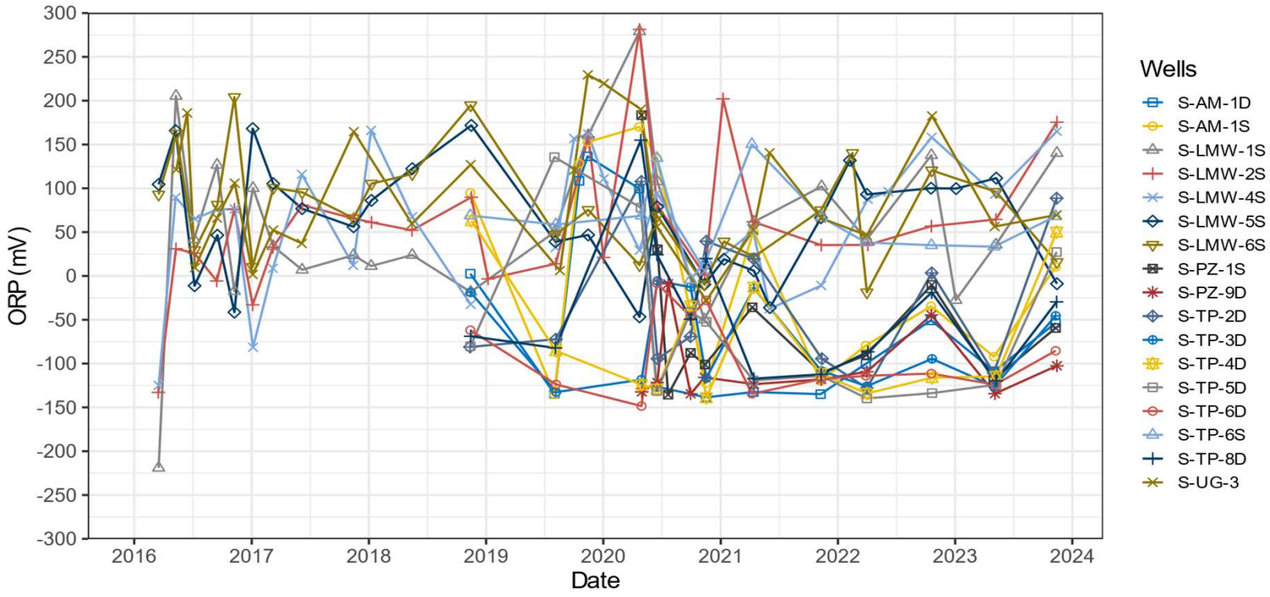
TITLE
pH of Groundwater at (a) Compliance Monitoring and Background Wells, (b) Corrective Action Network Wells, and (c) Nature and Extent Wells

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	3

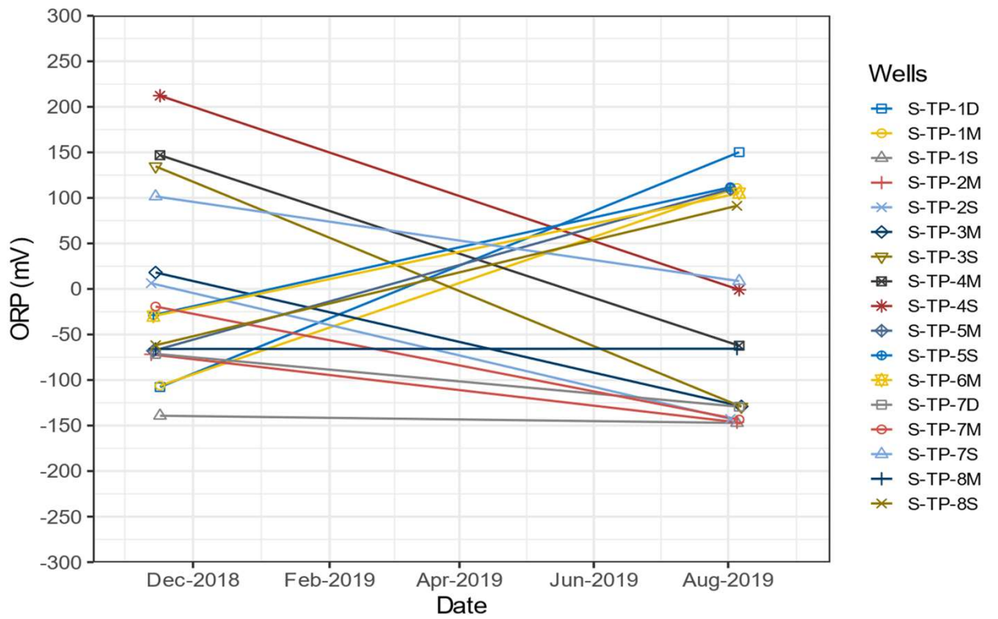
a



b



c



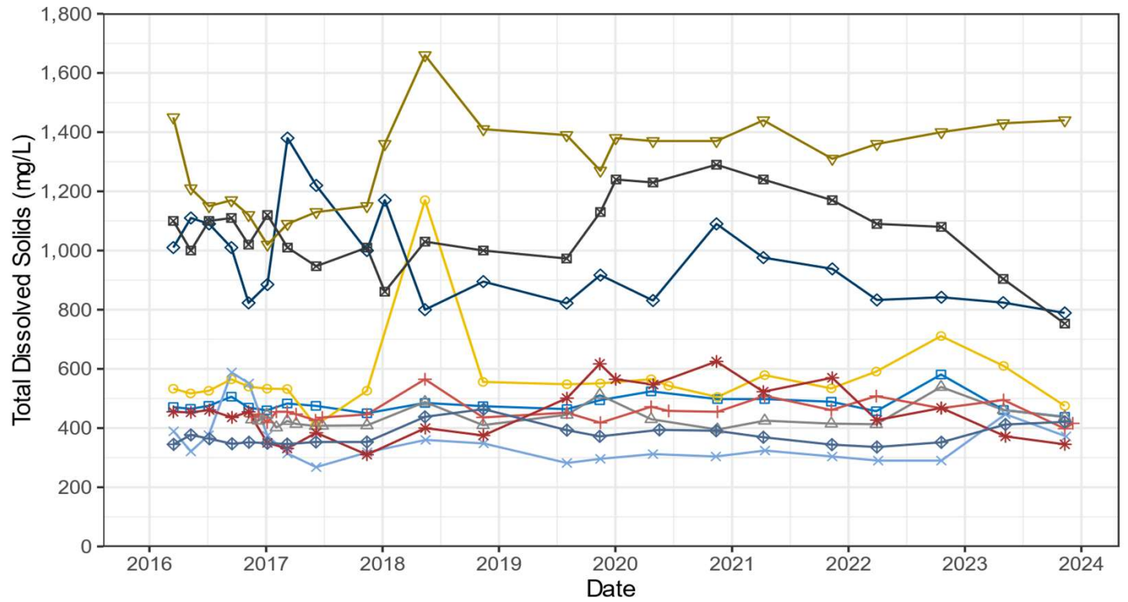
CLIENT
Ameren Missouri

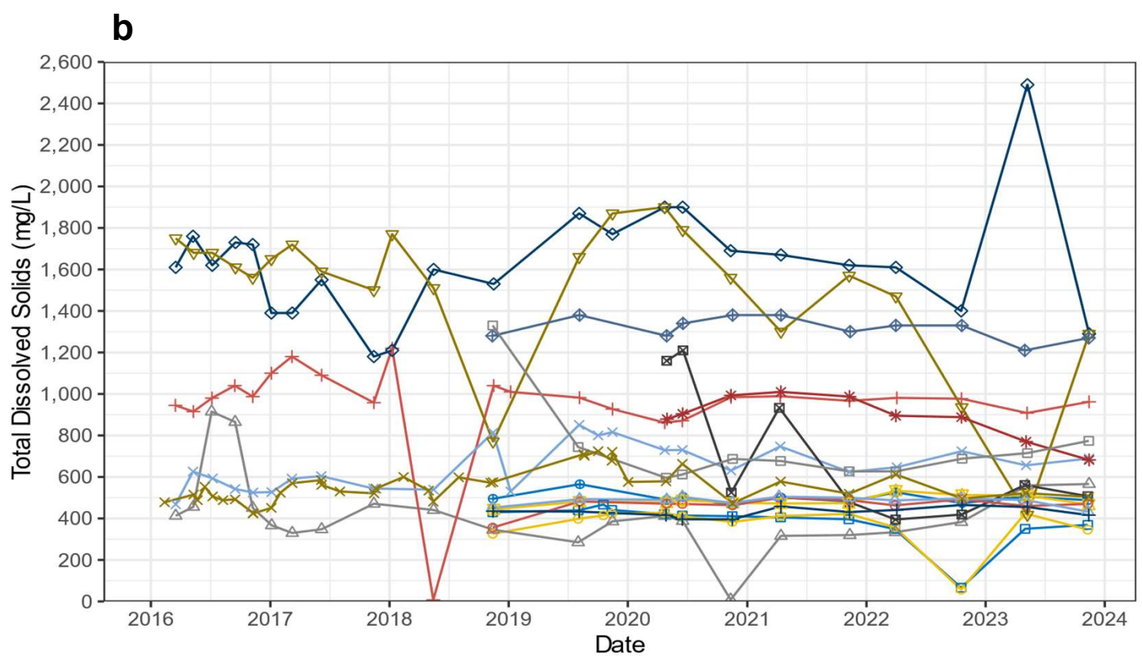
PROJECT
Monitored Natural Attenuation Evaluation

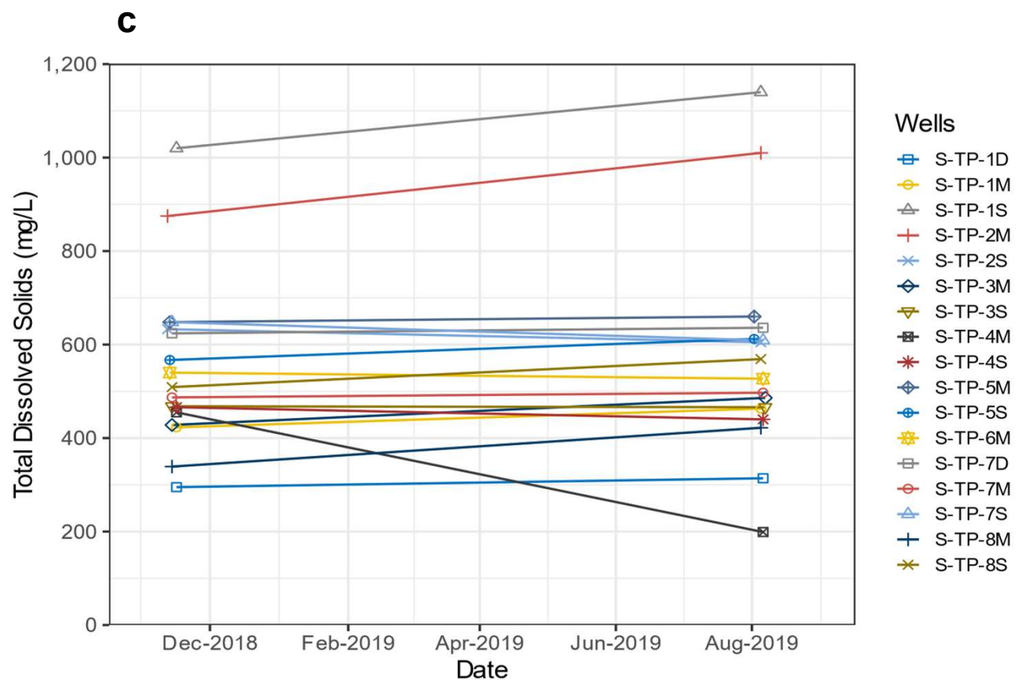
CONSULTANT
wsp

TITLE
ORP of Groundwater at (a) Compliance Monitoring and Background Wells, (b) Corrective Action Network Wells, and (c) Nature and Extent Wells

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	4







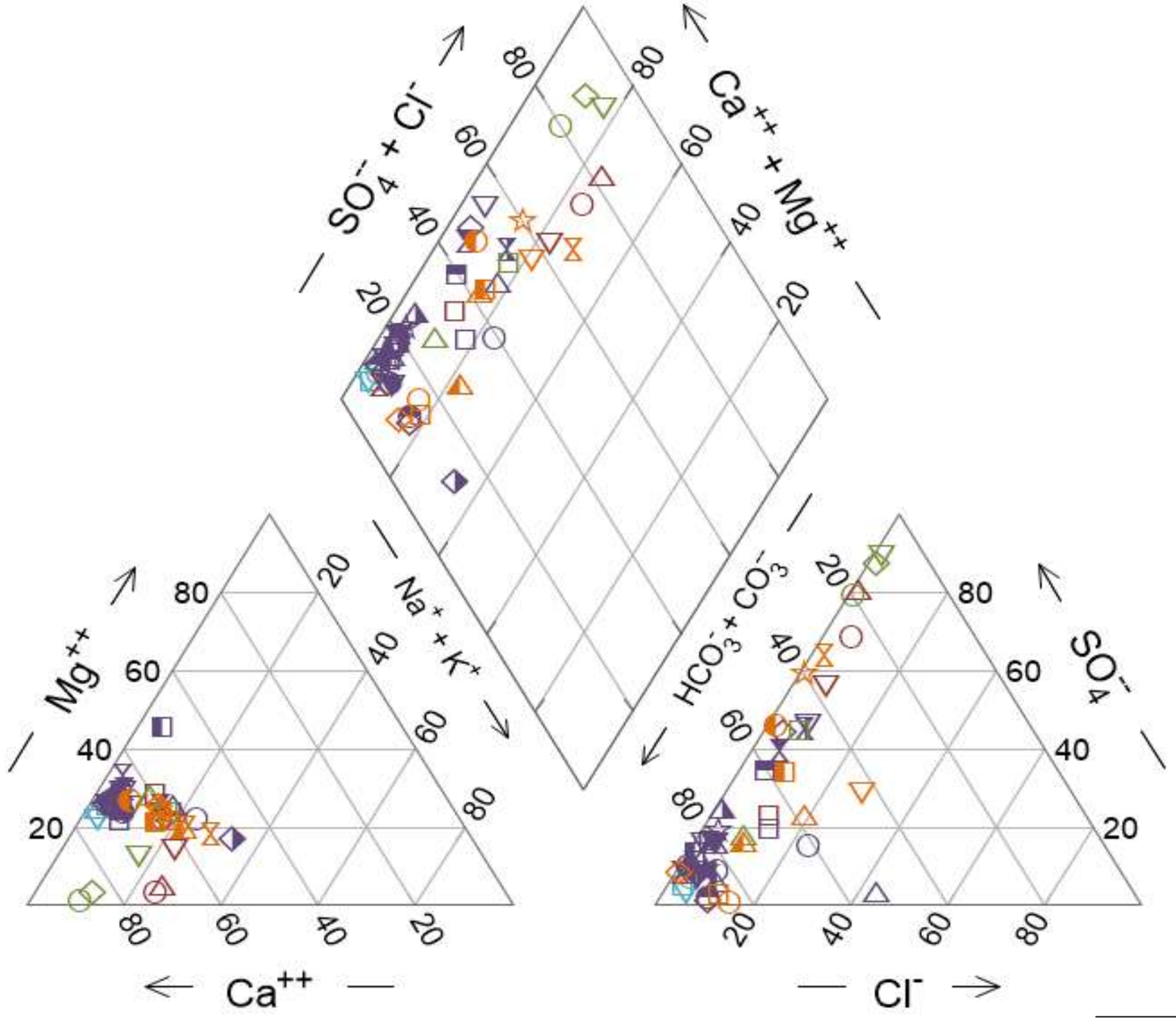
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Total Dissolved Solids in Groundwater at (a) Compliance Monitoring and Background Wells, (b) Corrective Action Network Wells, and (c) Nature and Extent Wells

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	5



%meq/kg

CCR Unit Porewater Piezometers
- S-SCPA–1D
- S-SCPA–1S
- S-SCPA–2
- S-SCPA–3D
- S-SCPA–3S

Background
- S-BMW–1D
- S-BMW–3D
- S-BMW–1S
- S-BMW–3S

SCPA Compliance Monitoring
- S-UMW–1D
- S-UMW–2D
- S-UMW–3D
- S-UMW–4D
- S-UMW–5D
- S-UMW–6D

SCPA Corrective Action[1]
- S-AM–1D
- S-AM–1S
- S-LMW–1S
- S-LMW–2S
- S-LMW–4S
- S-LMW–5S
- S-LMW–6S
- S-PZ–1S
- S-PZ–9D
- S-UG–3

SCPA Nature and Extent Monitoring
- S-TP–1D
- S-TP–1M
- S-TP–1S
- S-TP–2D
- S-TP–2M
- S-TP–2S
- S-TP–3D
- S-TP–3M
- S-TP–3S
- S-TP–4D
- S-TP–4M
- S-TP–4S
- S-TP–5D
- S-TP–5M
- S-TP–5S
- S-TP–6D
- S-TP–6M
- S-TP–6S
- S-TP–7D
- S-TP–7M
- S-TP–7S
- S-TP–8D
- S-TP–8M
- S-TP–8S

Notes:
1 - Excluding wells also found in Nature and Extent monitoring network

CLIENT
Ameren Missouri

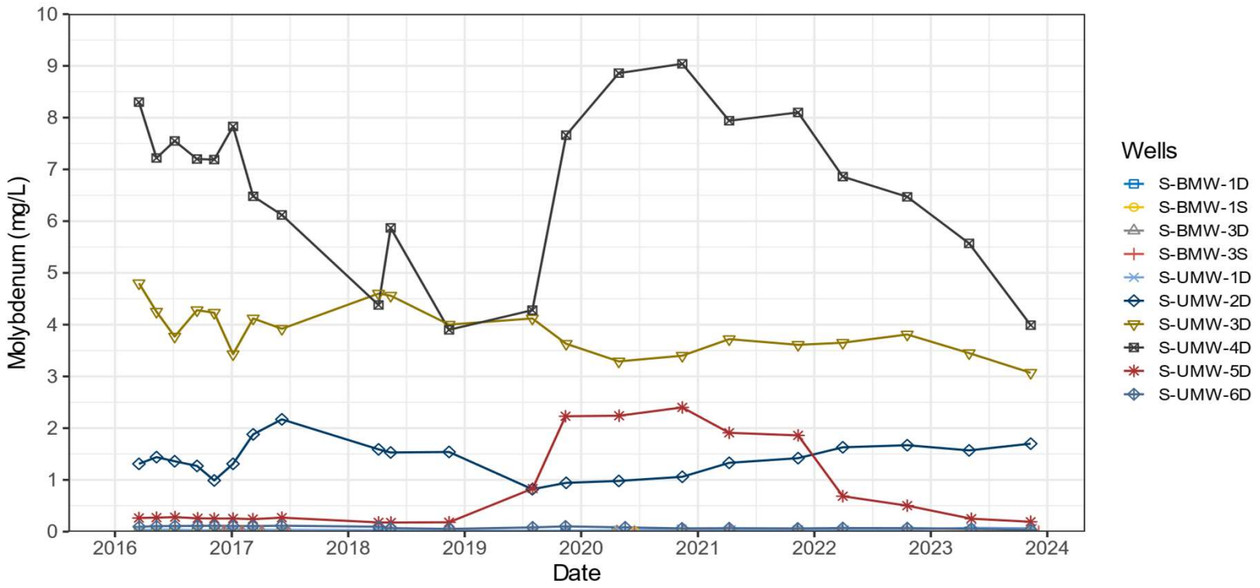
PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

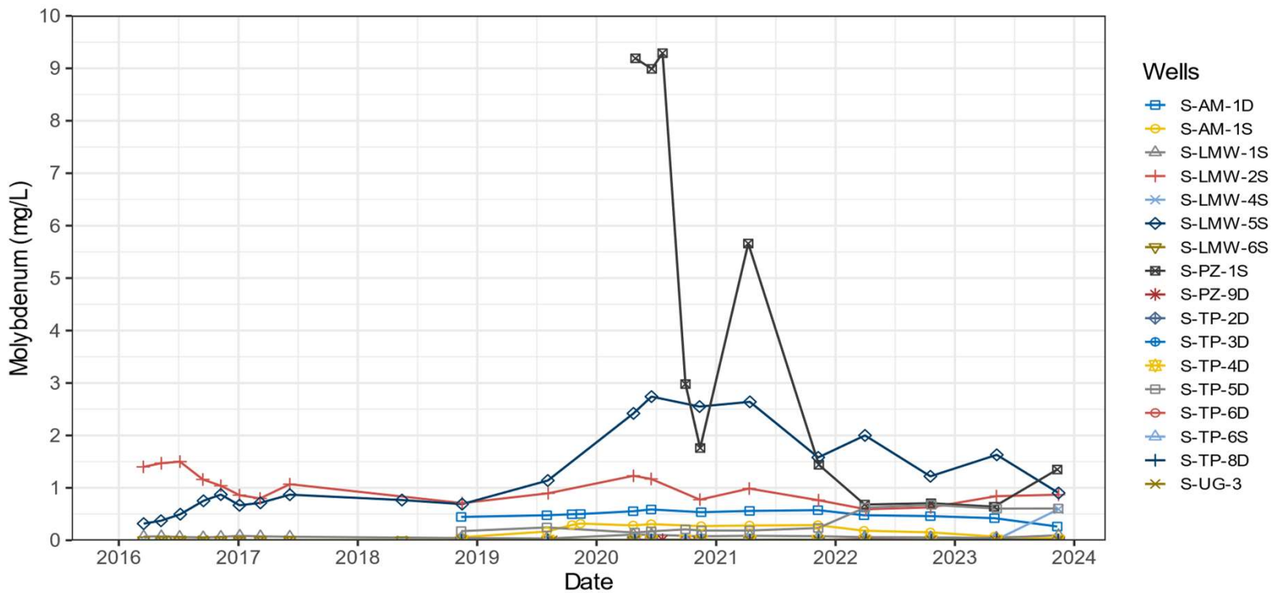
TITLE
Trilinear Diagram – Groundwater Characterization of Compliance, Corrective Action, and Nature and Extent Monitoring Network Wells

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	6

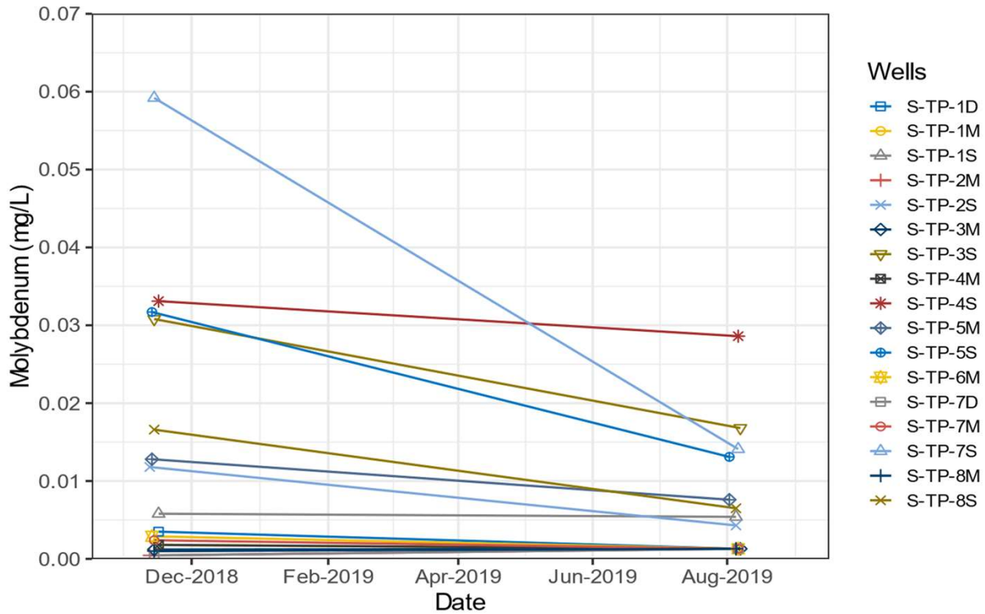
a



b



c



CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

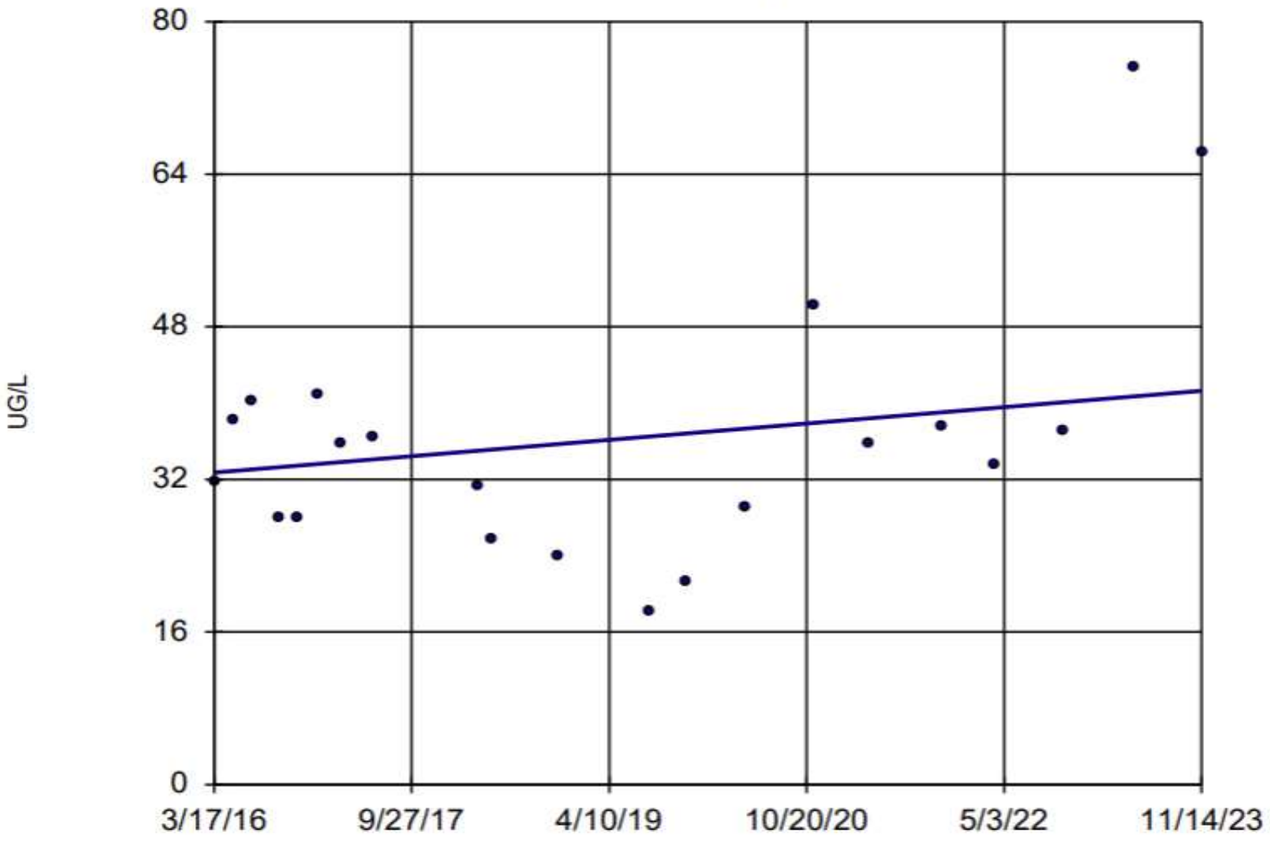
TITLE
Molybdenum in Groundwater at (a) Compliance Monitoring and Background Wells, (b) Corrective Action Network Wells, and (c) Nature and Extent Wells

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	7

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope Estimator

S-UMW-1D



n = 21

Slope = 1.117 units per year.

Mann-Kendall statistic = 30
critical = 78

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

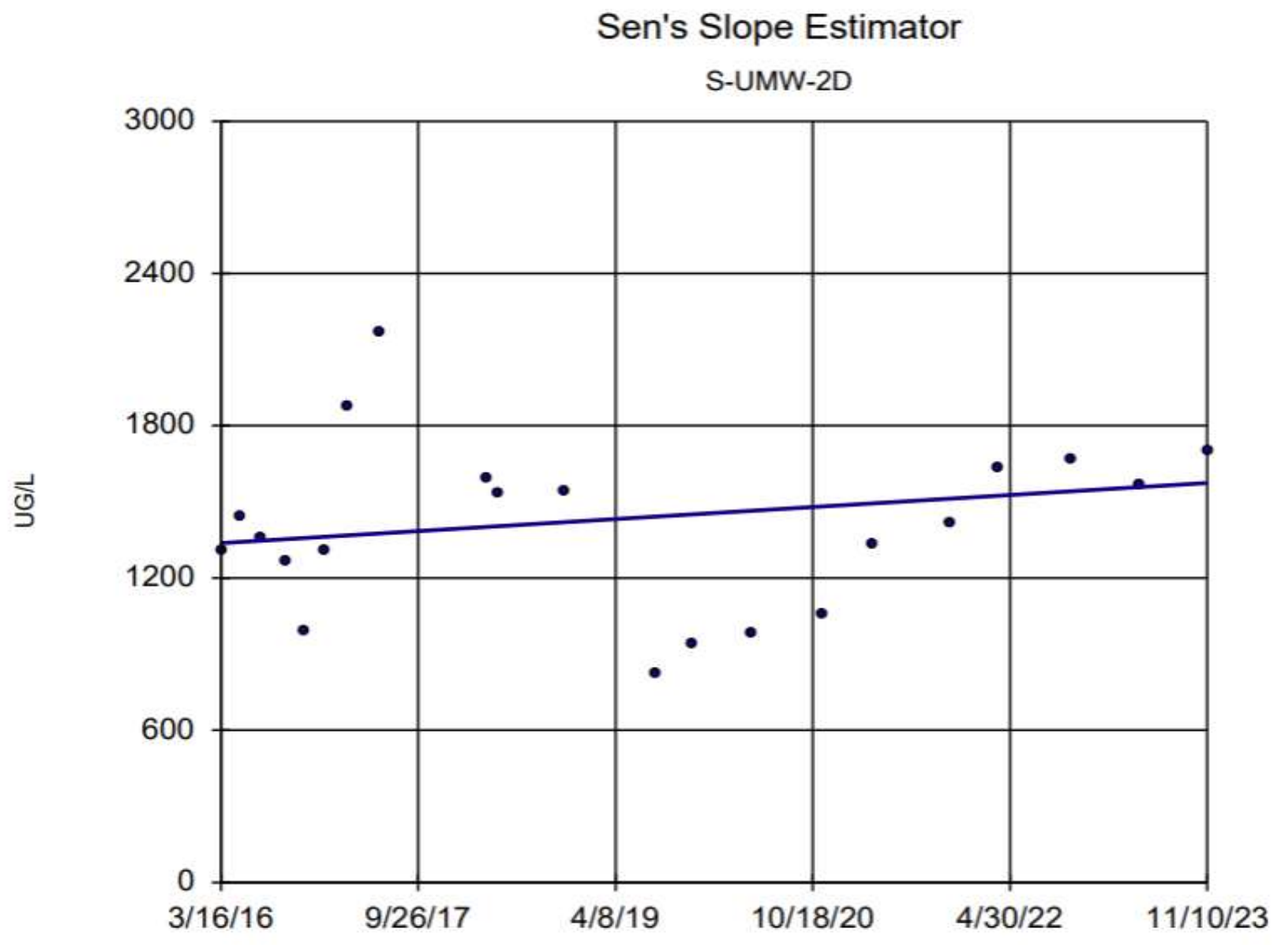
PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-1D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	8

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG



n = 21

Slope = 30.86 units per year.

Mann-Kendall statistic = 39
critical = 78

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring
Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

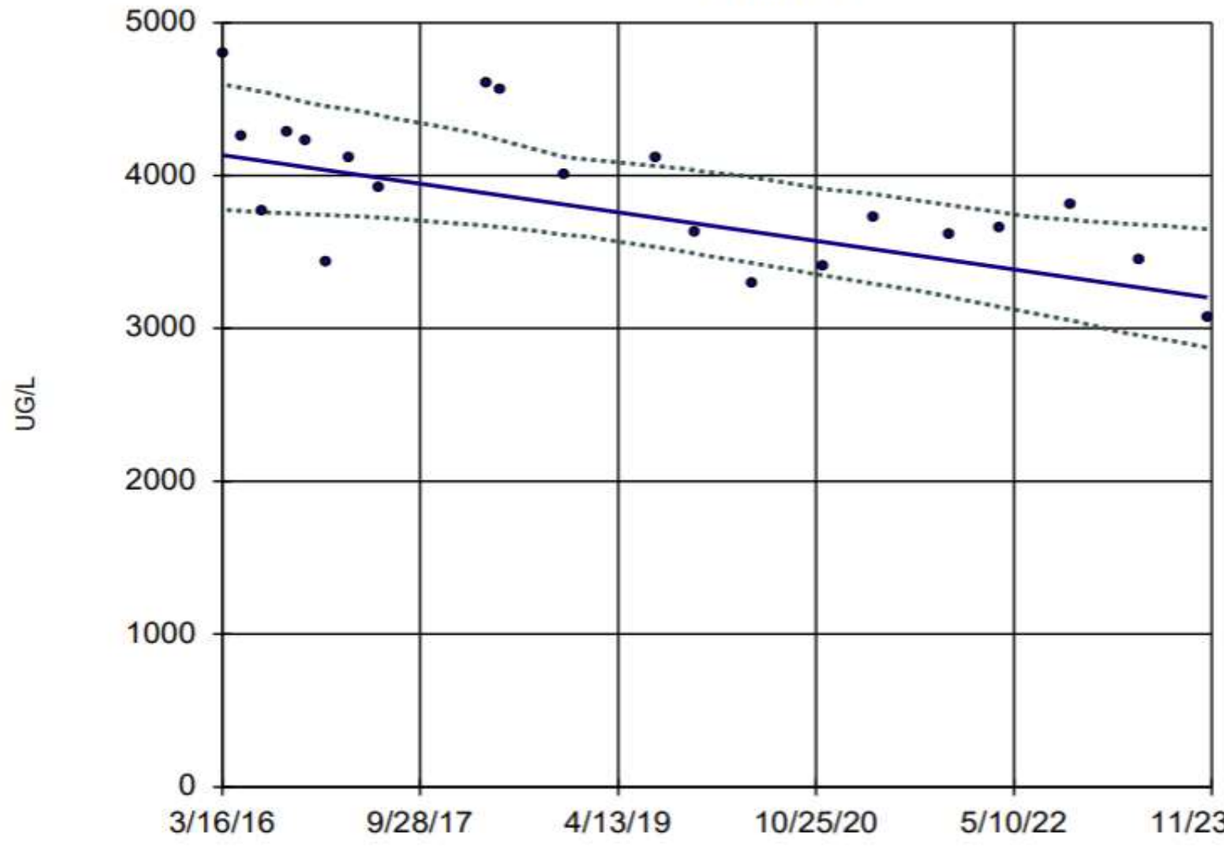
TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-2D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	9

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope and 95% Confidence Band

S-UMW-3D



n = 21

Slope = -121.4 units per year.

Mann-Kendall statistic = -103
critical = -78

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring
Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

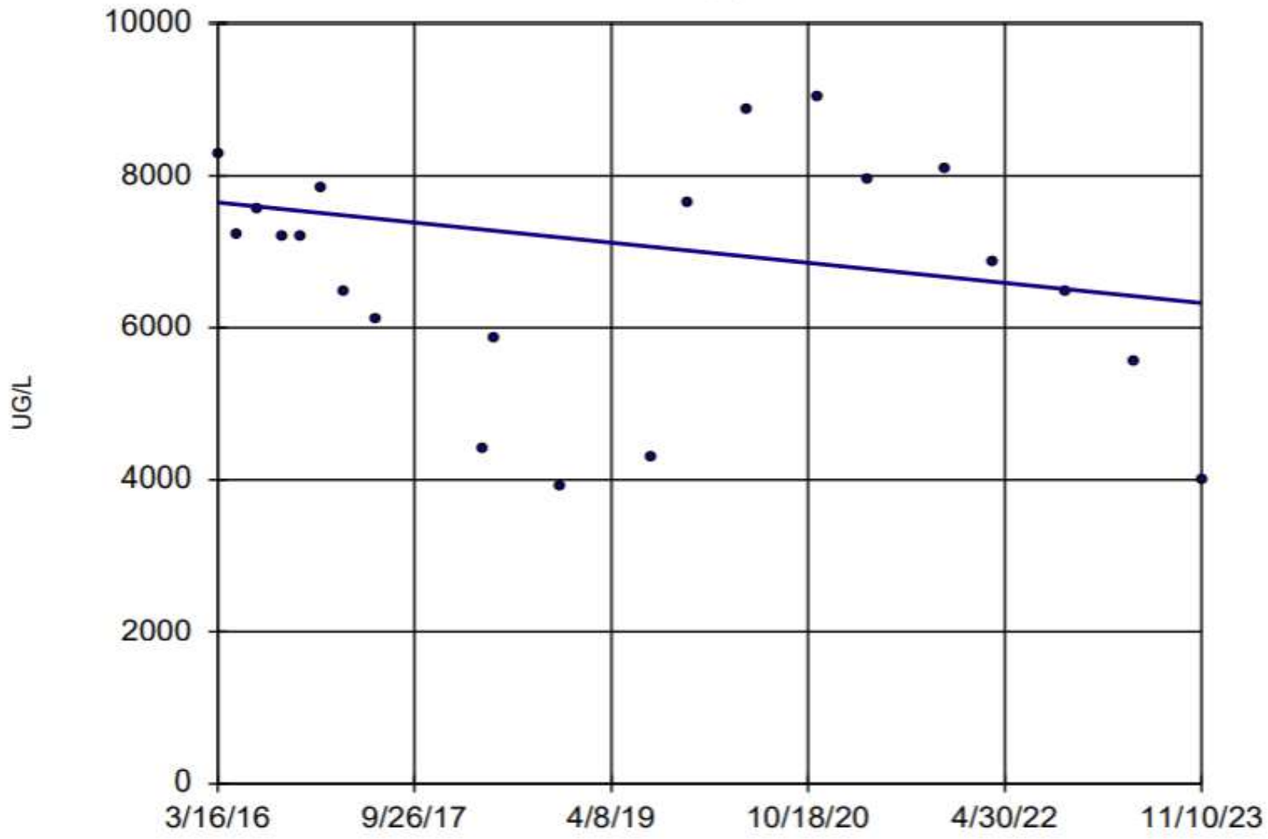
TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-3D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	10

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope Estimator

S-UMW-4D



n = 21

Slope = -173.1 units per year.

Mann-Kendall statistic = -42
critical = -78

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

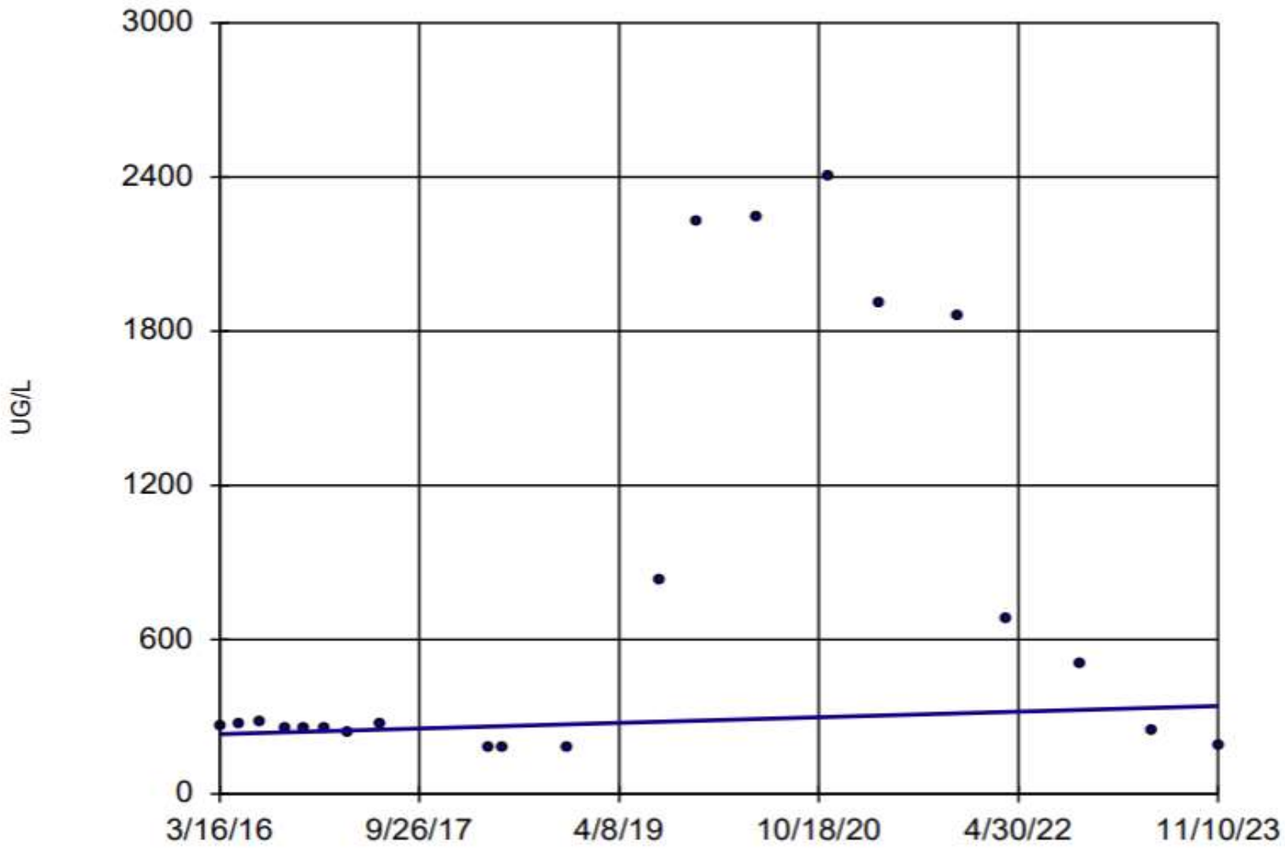
TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-4D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	11

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope Estimator

S-UMW-5D



n = 21

Slope = 14.3 units per year.

Mann-Kendall statistic = 18
critical = 78

Trend not significant at 98% confidence level ($\alpha = 0.01$ per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring
Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

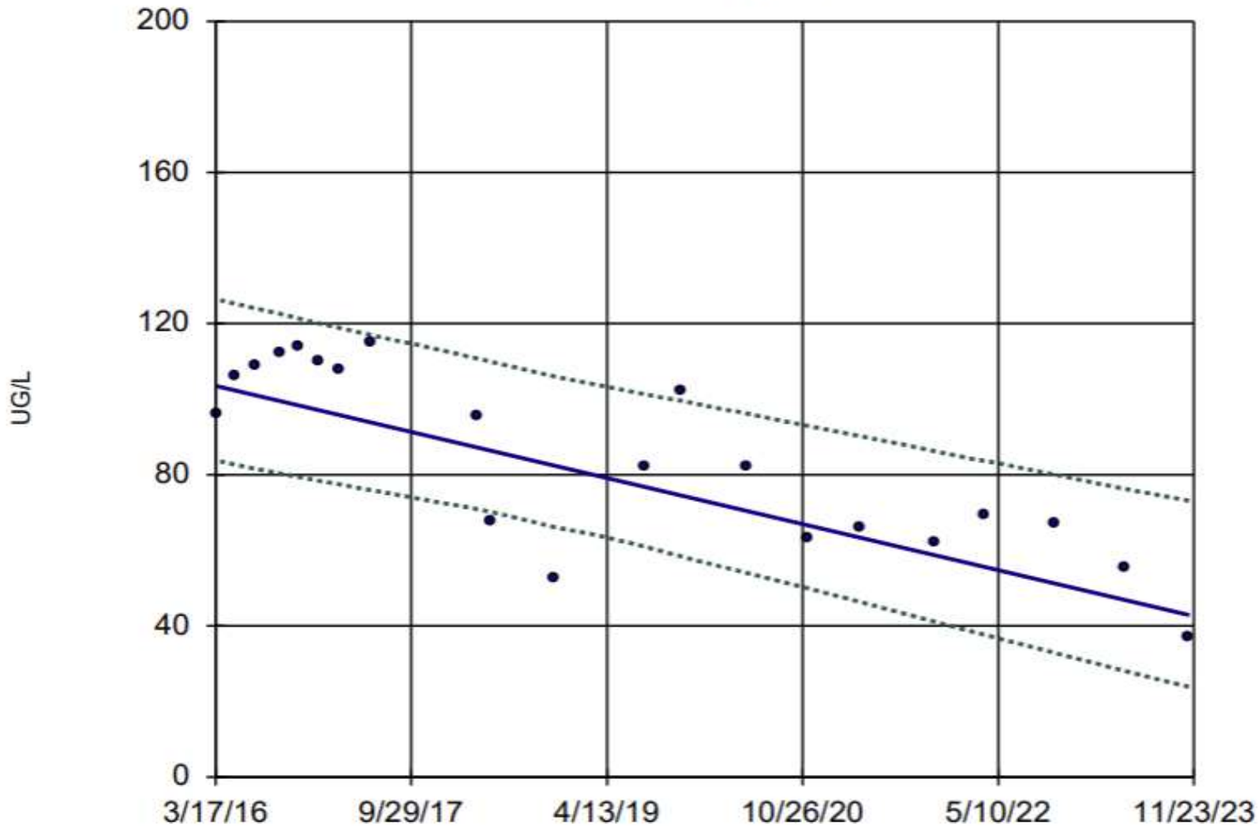
TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-5D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	12

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope and 95% Confidence Band

S-UMW-6D



n = 21

Slope = -7.923 units per year.

Mann-Kendall statistic = -118 critical = -78

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

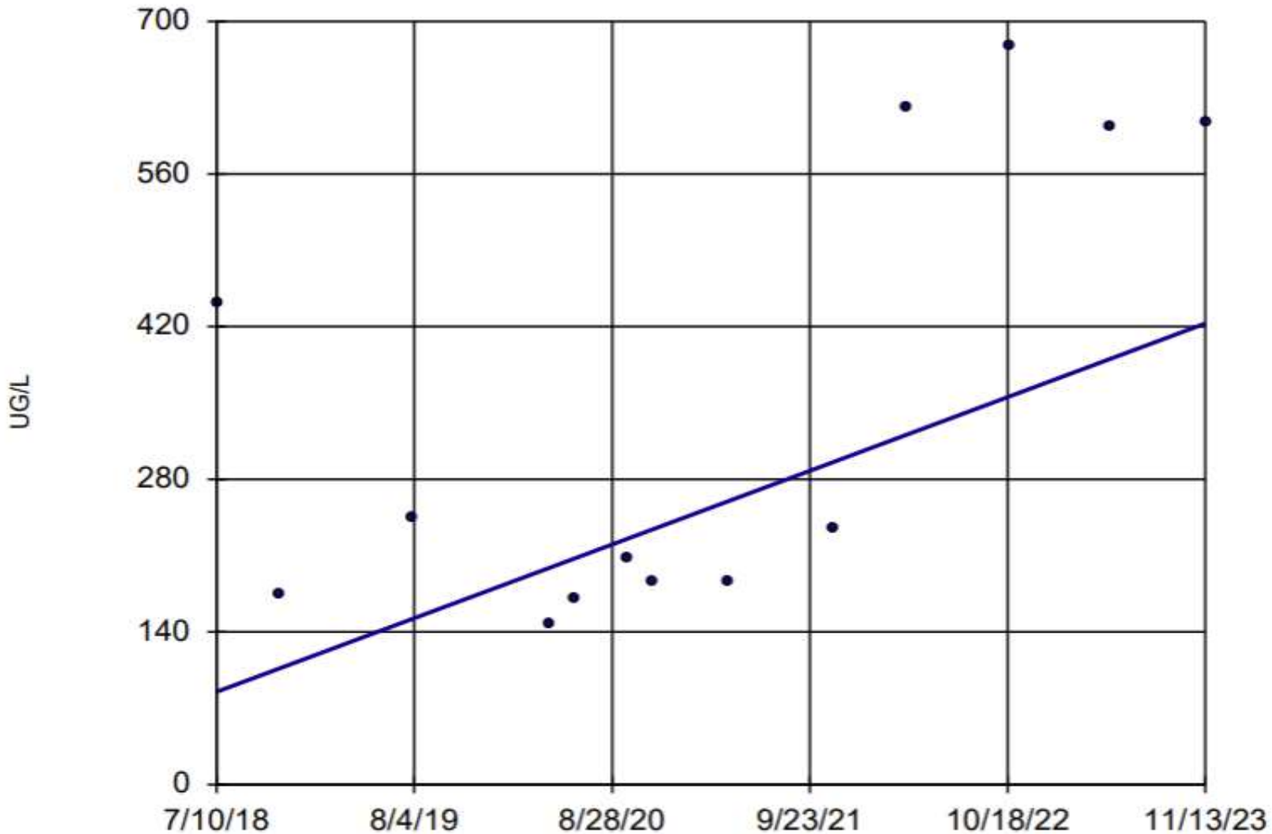
TITLE
Mann-Kendall Test of Trend for Molybdenum at well UMW-6D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	13

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope Estimator

S-TP-5D



n = 13

Slope = 63.19 units per year.

Mann-Kendall statistic = 33
critical = 39

Trend not significant at 98% confidence level ($\alpha = 0.01$ per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

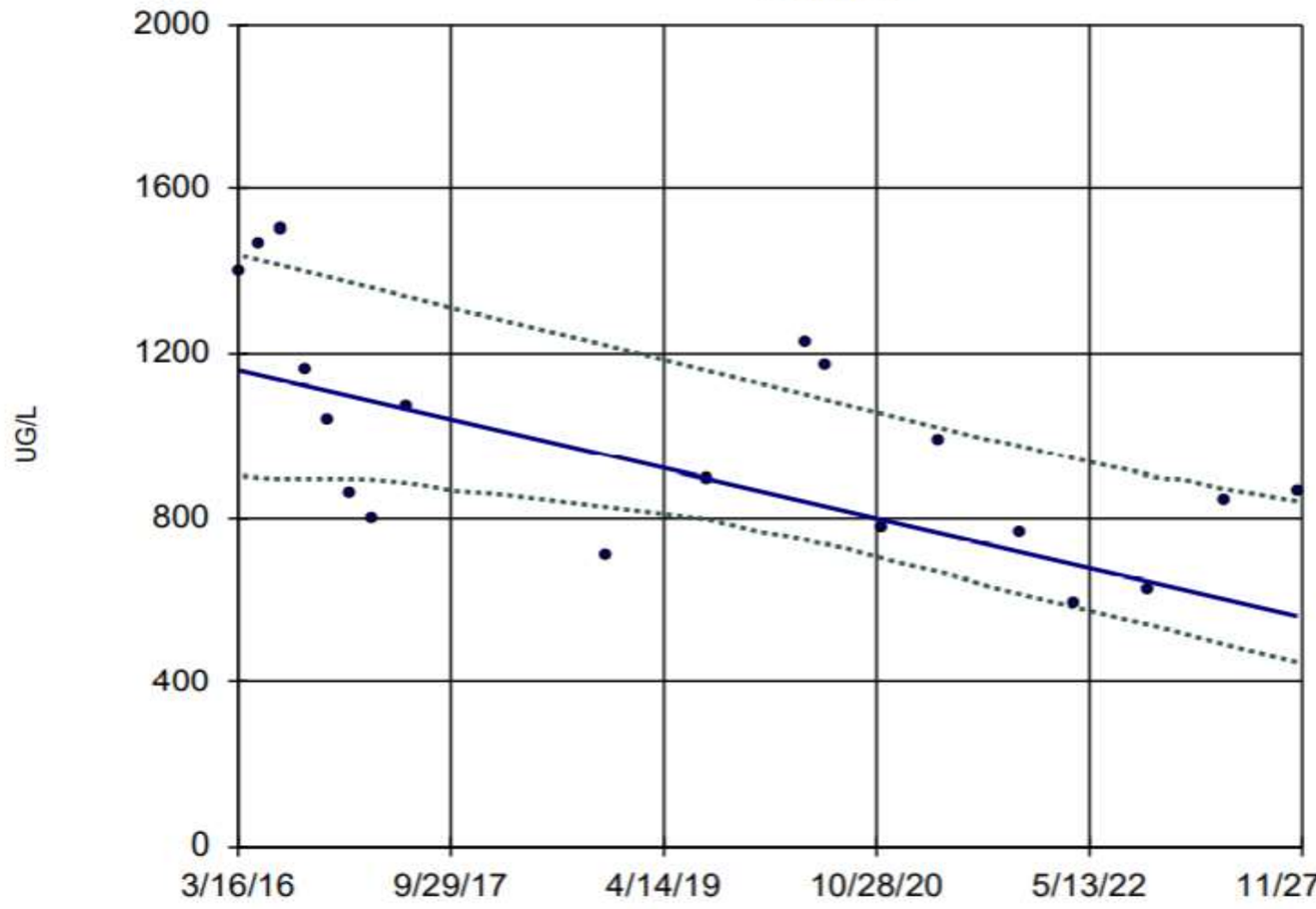
TITLE
Mann-Kendall Test of Trend for Molybdenum at well TP-5D for Molybdenum since 7/10/2018

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	14

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope and 95% Confidence Band

S-LMW-2S



n = 19

Slope = -78.06 units per year.

Mann-Kendall statistic = -81 critical = -68

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

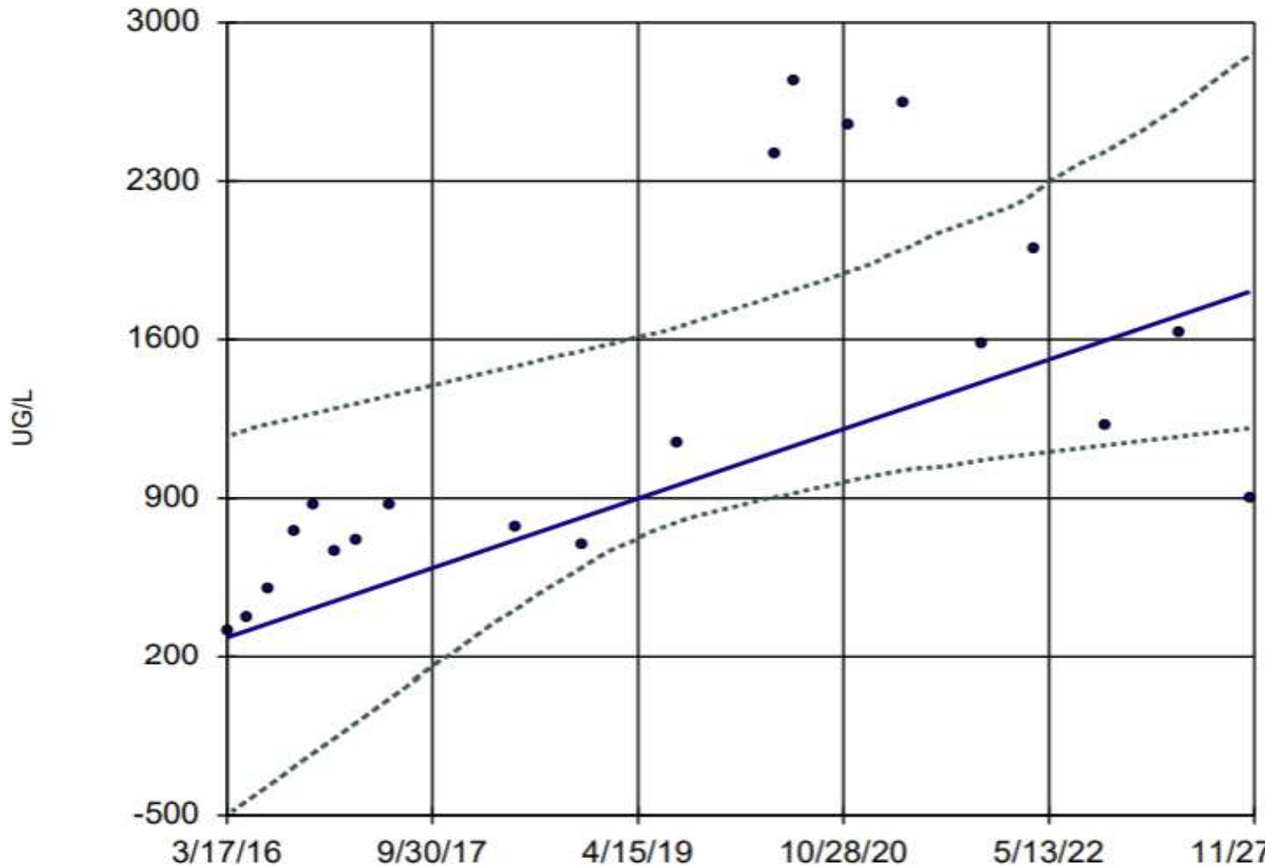
TITLE
Mann-Kendall Test of Trend for Molybdenum at well LMW-2S for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	15

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope and 95% Confidence Band

S-LMW-5S



n = 20

Slope = 199.1 units per year.

Mann-Kendall statistic = 106
critical = 73

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

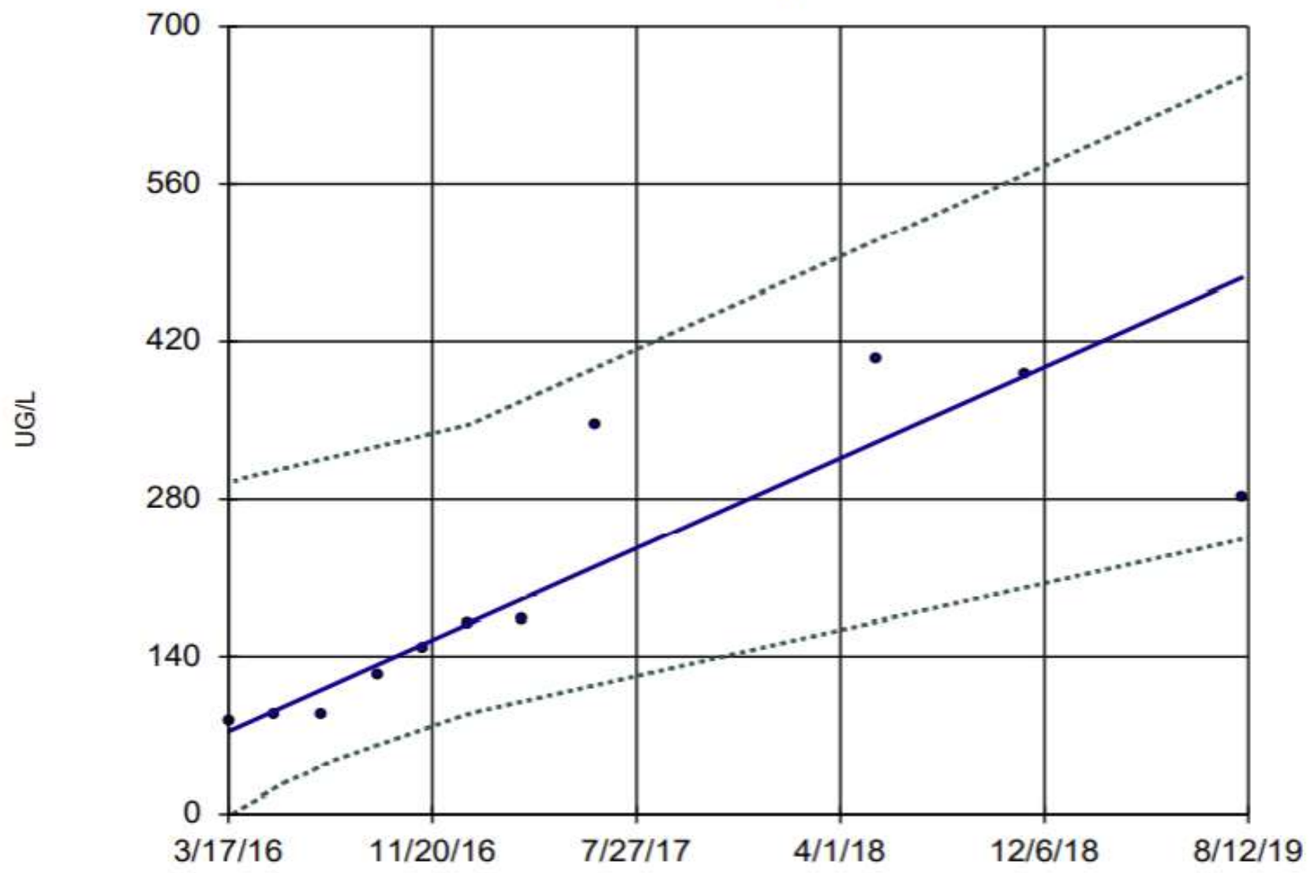
TITLE
Mann-Kendall Test of Trend for Molybdenum at well LMW-5S for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	16

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope and 95% Confidence Band

S-LMW-8S



n = 11

Slope = 118.8 units per year.

Mann-Kendall statistic = 47
critical = 31

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring
Sioux E.C. Client: Ameren Data: SEC DATA

CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT

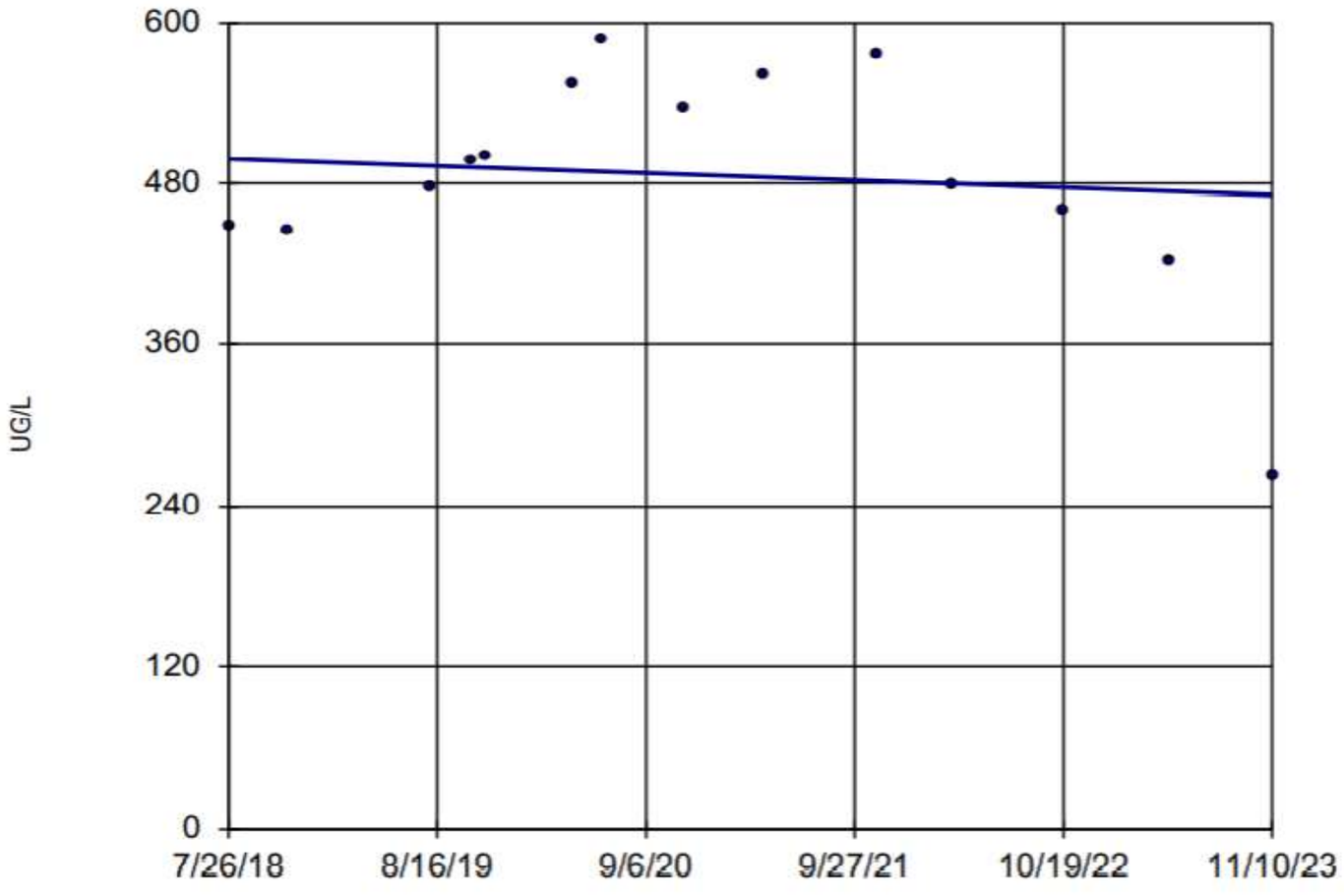
TITLE
Mann-Kendall Test of Trend for Molybdenum at well LMW-8S for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	17

Sanitas™ v.9.6.37 Software licensed to Rocksmith Geoengineering. UG

Sen's Slope Estimator

S-AM-1D



n = 14

Slope = -4.979 units per year.

Mann-Kendall statistic = -1
critical = -44

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring
Sioux E.C. Client: Ameren Data: SEC DATA

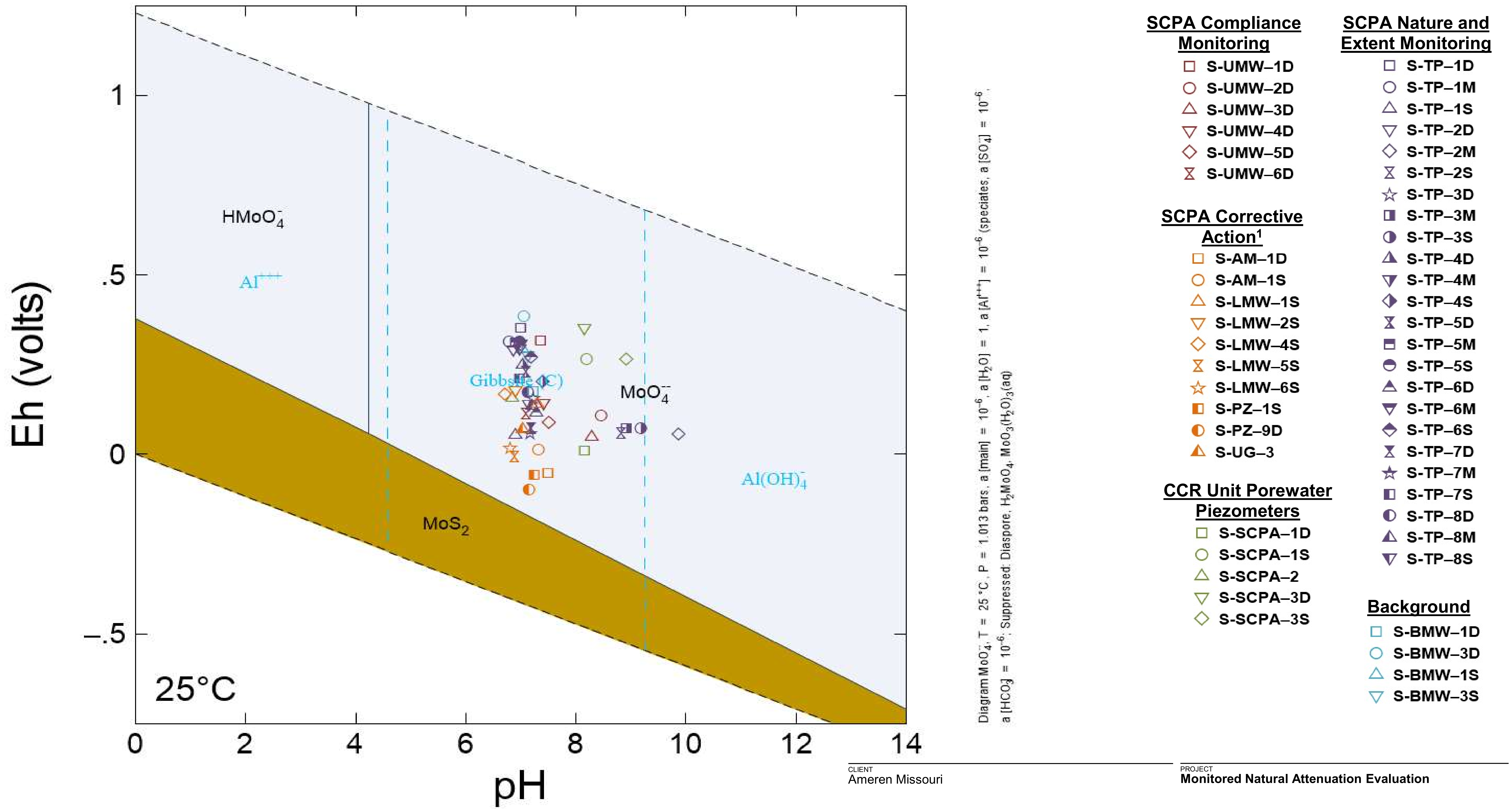
CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
Mann-Kendall Test of Trend for Molybdenum at well AM-1D for Molybdenum since 3/17/2016

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	18


Eh (volts)
1
.5
0
–.5
0
2
4
6
8
10
12
14
pH
25°C
HMoO4-
Al+++
Gibbsite (C)
MoO4--
MoS2
Al(OH)4-
Diagram MoO4--, T = 25 °C, P = 1.013 bars, a [main] = 10–6, a [H2O] = 1, a [Al+++] = 10–6 (speciates, a [SO4--] = 10–6,
a [HCO3-] = 10–6; Suppressed: Diaspore, H2MoO4, MoO3(H2O)3(aq)
SCPA Compliance Monitoring
S-UMW–1D
S-UMW–2D
S-UMW–3D
S-UMW–4D
S-UMW–5D
S-UMW–6D
SCPA Corrective Action1
S-AM–1D
S-AM–1S
S-LMW–1S
S-LMW–2S
S-LMW–4S
S-LMW–5S
S-LMW–6S
S-PZ–1S
S-PZ–9D
S-UG–3
CCR Unit Porewater Piezometers
S-SCPA–1D
S-SCPA–1S
S-SCPA–2
S-SCPA–3D
S-SCPA–3S
SCPA Nature and Extent Monitoring
S-TP–1D
S-TP–1M
S-TP–1S
S-TP–2D
S-TP–2M
S-TP–2S
S-TP–3D
S-TP–3M
S-TP–3S
S-TP–4D
S-TP–4M
S-TP–4S
S-TP–5D
S-TP–5M
S-TP–5S
S-TP–6D
S-TP–6M
S-TP–6S
S-TP–7D
S-TP–7M
S-TP–7S
S-TP–8D
S-TP–8M
S-TP–8S
Background
S-BMW–1D
S-BMW–3D
S-BMW–1S
S-BMW–3S

Notes:

1 - Excluding wells also found in Nature and Extent monitoring network

CLIENT Ameren Missouri	PROJECT **Monitored Natural Attenuation Evaluation**
CONSULTANT wsp	TITLE Molybdenum Pourbaix Diagram - (with Aluminum Stability Overlaid)
	PROJECT NO. US0023766.2548 · PHASE · REV. 0 · FIGURE 19

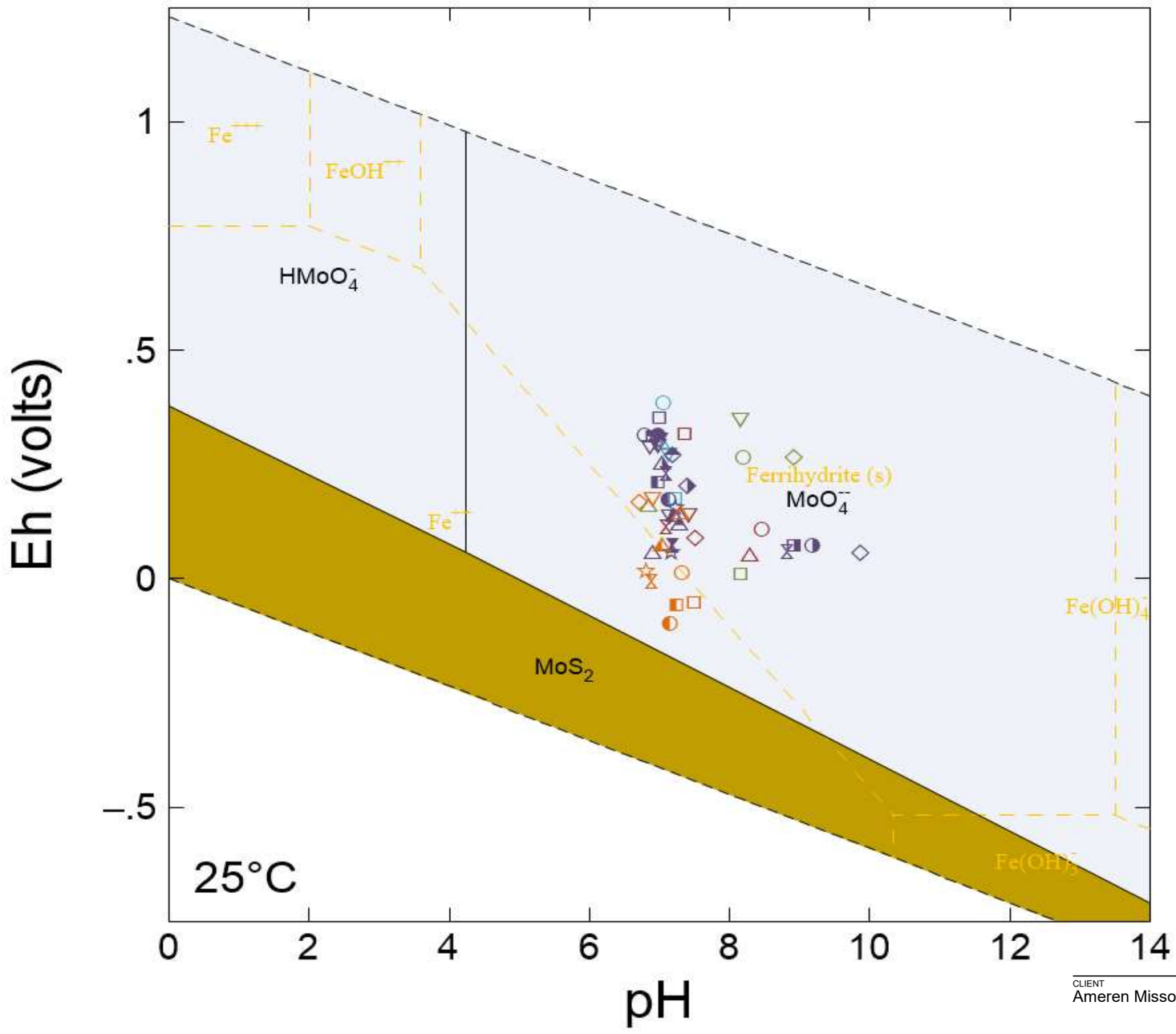


Diagram MoO_4^{--}, T = 25 °C, P = 1.013 bars, a [main] = 10^{-6}, a [H_2O] = 1, a [Fe^{++}] = 10^{-6} (speciates, a [HCO_3^-] = 10^{-6}, a [SO_4^{--}] = 10^{-6}; Suppressed: $Fe(OH)_2$ (am), $Fe(OH)_2$ (aq), $Fe(OH)_3$ (c), $Fe_3(OH)_8$, $FeOH^+$, Ferrihydrite (aged), Goethite, H_2MoO_4, Hematite, Lepidocrocite, Maghemite, Magnetite, $MoO_3(H_2O)_3$(aq)

SCPA Compliance Monitoring

- S-UMW–1D
- S-UMW–2D
- S-UMW–3D
- S-UMW–4D
- S-UMW–5D
- S-UMW–6D

SCPA Corrective Action[1]

- S-AM–1D
- S-AM–1S
- S-LMW–1S
- S-LMW–2S
- S-LMW–4S
- S-LMW–5S
- S-LMW–6S
- S-PZ–1S
- S-PZ–9D
- S-UG–3

CCR Unit Porewater Piezometers

- S-SCPA–1D
- S-SCPA–1S
- S-SCPA–2
- S-SCPA–3D
- S-SCPA–3S

SCPA Nature and Extent Monitoring

- S-TP–1D
- S-TP–1M
- S-TP–1S
- S-TP–2D
- S-TP–2M
- S-TP–2S
- S-TP–3D
- S-TP–3M
- S-TP–3S
- S-TP–4D
- S-TP–4M
- S-TP–4S
- S-TP–5D
- S-TP–5M
- S-TP–5S
- S-TP–6D
- S-TP–6M
- S-TP–6S
- S-TP–7D
- S-TP–7M
- S-TP–7S
- S-TP–8D
- S-TP–8M
- S-TP–8S

Background

- S-BMW–1D
- S-BMW–3D
- S-BMW–1S
- S-BMW–3S

Notes:
1 - Excluding wells also found in Nature and Extent monitoring network

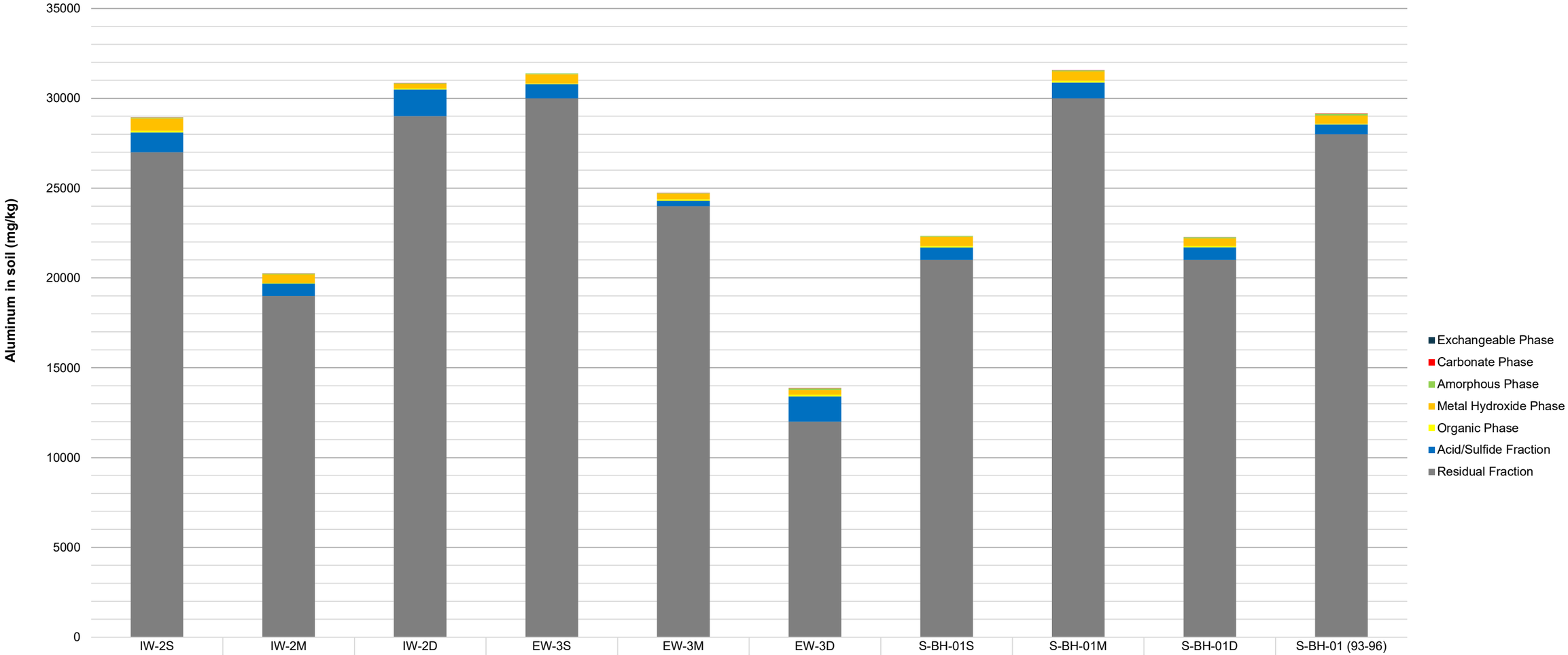
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Molybdenum Pourbaix Diagram - (with Iron Stability Overlaid)

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	20



	IW-2S	IW-2M	IW-2D	EW-3S	EW-3M	EW-3D	S-BH-01S	S-BH-01M	S-BH-01D	S-BH-01 (93-96)
Exchangeable Phase	0	0	0	0	0	0	0	0	0	0
Carbonate Phase	6.1	10	7.4	0	11	19	0	7.8	8.8	19
Amorphous Phase	55	49	25	42	30	83	38	48	51	110
Metal Hydroxide Phase	690	470	270	520	330	270	530	530	420	450
Organic Phase	88	31	38	40	73	100	70	99	76	44
Acid/Sulfide Fraction	1100	690	1500	780	300	1400	700	870	710	540
Residual Fraction	27000	19000	29000	30000	24000	12000	21000	30000	21000	28000

Borehole and depth below ground surface

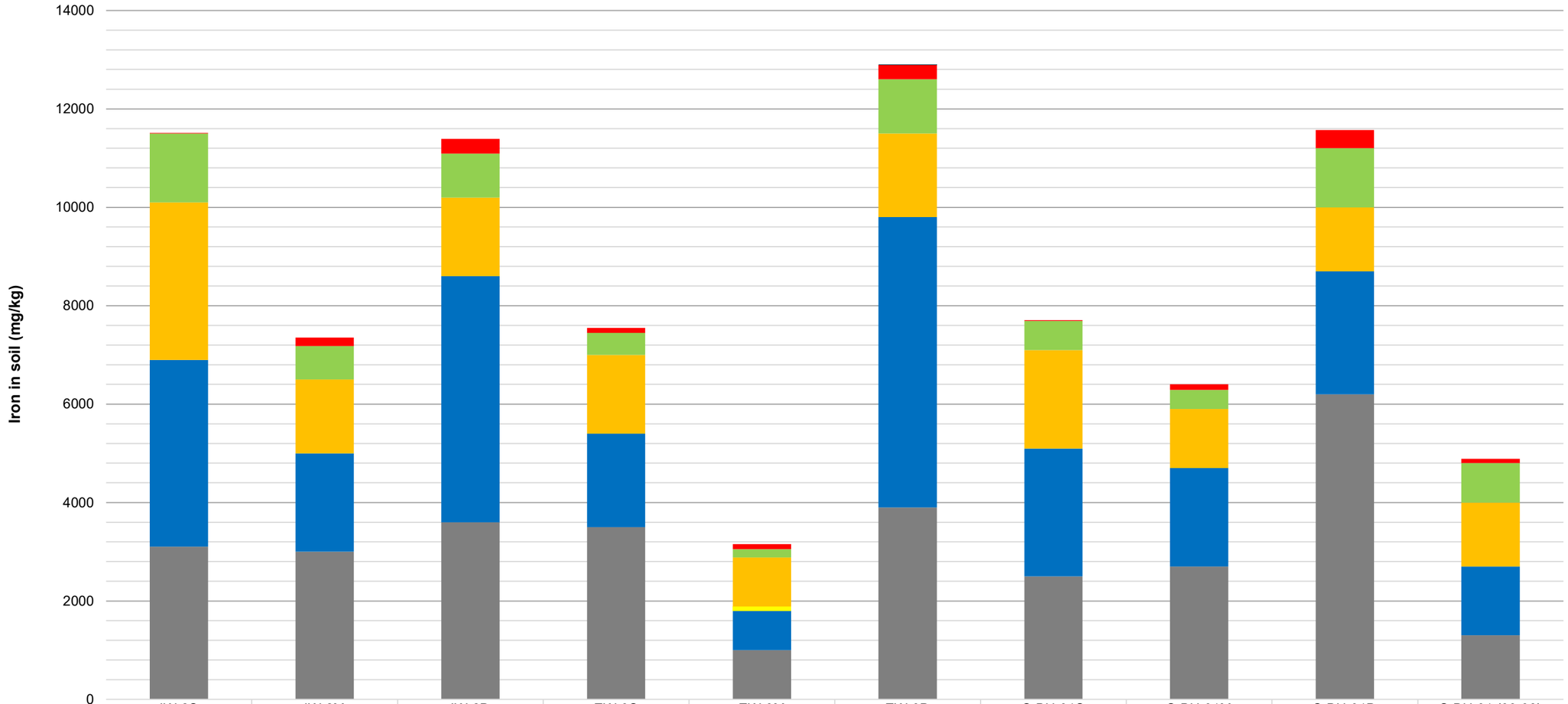
CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
Sequential Extraction of Aluminum from Soil in Select Borings

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	21



	IW-2S	IW-2M	IW-2D	EW-3S	EW-3M	EW-3D	S-BH-01S	S-BH-01M	S-BH-01D	S-BH-01 (93-96)
Exchangeable Phase	0	0	0	0	0	13	0	0	0	0
Carbonate Phase	14	170	300	100	99	290	13	110	370	86
Amorphous Phase	1400	680	890	450	170	1100	590	390	1200	800
Metal Hydroxide Phase	3200	1500	1600	1600	1000	1700	2000	1200	1300	1300
Organic Phase	0	0	0	0	84	0	0	0	0	0
Acid/Sulfide Fraction	3800	2000	5000	1900	800	5900	2600	2000	2500	1400
Residual Fraction	3100	3000	3600	3500	1000	3900	2500	2700	6200	1300

Borehole and depth below ground surface

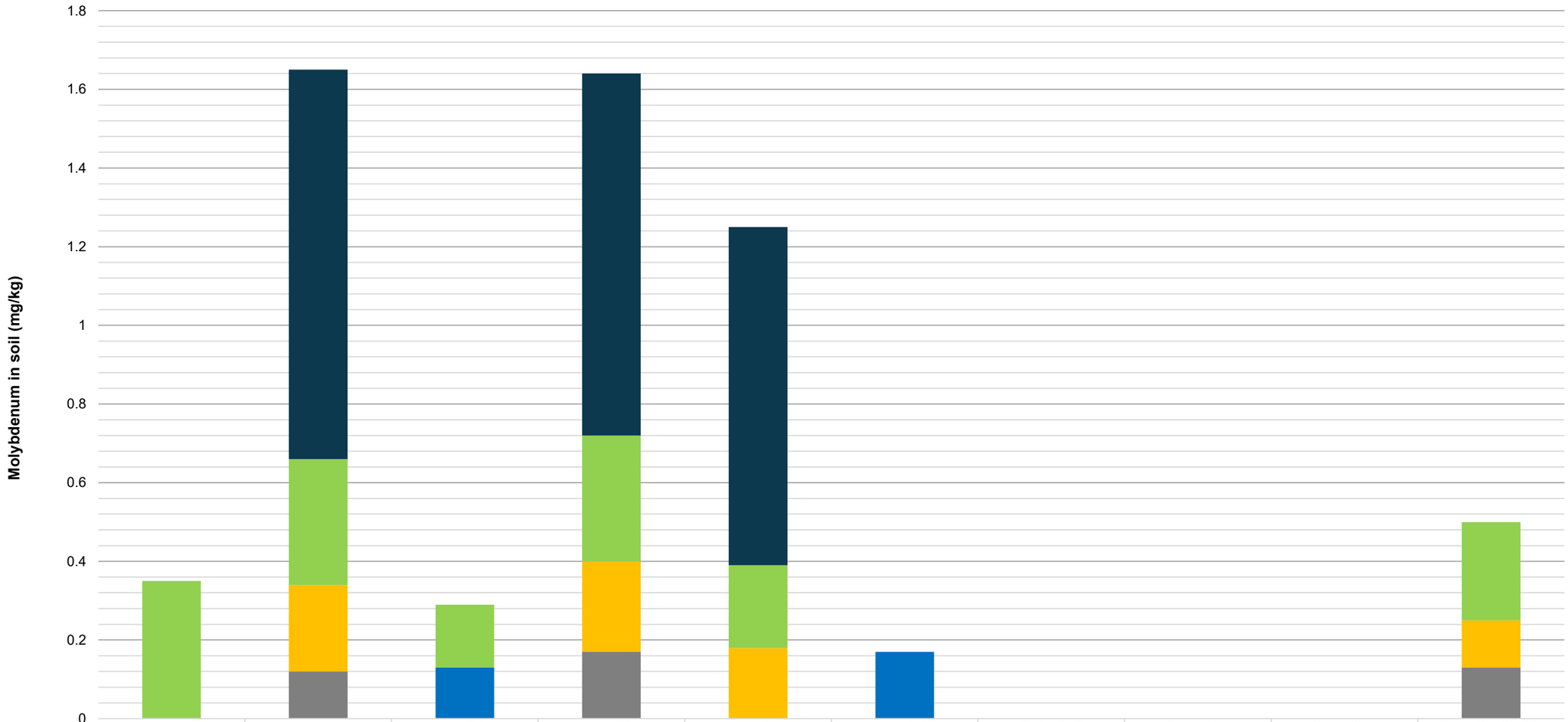
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Sequential Extraction of Iron from Soil in Select Borings

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	22



	IW-2S	IW-2M	IW-2D	EW-3S	EW-3M	EW-3D	S-BH-01S	S-BH-01M	S-BH-01D	S-BH-01 (93-96)
Exchangeable Phase	0	0.99	0	0.92	0.86	0	0	0	0	0
Carbonate Phase	0	0	0	0	0	0	0	0	0	0
Amorphous Phase	0.35	0.32	0.16	0.32	0.21	0	0	0	0	0.25
Metal Hydroxide Phase	0	0.22	0	0.23	0.18	0	0	0	0	0.12
Organic Phase	0	0	0	0	0	0	0	0	0	0
Acid/Sulfide Fraction	0	0	0.13	0	0	0.17	0	0	0	0
Residual Fraction	0	0.12	0	0.17	0	0	0	0	0	0.13

Borehole and depth below ground surface

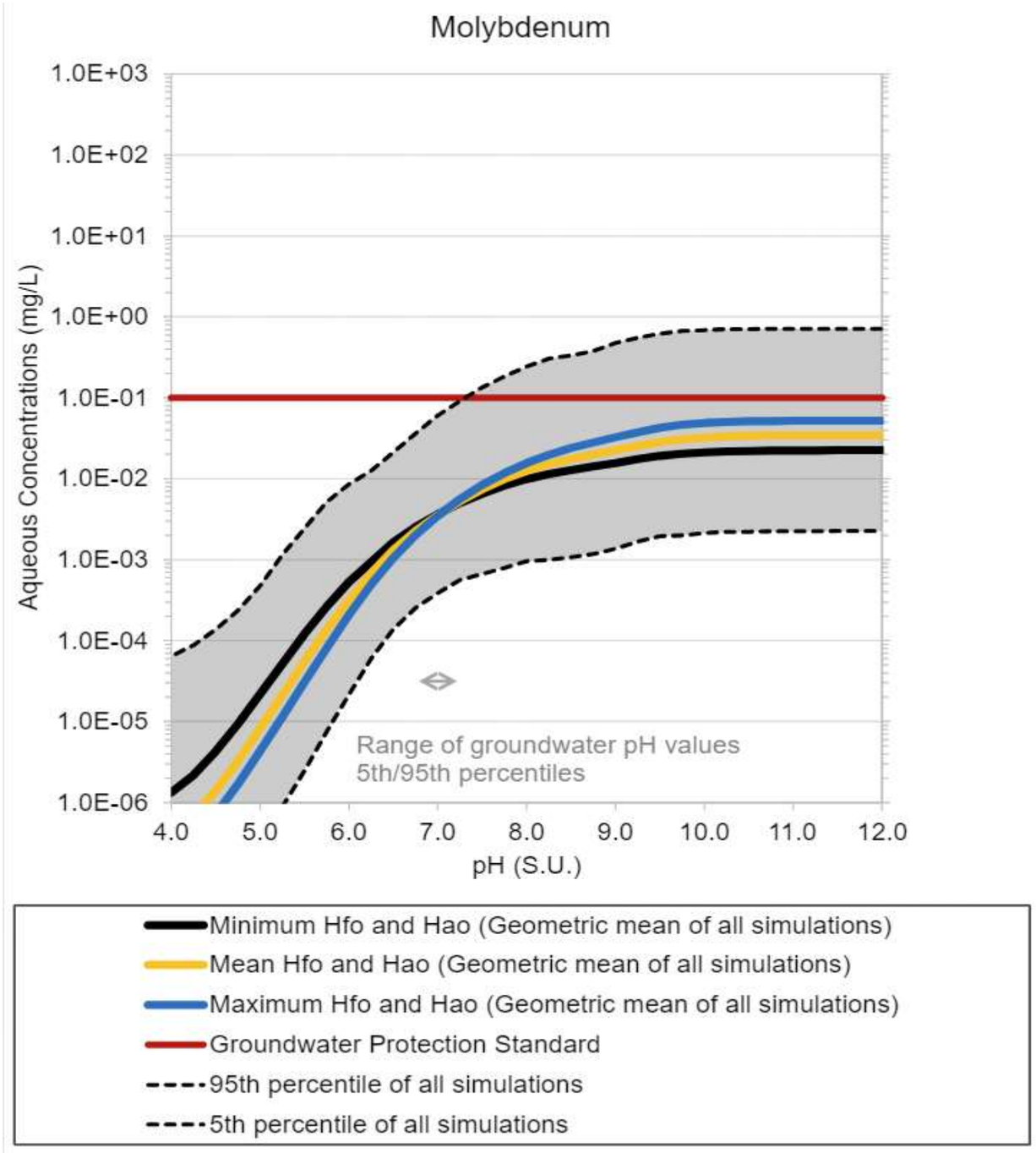
CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
Sequential Extraction of Molybdenum from Soil in Select Borings

PROJECT NO. US0023766.2548 | PHASE | REV. 0 | FIGURE 23



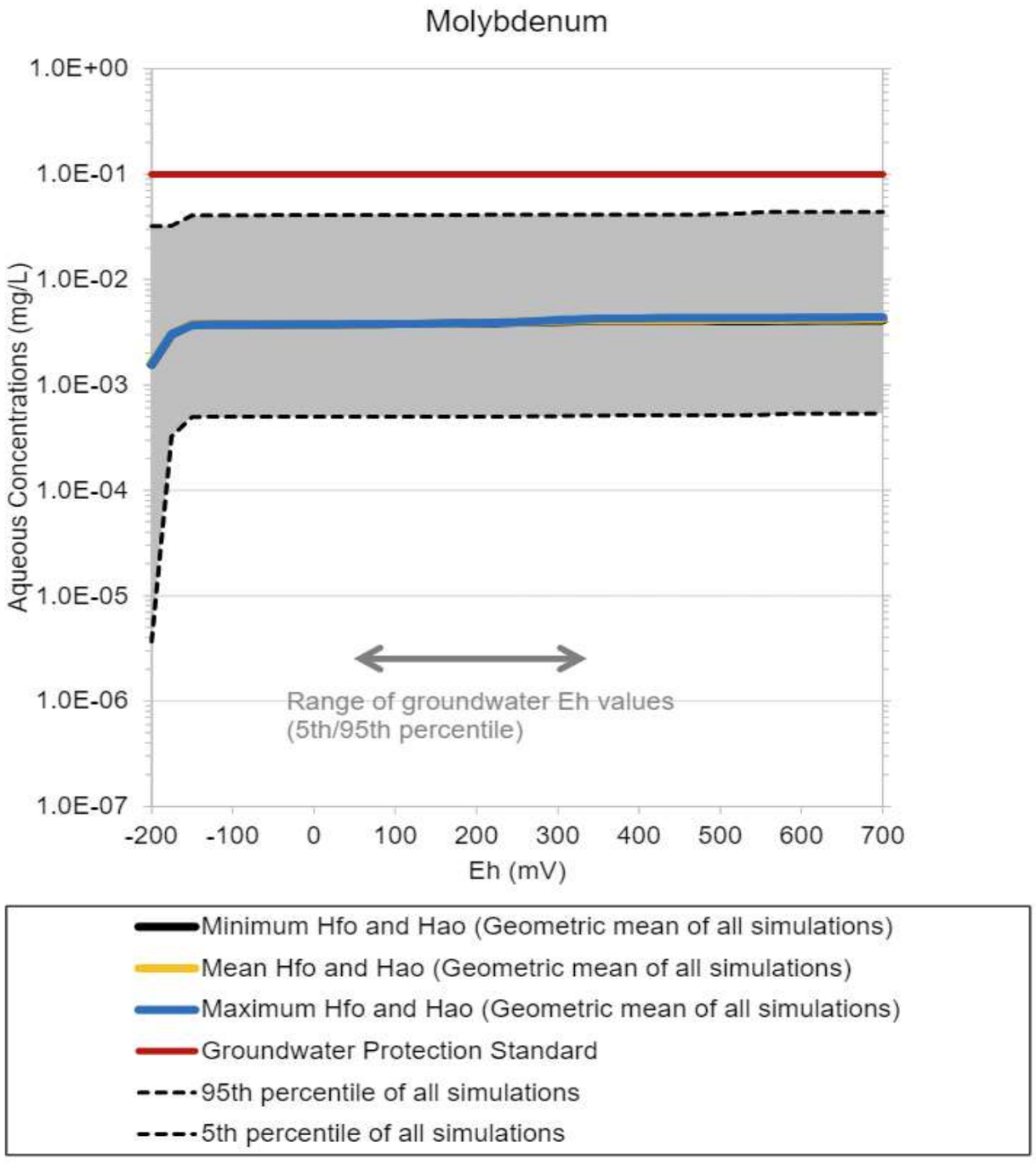
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
pH MNA Stability Evaluation

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	24



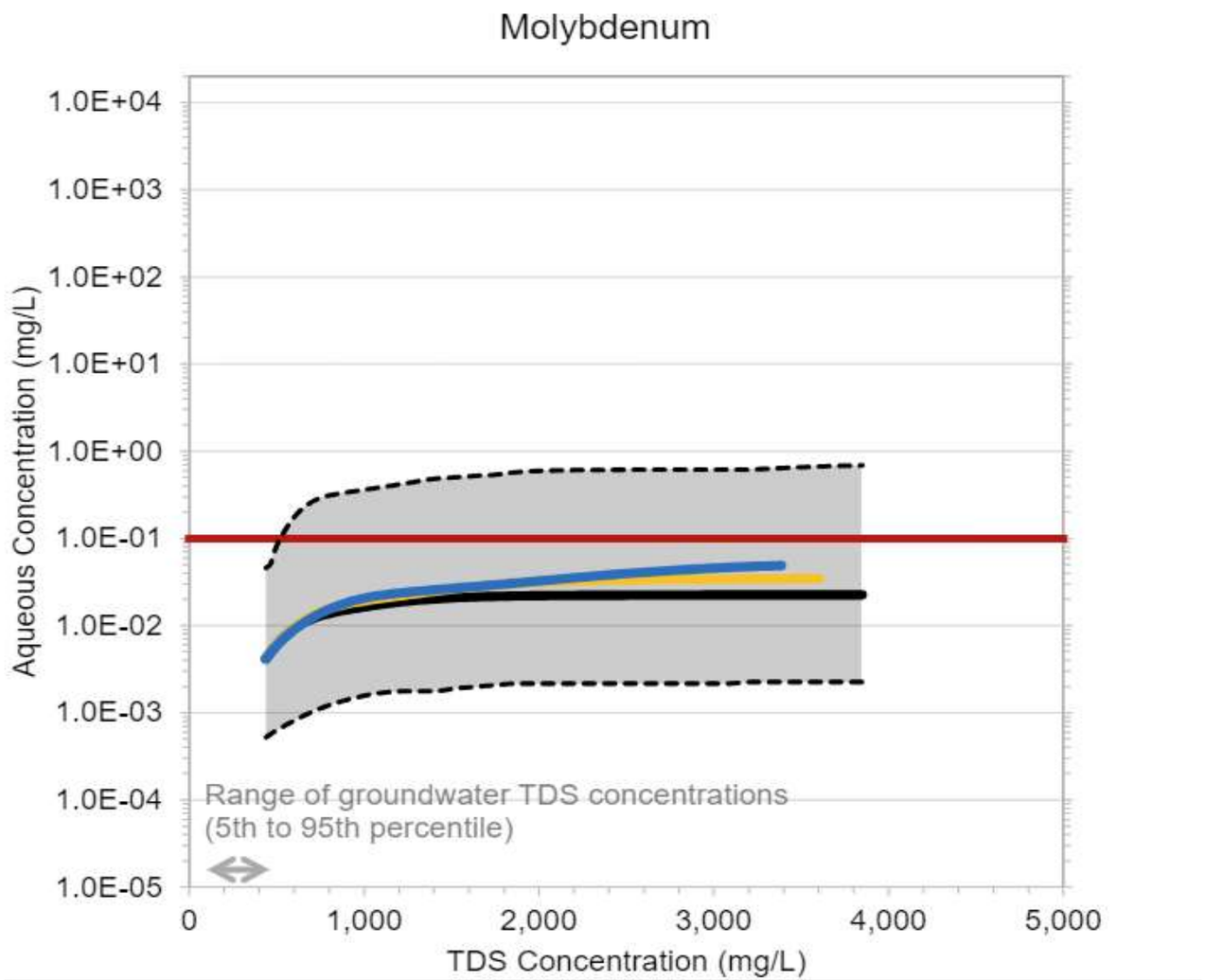
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Redox MNA Stability Evaluation

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	25



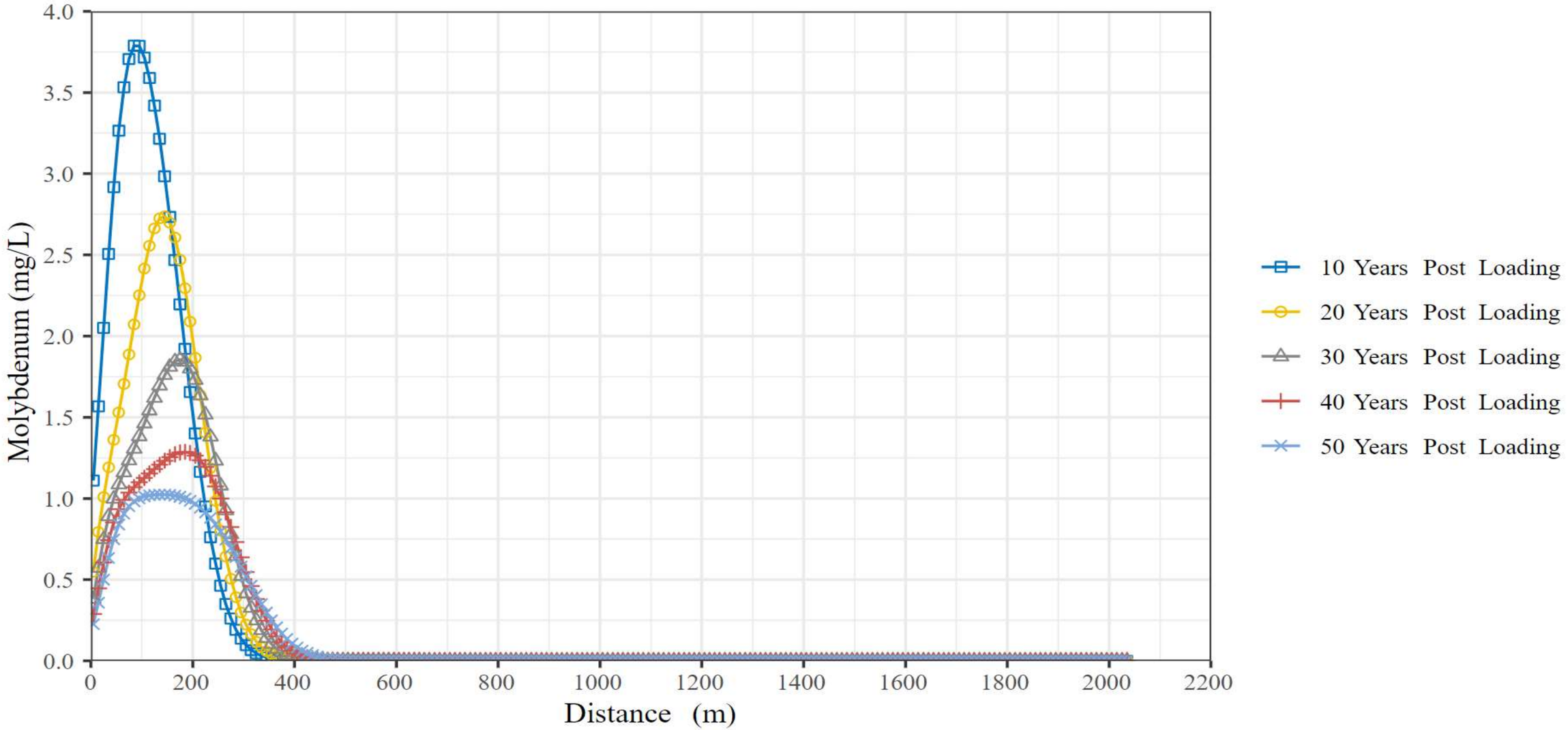
CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
TDS MNA Stability Evaluation

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	26



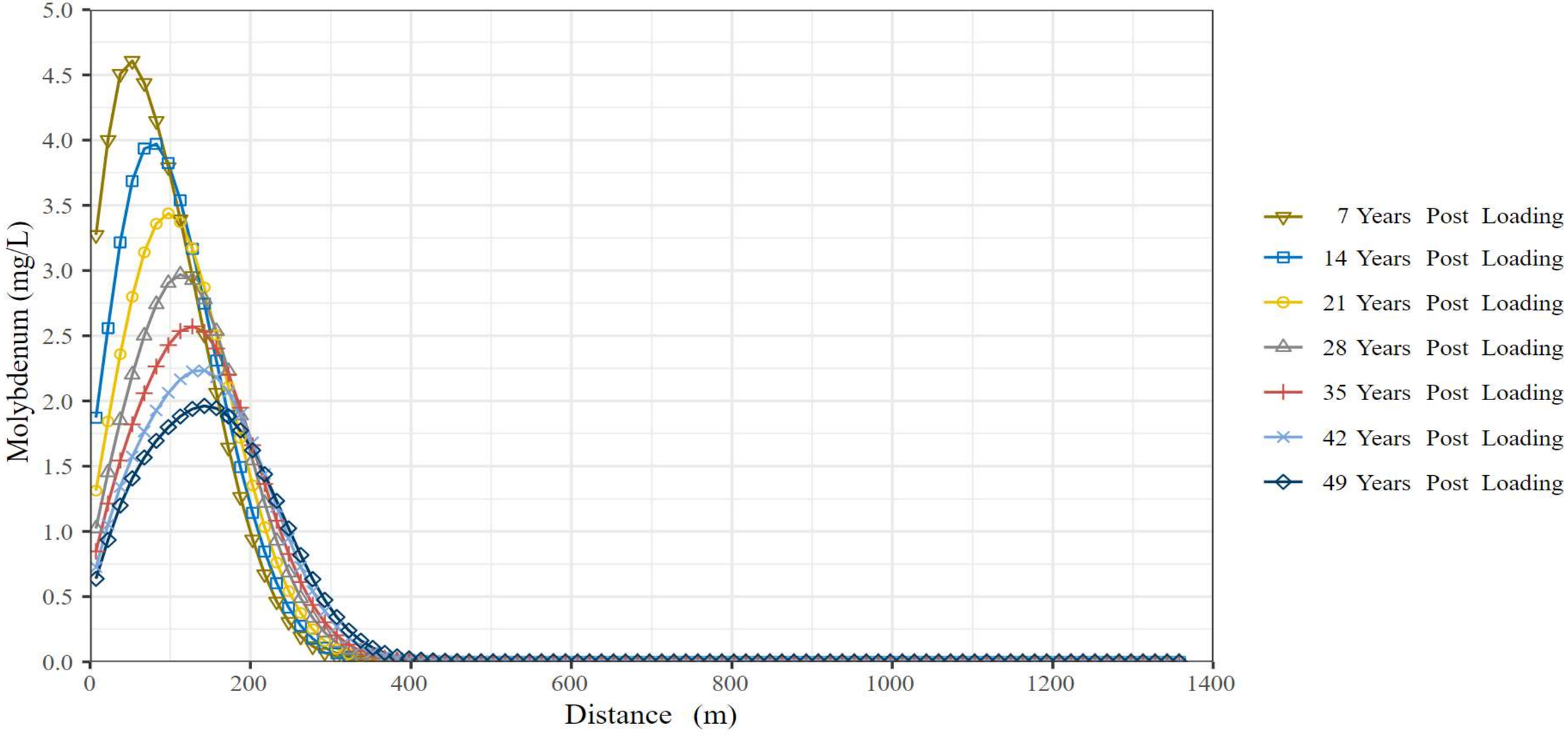
CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Modeled Concentrations of Molybdenum along a Transect Running from SCPA-3 to TP-8D

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	27



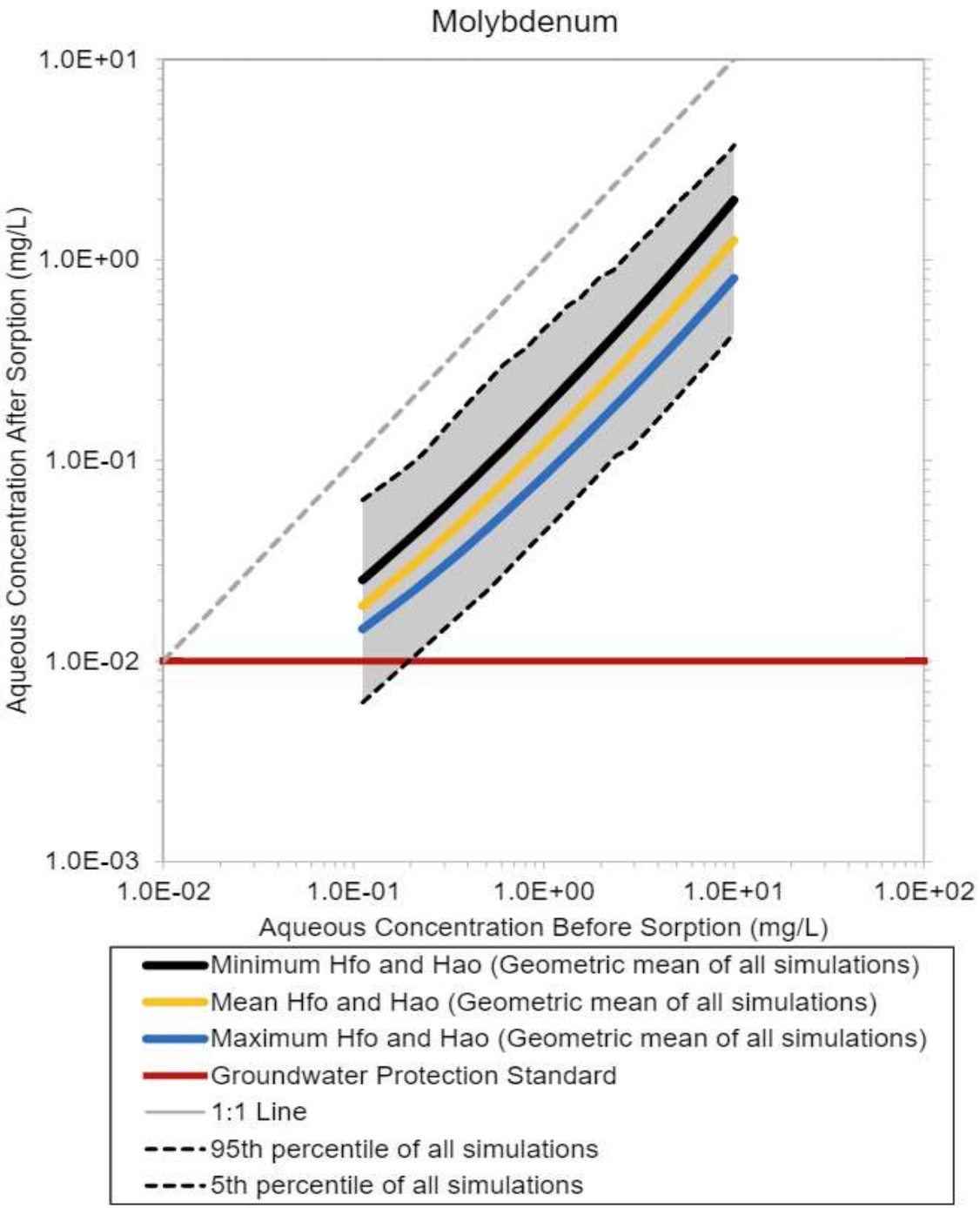
CLIENT
Ameren Missouri

PROJECT
Monitored Natural Attenuation Evaluation

CONSULTANT
wsp

TITLE
Modeled Concentrations of Molybdenum along a Transect Running from SCPA-3 to TP-4S

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	28



CLIENT
Ameren Missouri

CONSULTANT
wsp

PROJECT
Monitored Natural Attenuation Evaluation

TITLE
Modeled Attenuation Capacity of the Compliance and Nature and Extent Well Network for Molybdenum at the SCPA

PROJECT NO.	PHASE	REV.	FIGURE
US0023766.2548		0	29

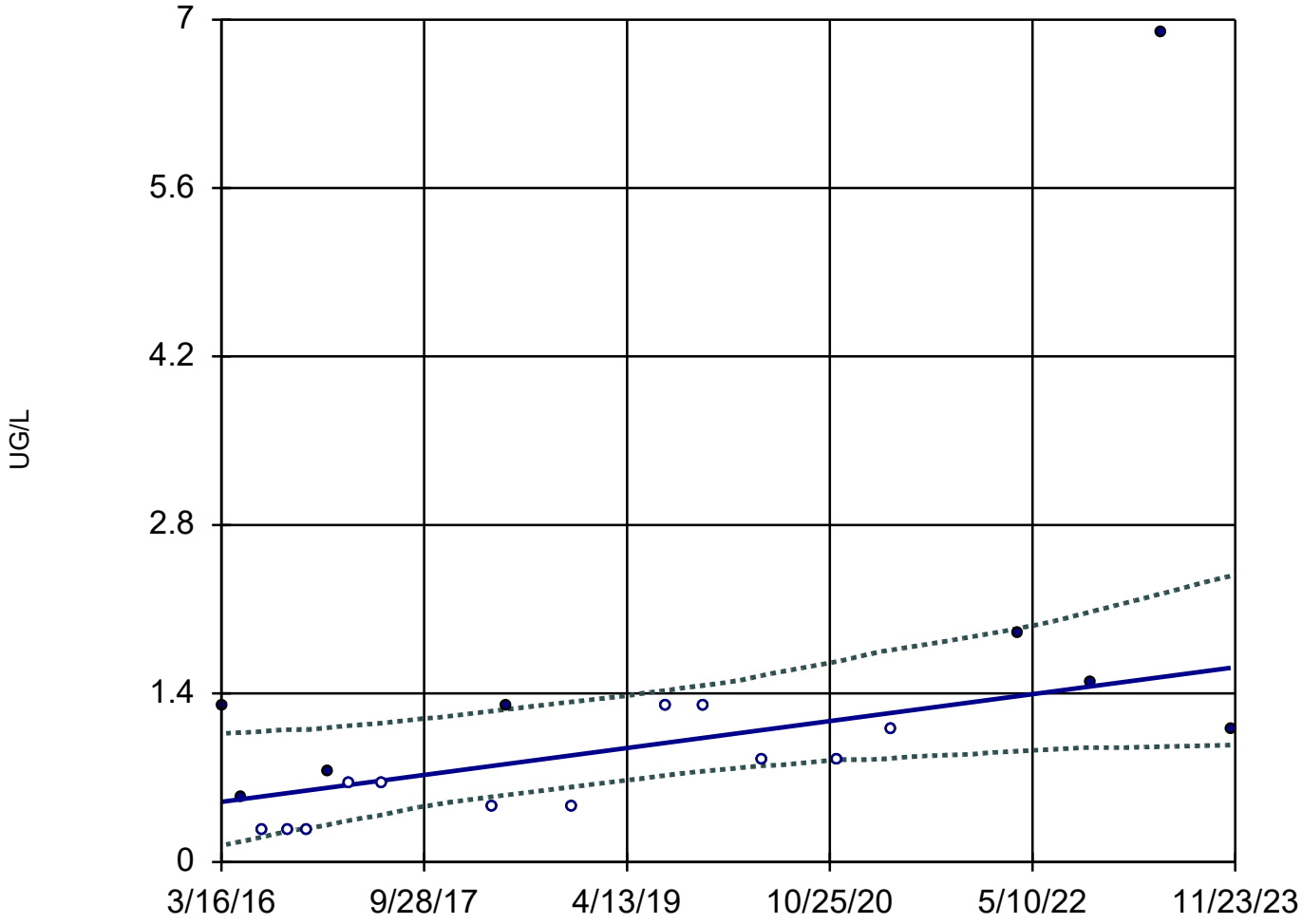
APPENDIX A

Mann-Kendall Trend Evaluations of Molybdenum

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-BMW-1D (bg)



n = 20

Slope = 0.1455 units per year.

Mann-Kendall statistic = 91
critical = 73

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

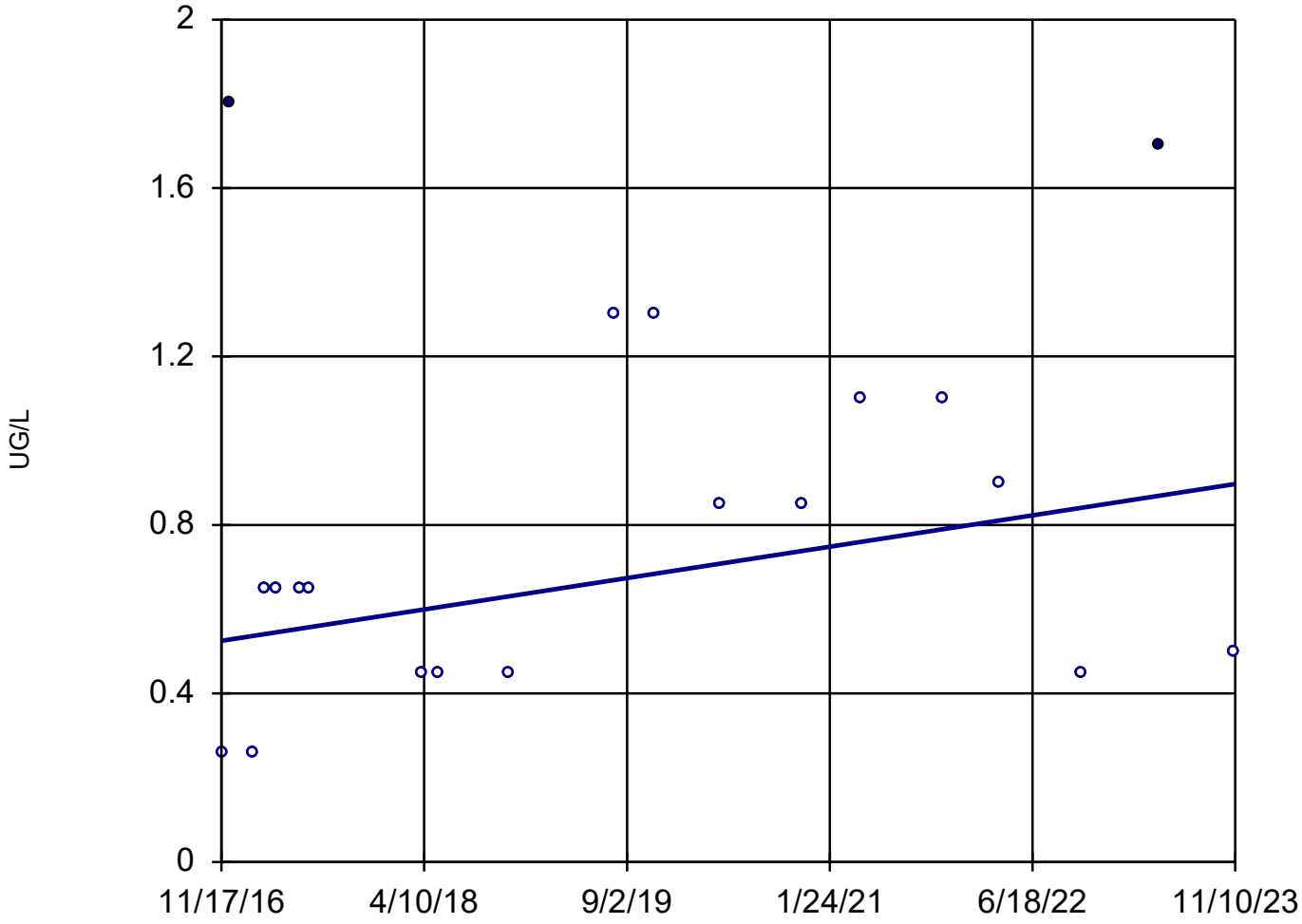
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-BMW-3D (bg)



n = 20

Slope = 0.05332 units per year.

Mann-Kendall statistic = 44
critical = 73

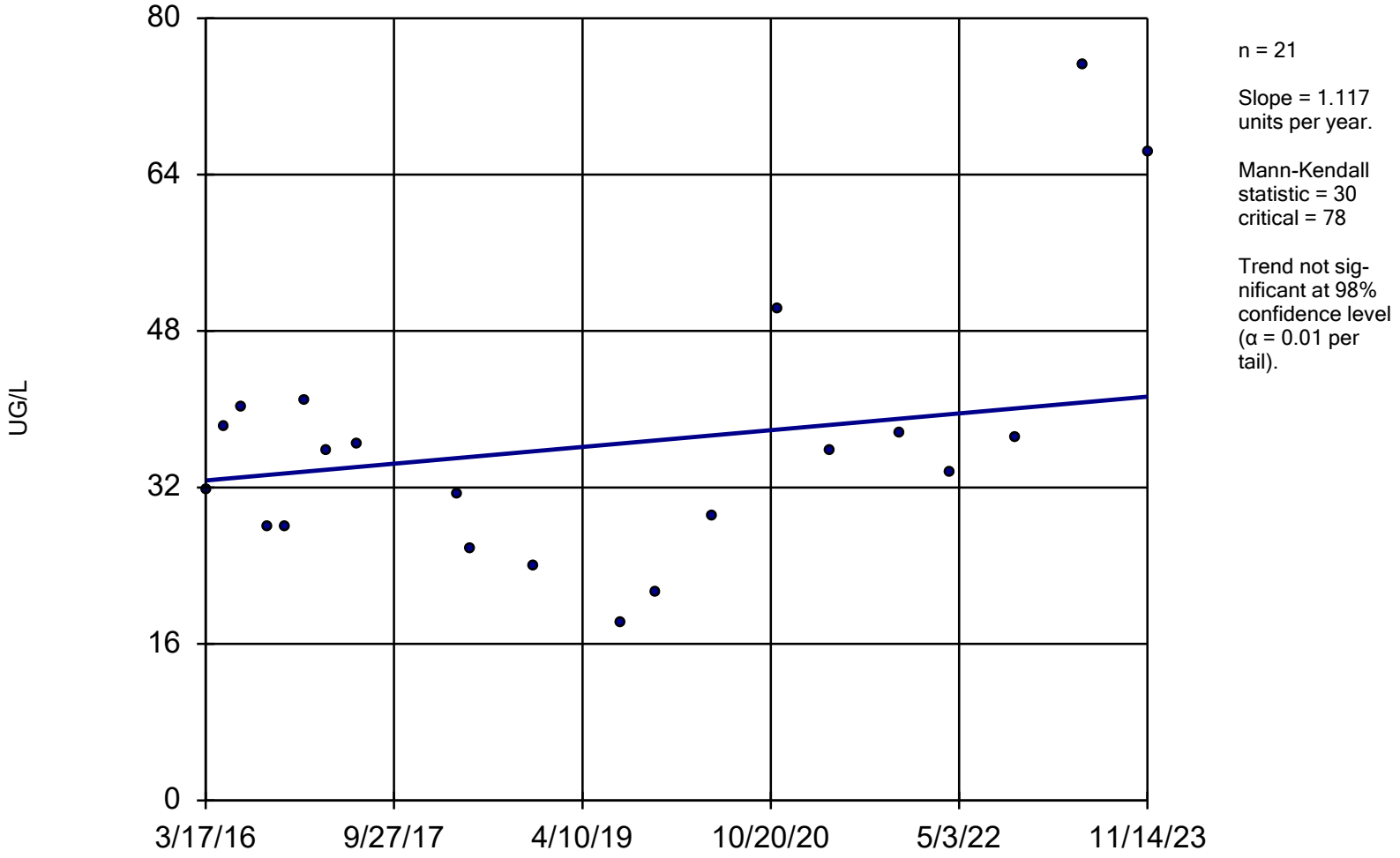
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-UMW-1D



n = 21

Slope = 1.117 units per year.

Mann-Kendall statistic = 30
critical = 78

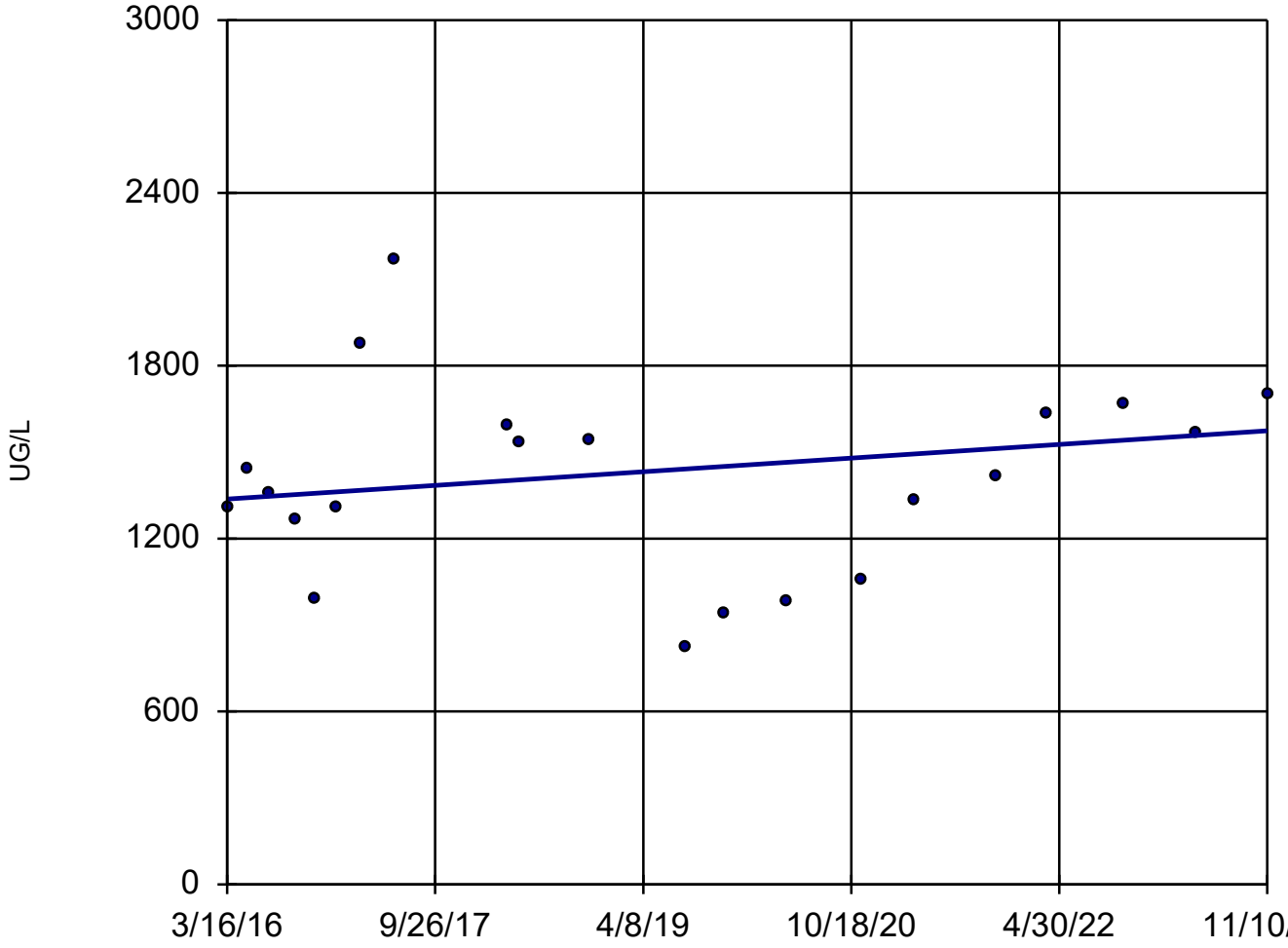
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-UMW-2D



n = 21

Slope = 30.86 units per year.

Mann-Kendall statistic = 39
critical = 78

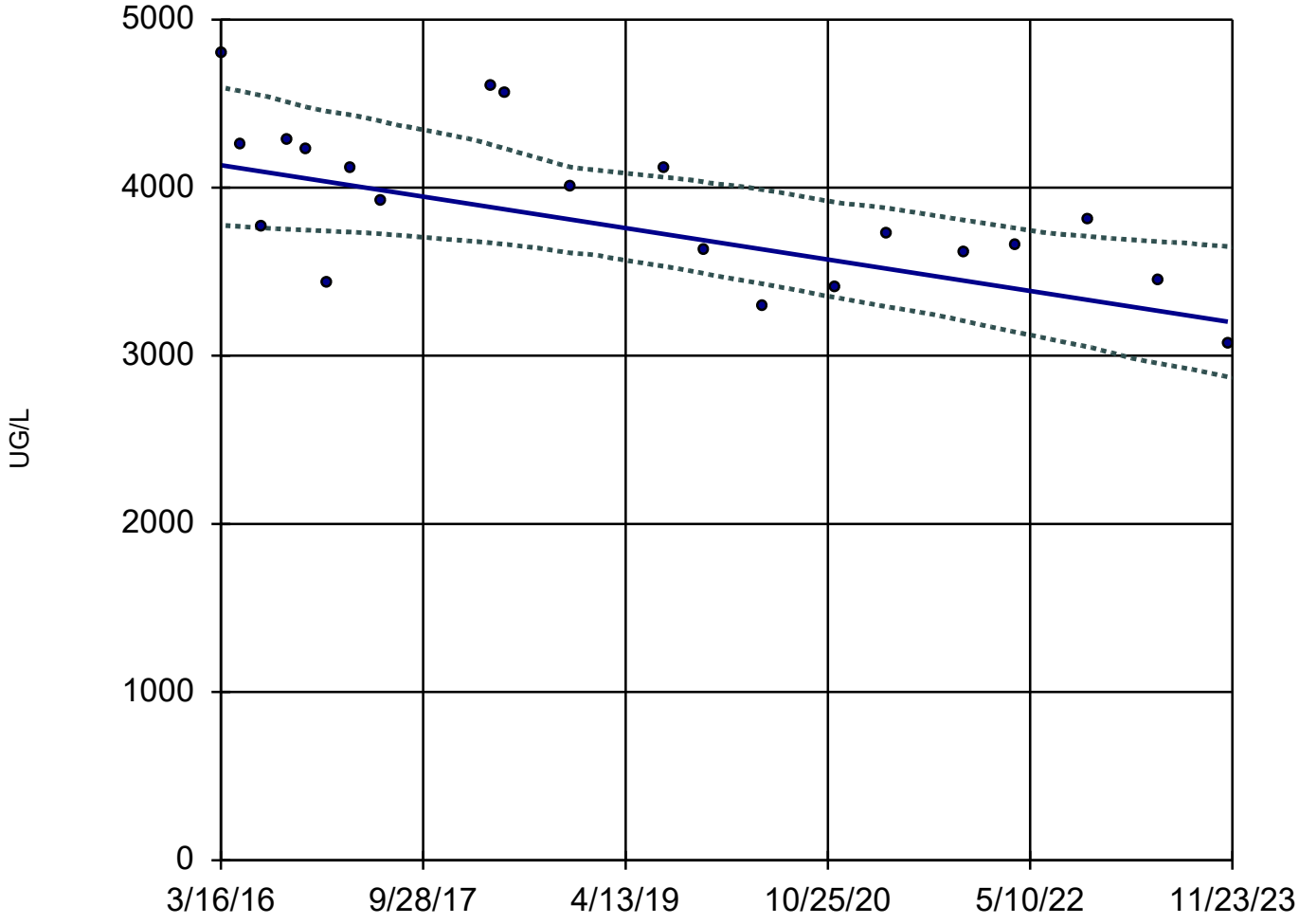
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-UMW-3D



n = 21

Slope = -121.4 units per year.

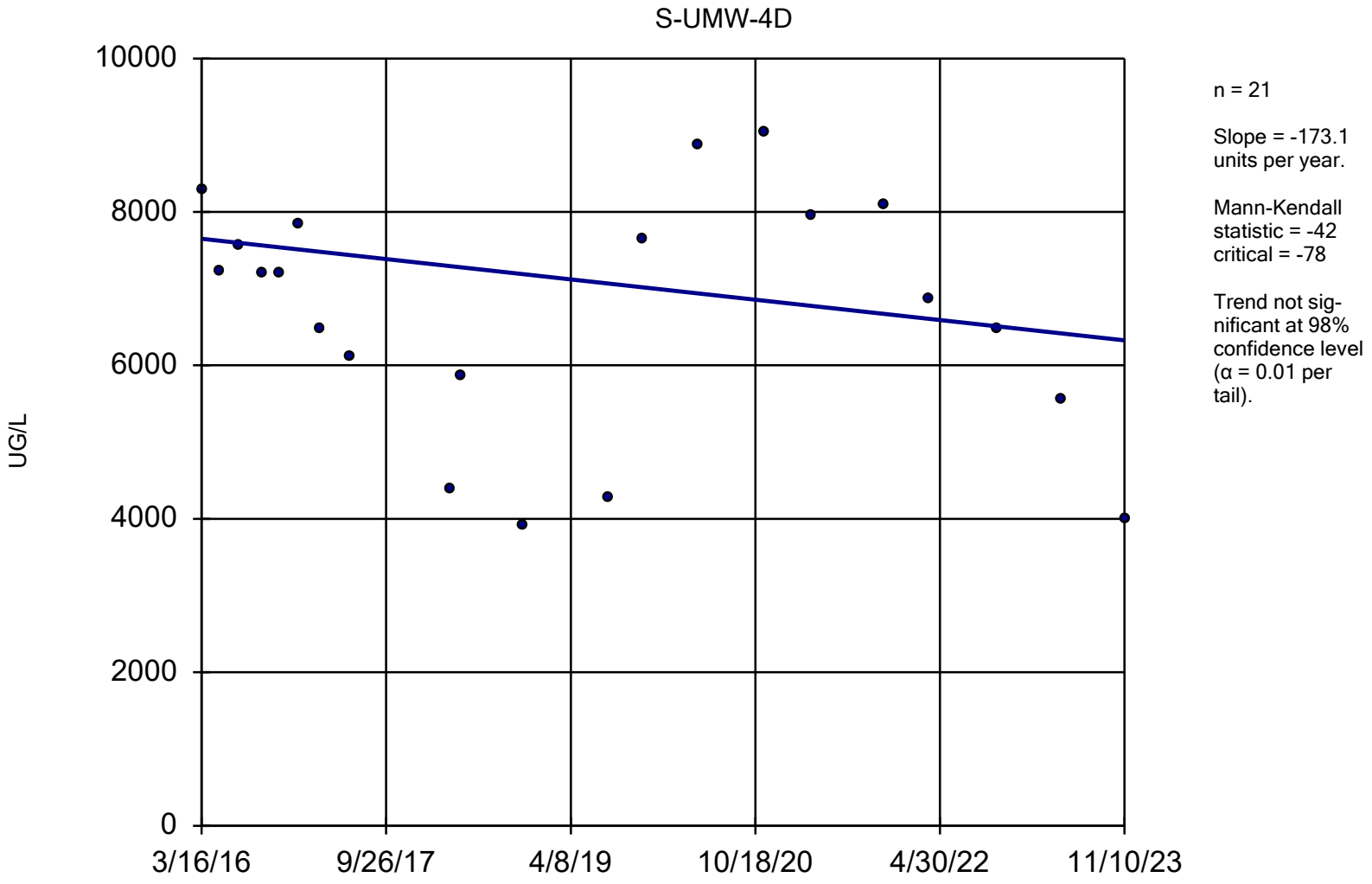
Mann-Kendall statistic = -103
critical = -78

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

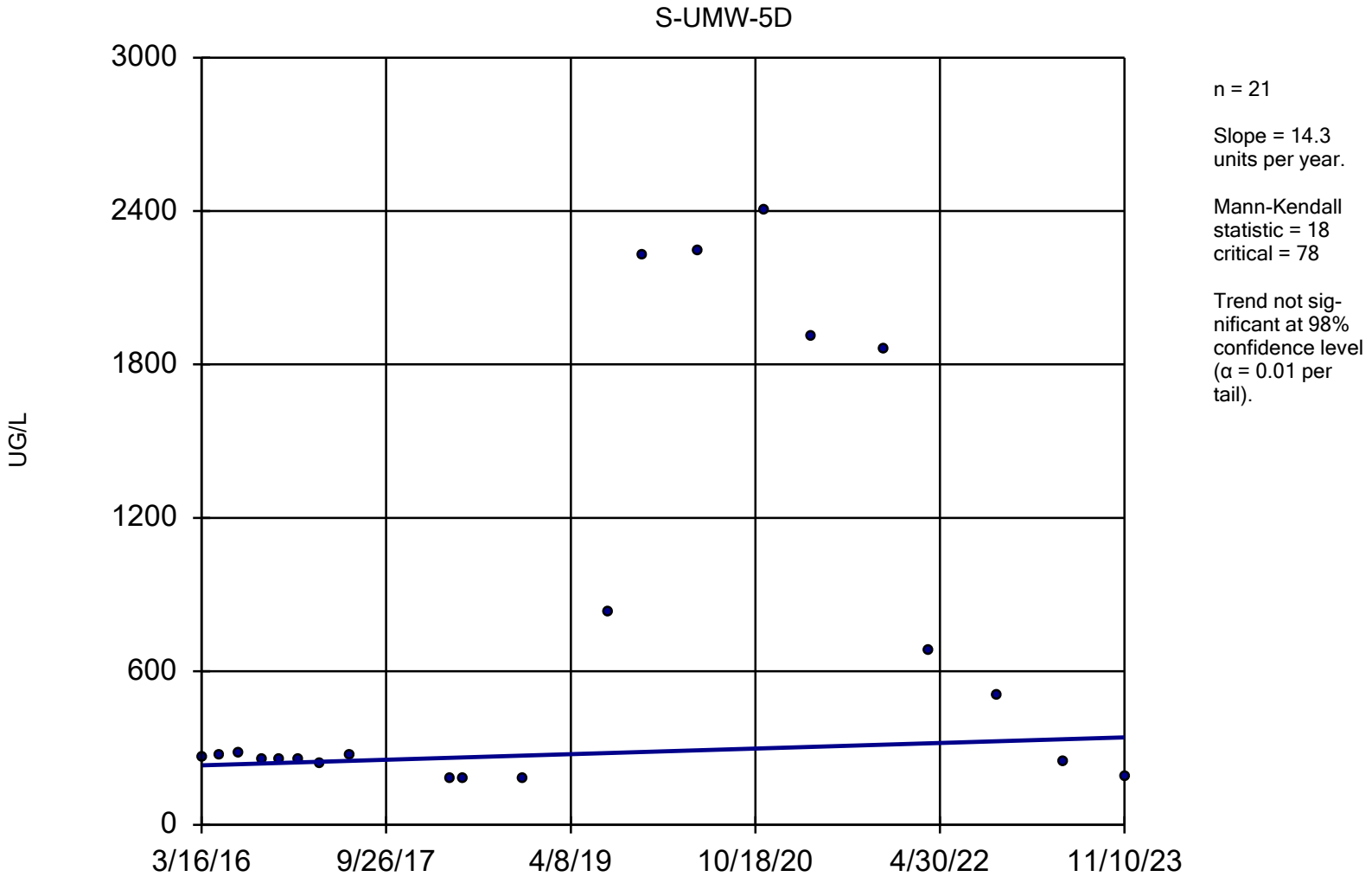
Sen's Slope Estimator



Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

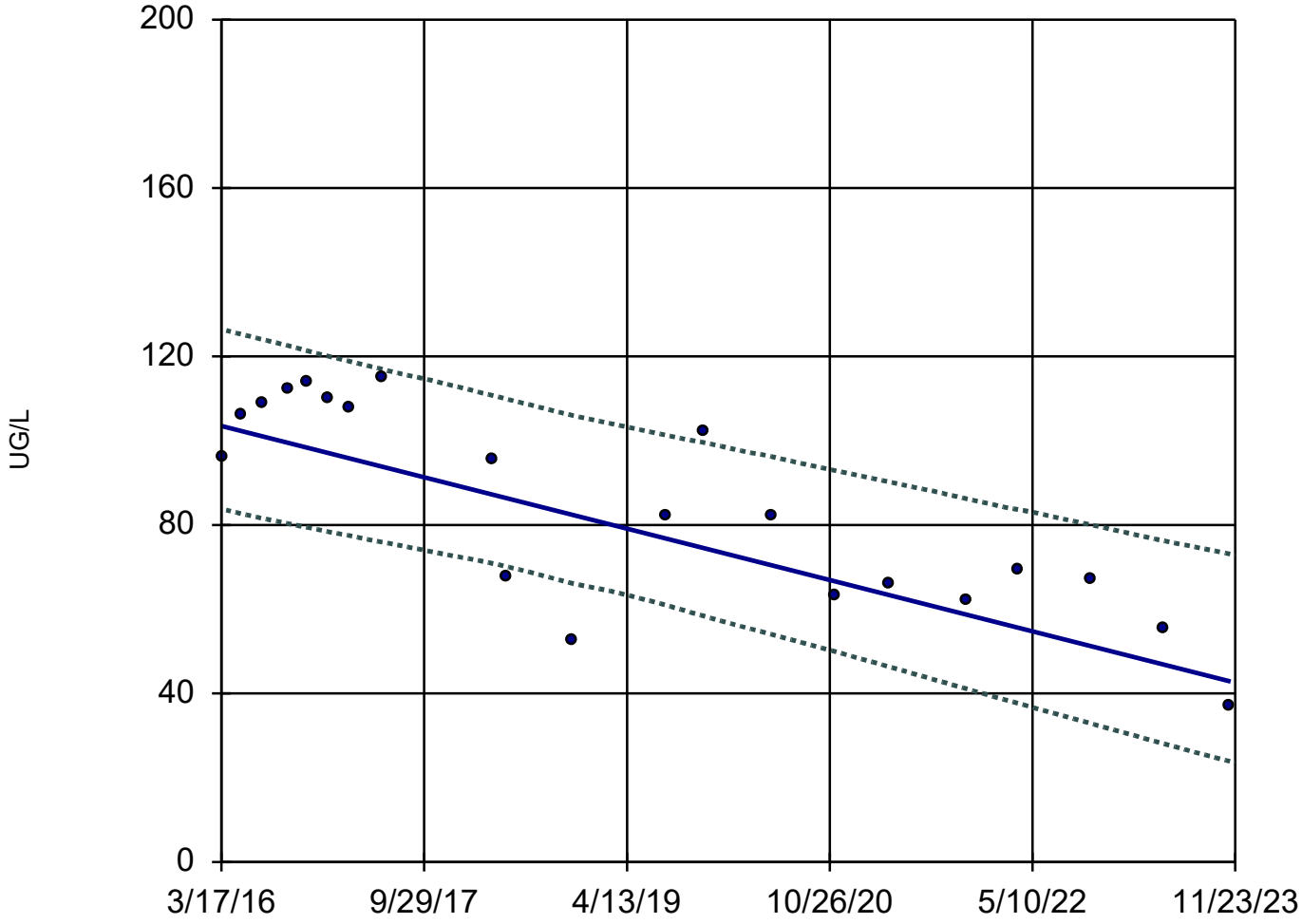


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-UMW-6D



n = 21

Slope = -7.923 units per year.

Mann-Kendall statistic = -118
critical = -78

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

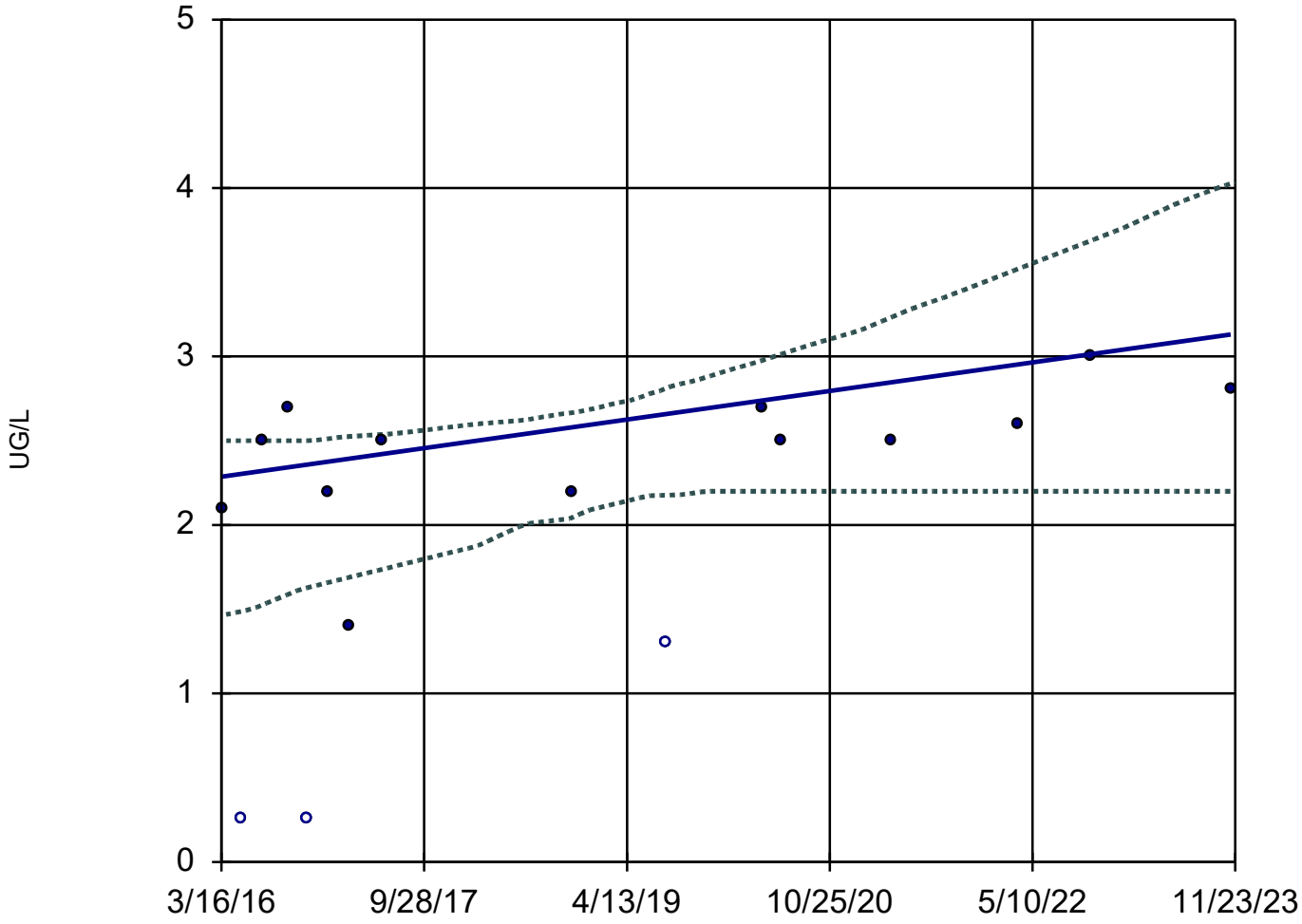
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:13 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-BMW-1S (bg)



n = 16

Slope = 0.1103 units per year.

Mann-Kendall statistic = 55
critical = 53

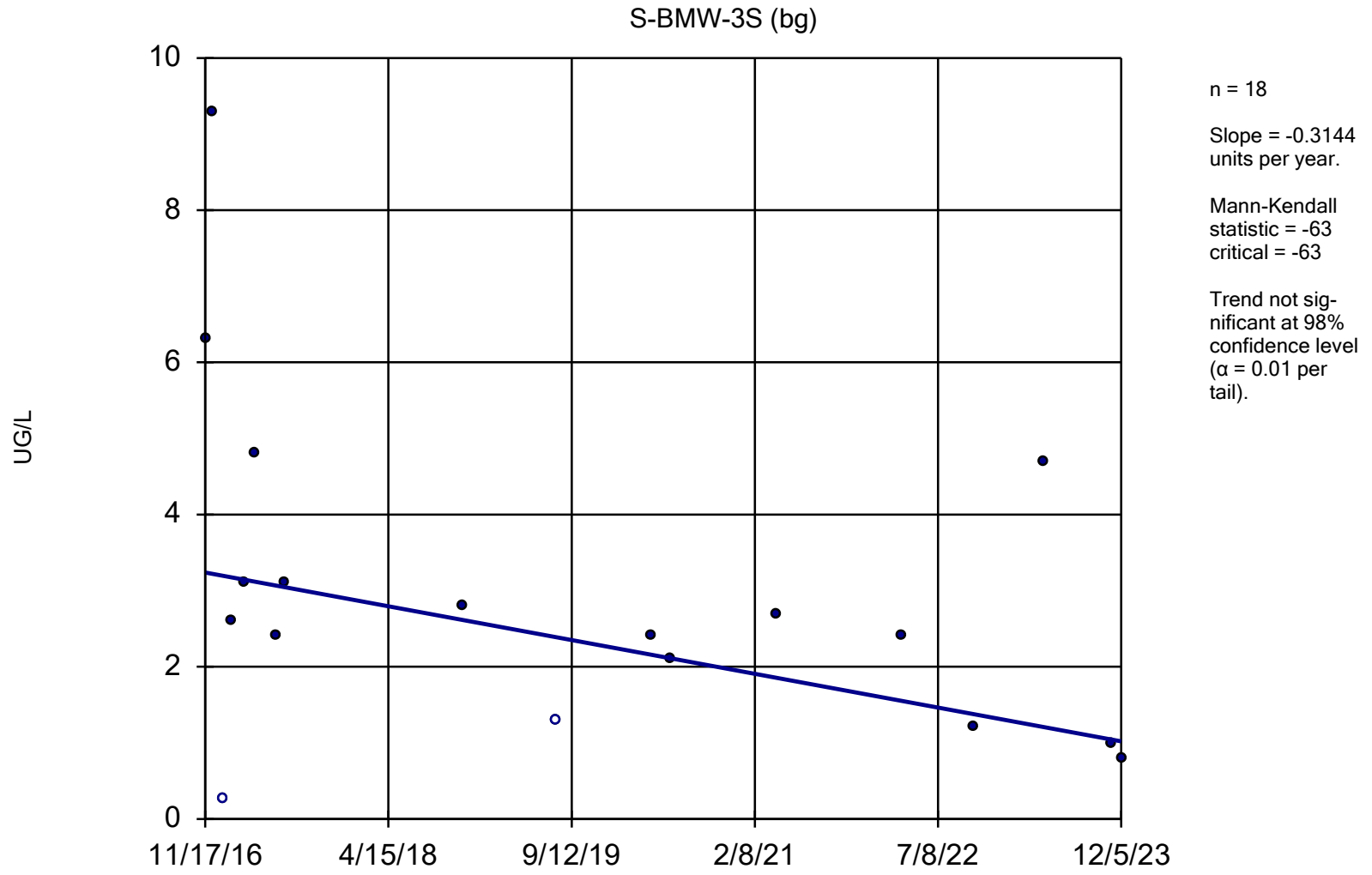
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

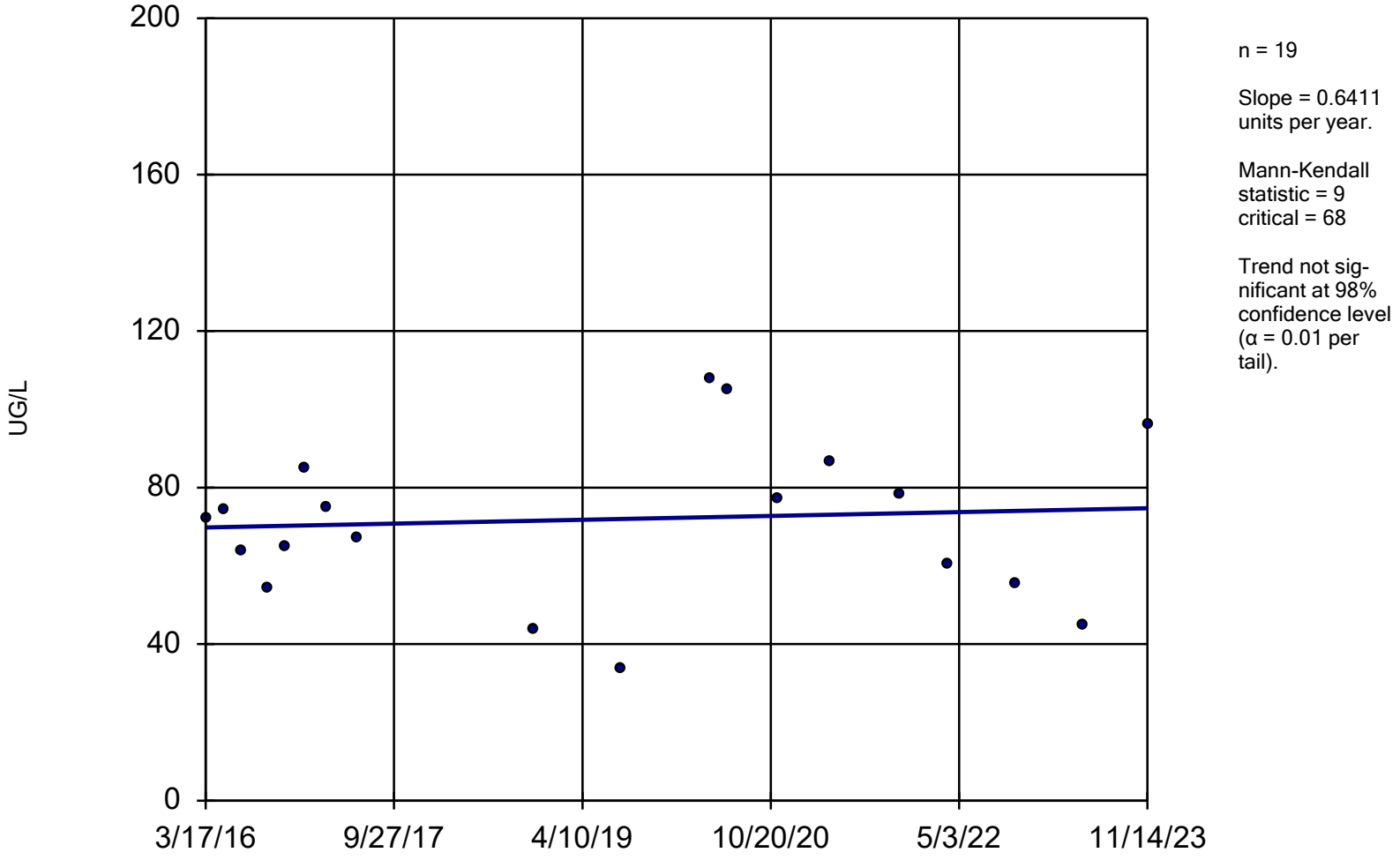


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-LMW-1S



n = 19

Slope = 0.6411 units per year.

Mann-Kendall statistic = 9
critical = 68

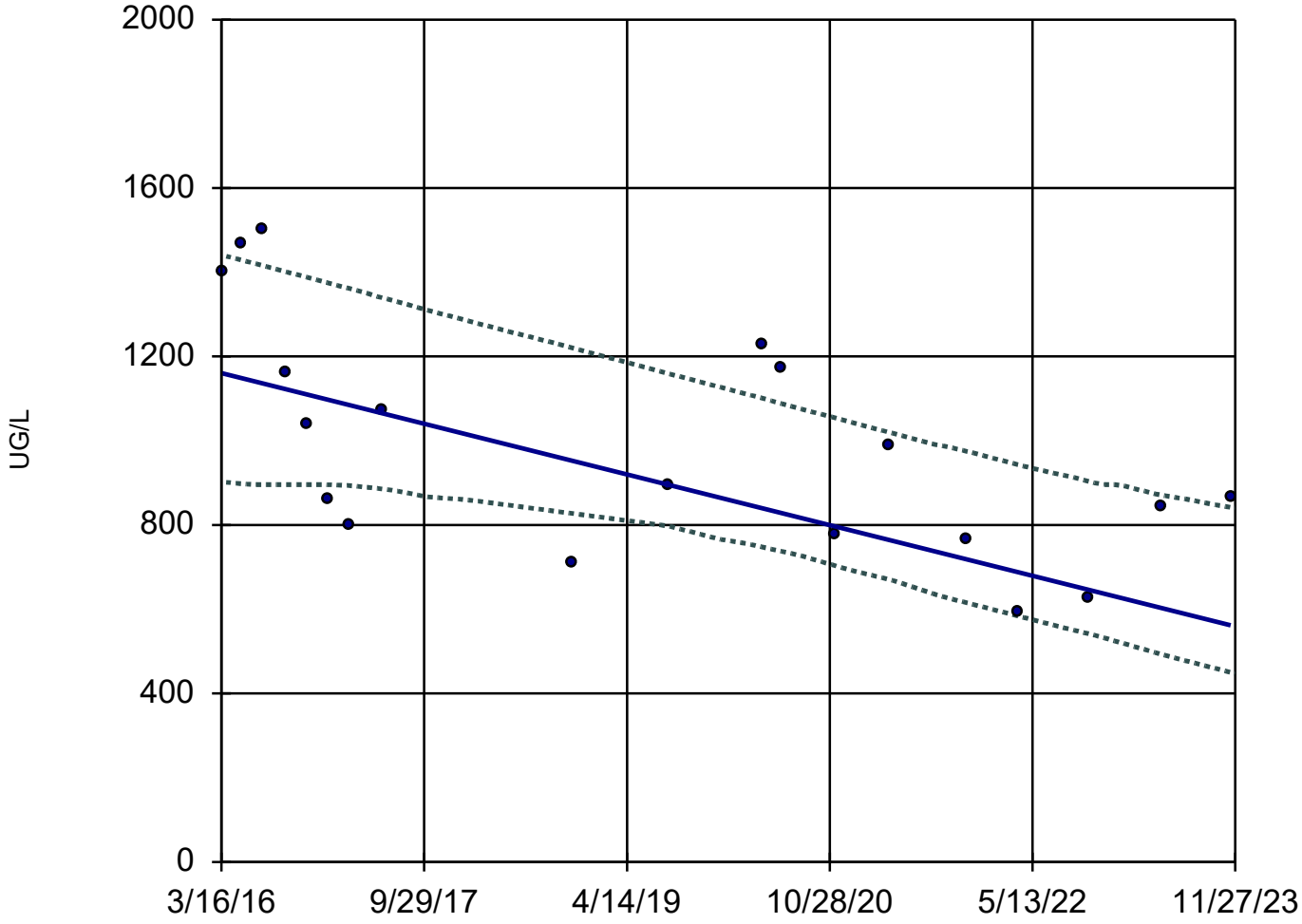
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-LMW-2S



n = 19

Slope = -78.06 units per year.

Mann-Kendall statistic = -81
critical = -68

Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

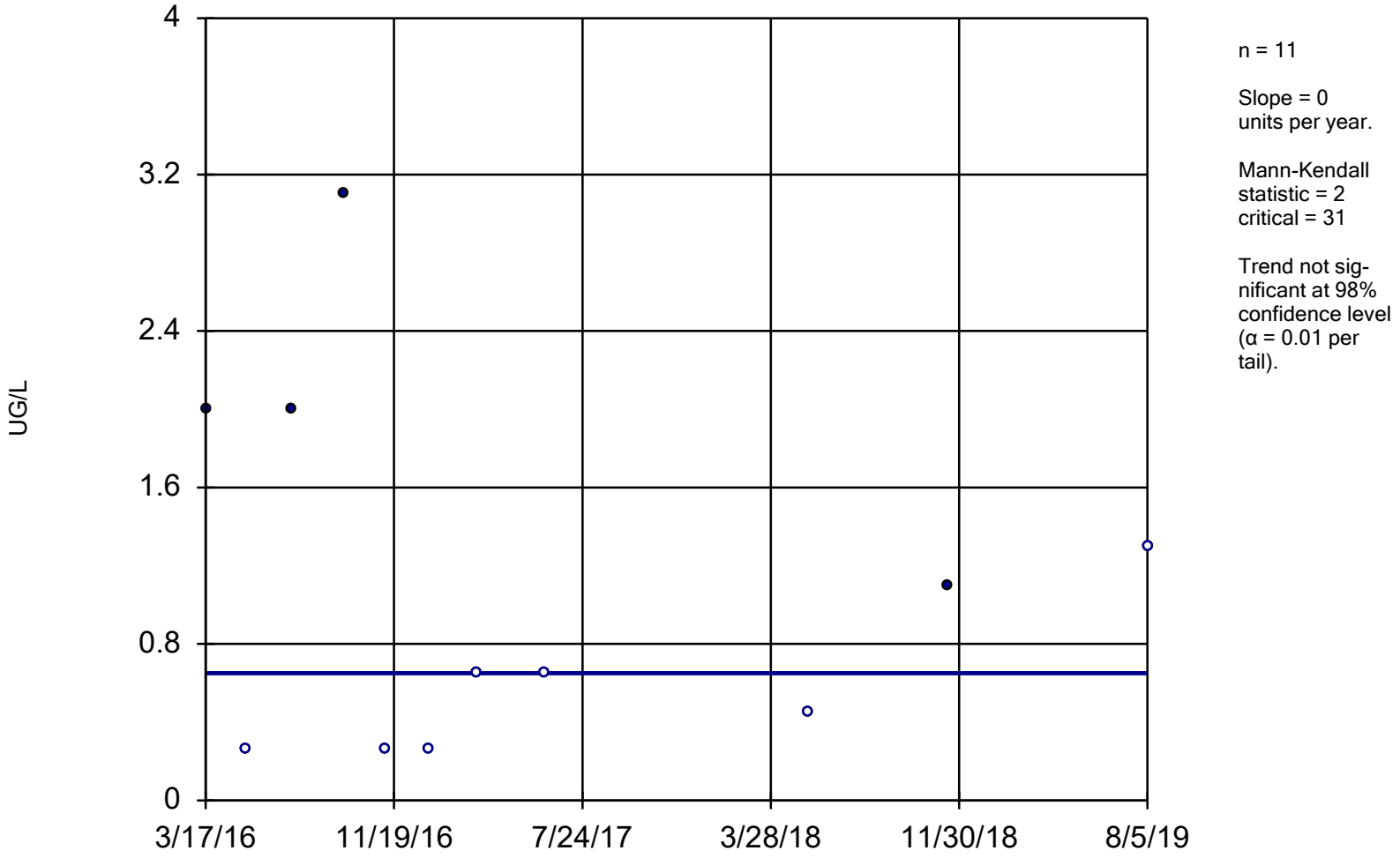
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-LMW-3S



n = 11

Slope = 0
units per year.

Mann-Kendall
statistic = 2
critical = 31

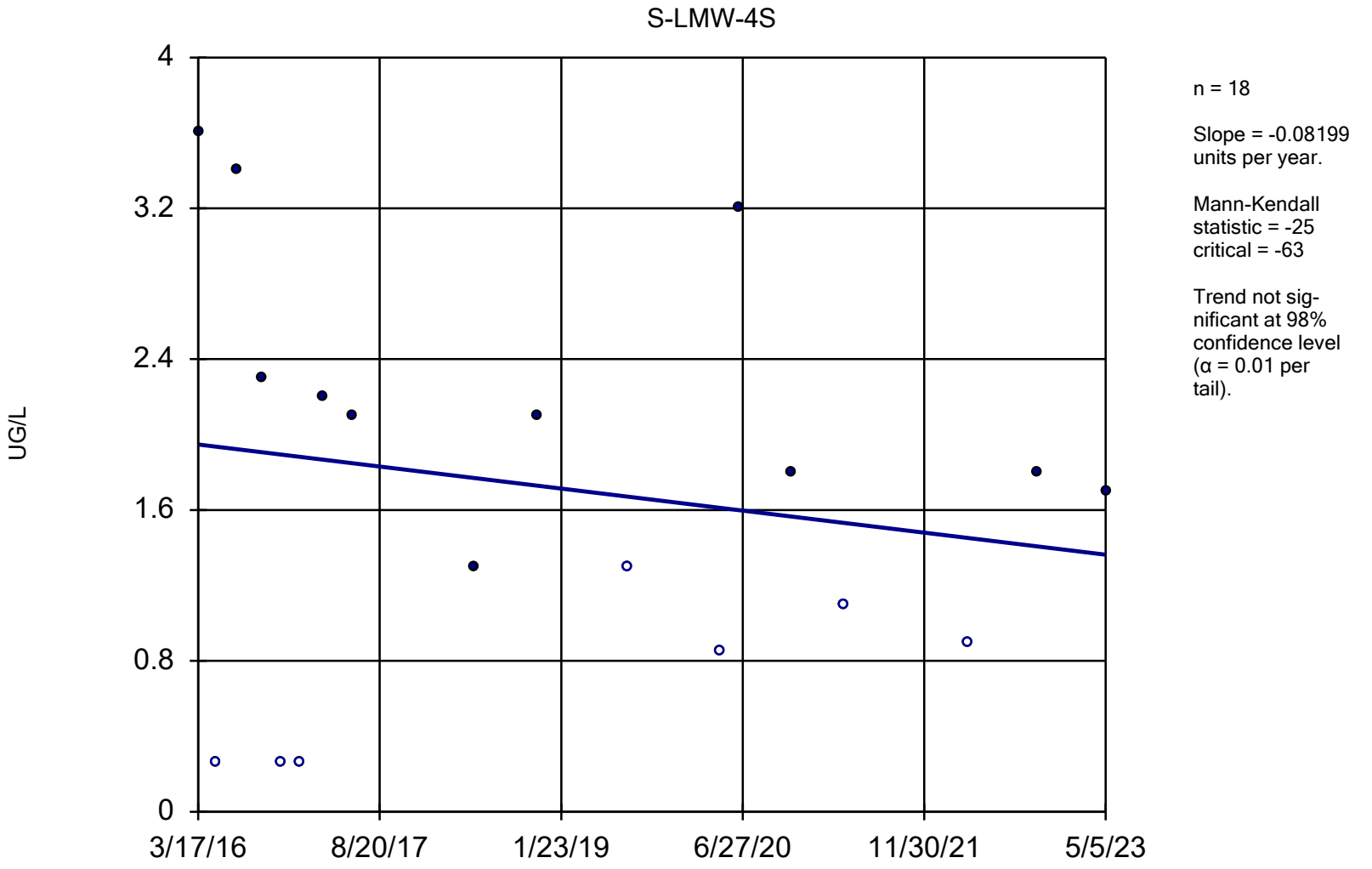
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

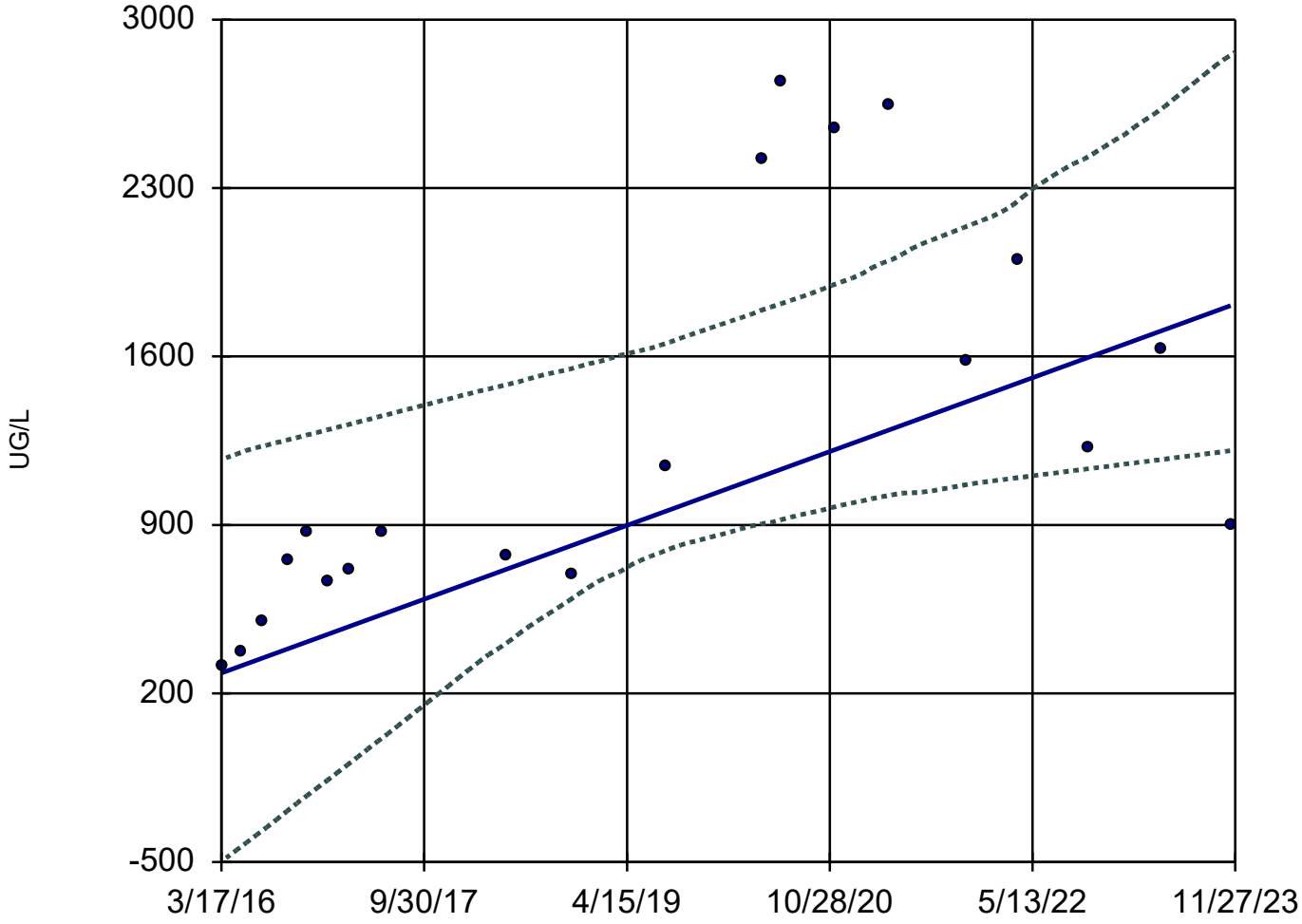


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-LMW-5S



n = 20

Slope = 199.1 units per year.

Mann-Kendall statistic = 106
critical = 73

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

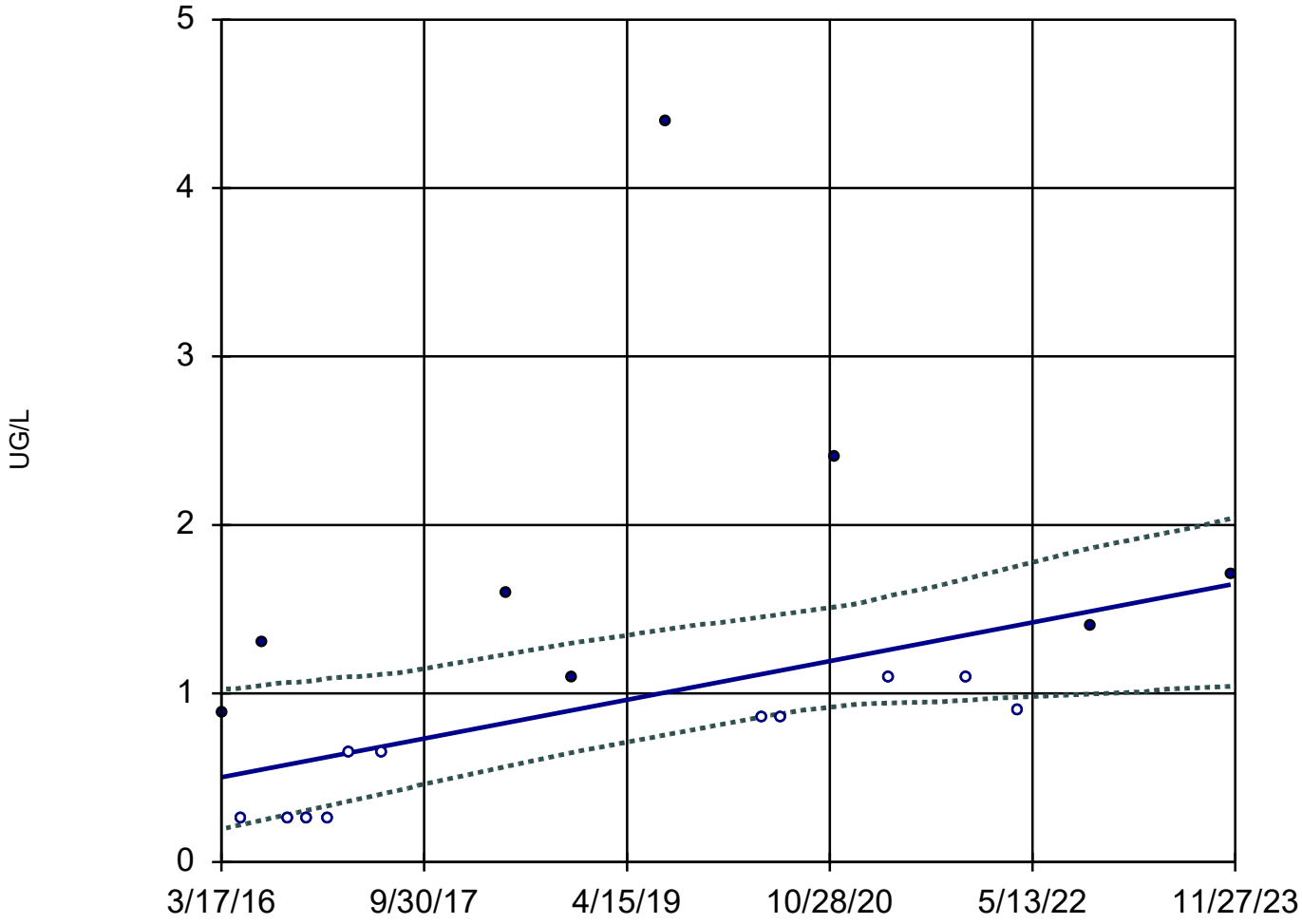
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

S-LMW-6S



n = 19

Slope = 0.1492 units per year.

Mann-Kendall statistic = 72
critical = 68

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

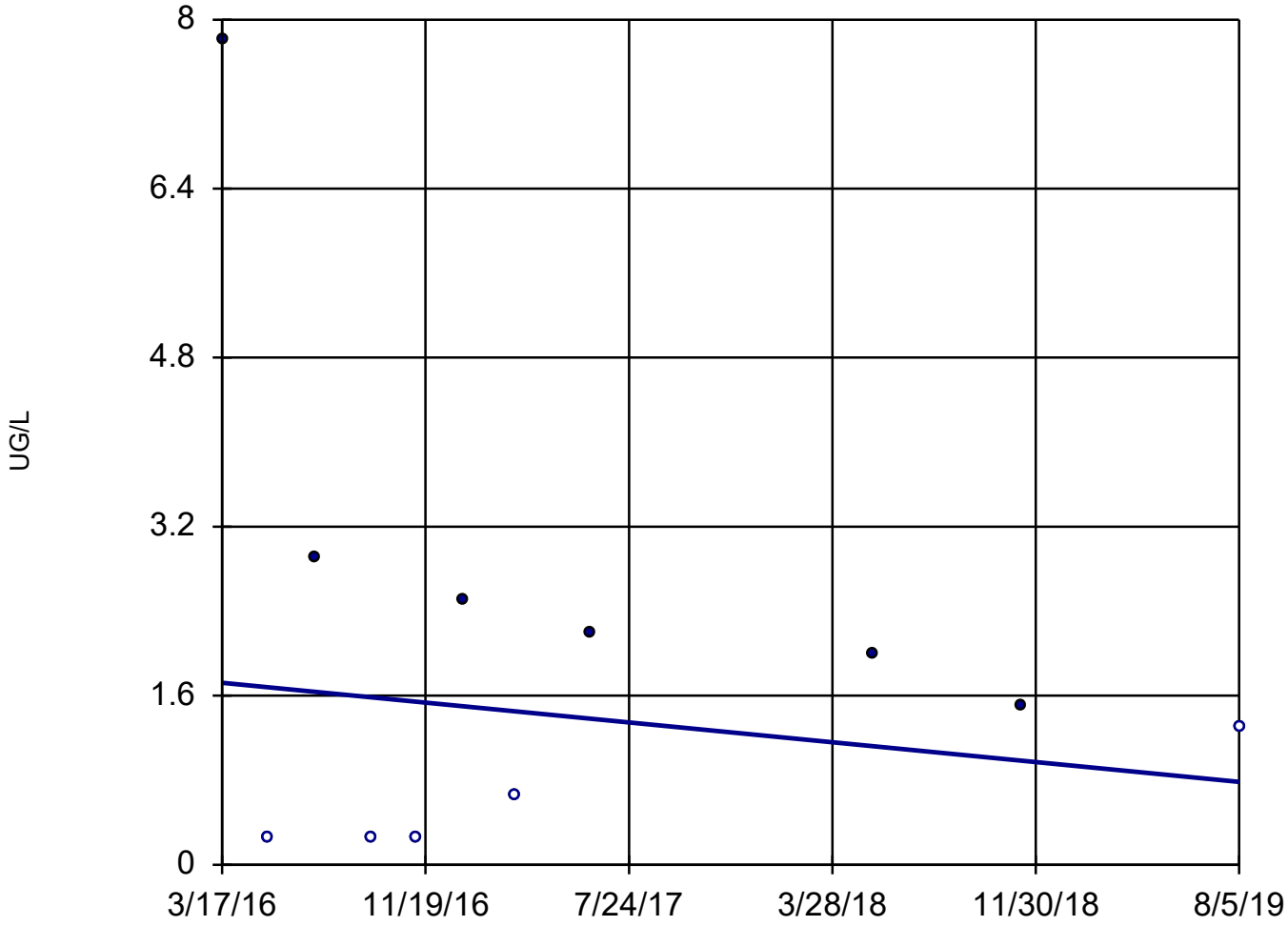
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-LMW-7S



n = 11

Slope = -0.2765 units per year.

Mann-Kendall statistic = -6
critical = -31

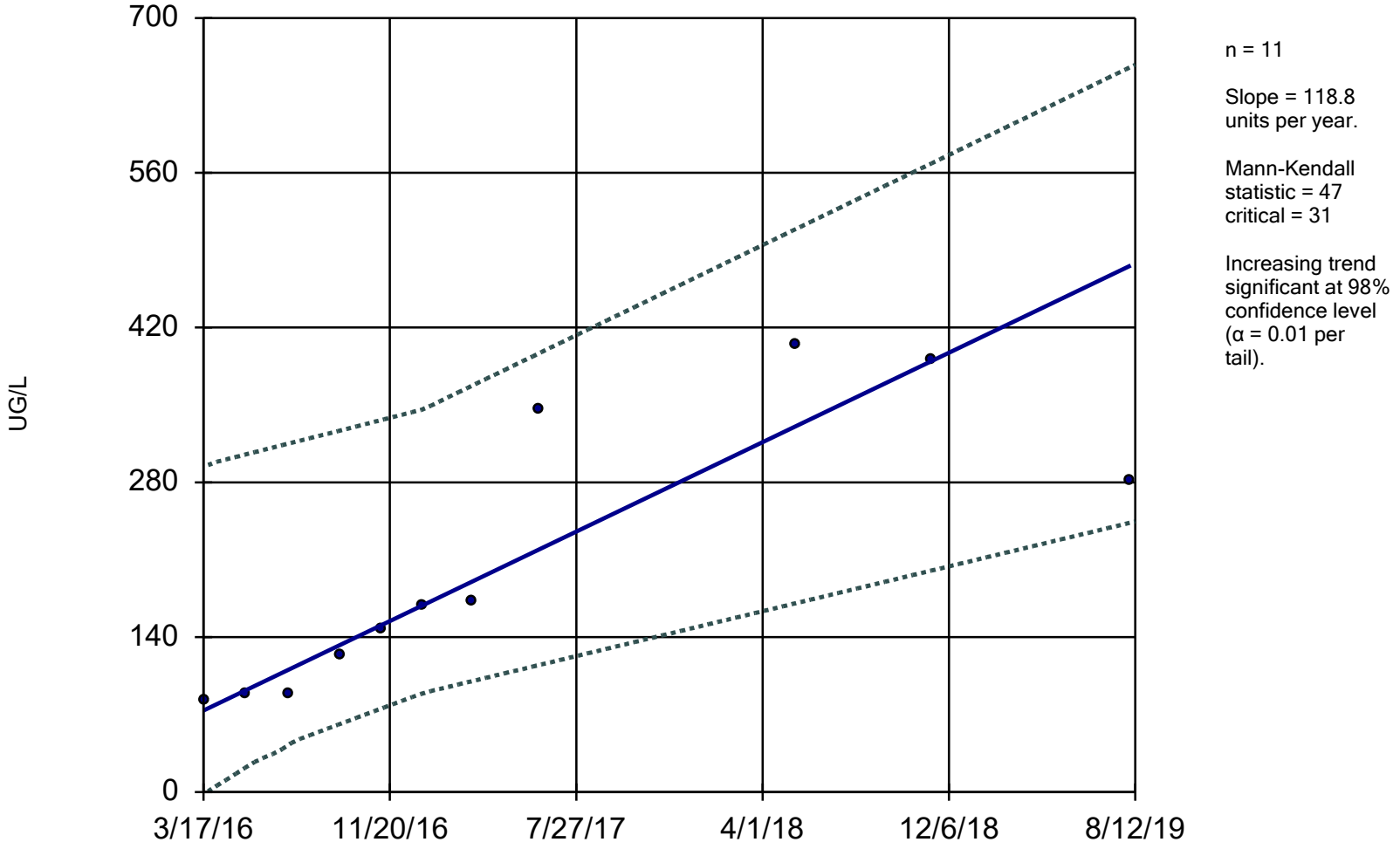
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-LMW-8S



n = 11

Slope = 118.8 units per year.

Mann-Kendall statistic = 47
critical = 31

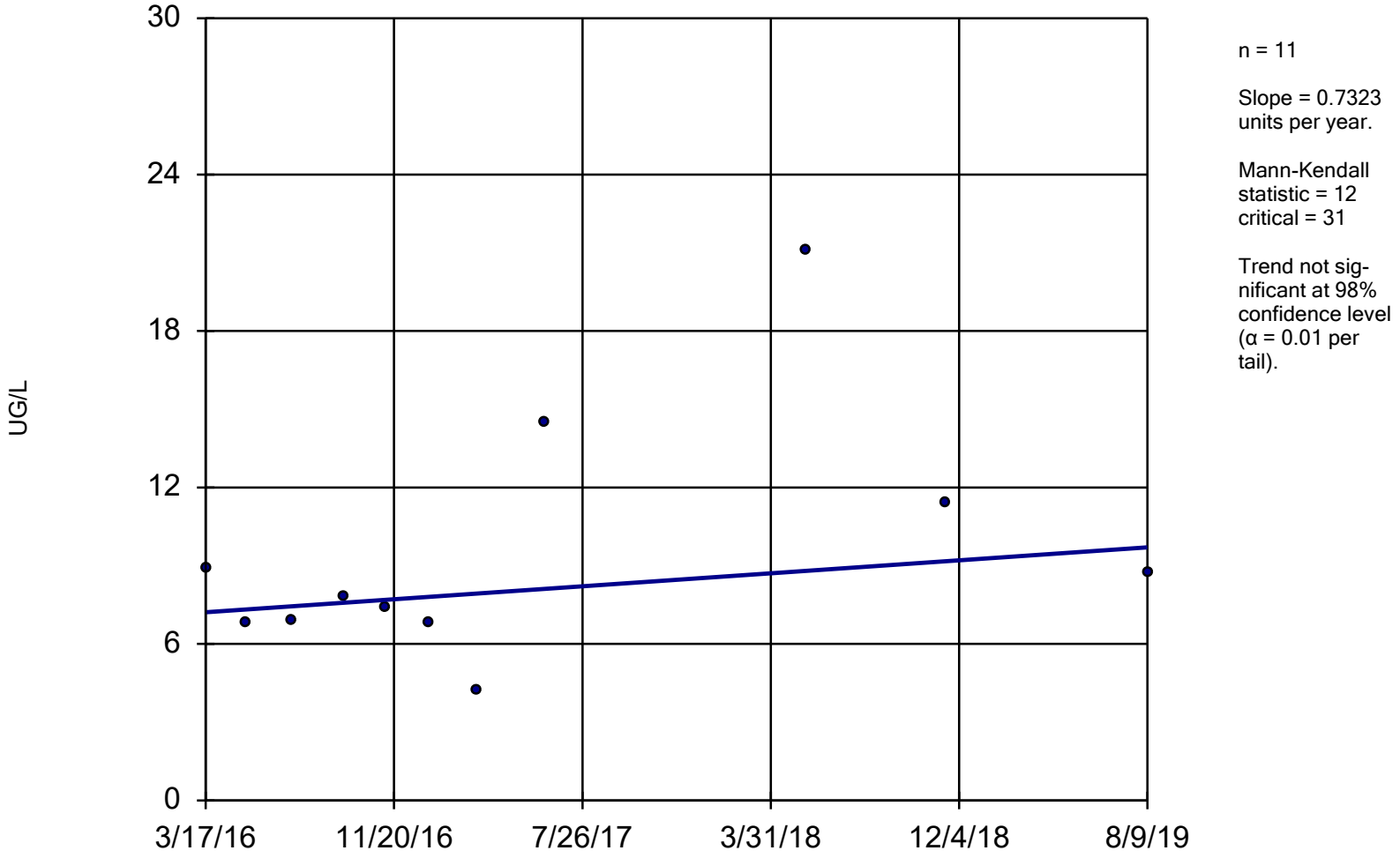
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-LMW-9S



n = 11

Slope = 0.7323 units per year.

Mann-Kendall statistic = 12
critical = 31

Trend not significant at 98% confidence level (α = 0.01 per tail).

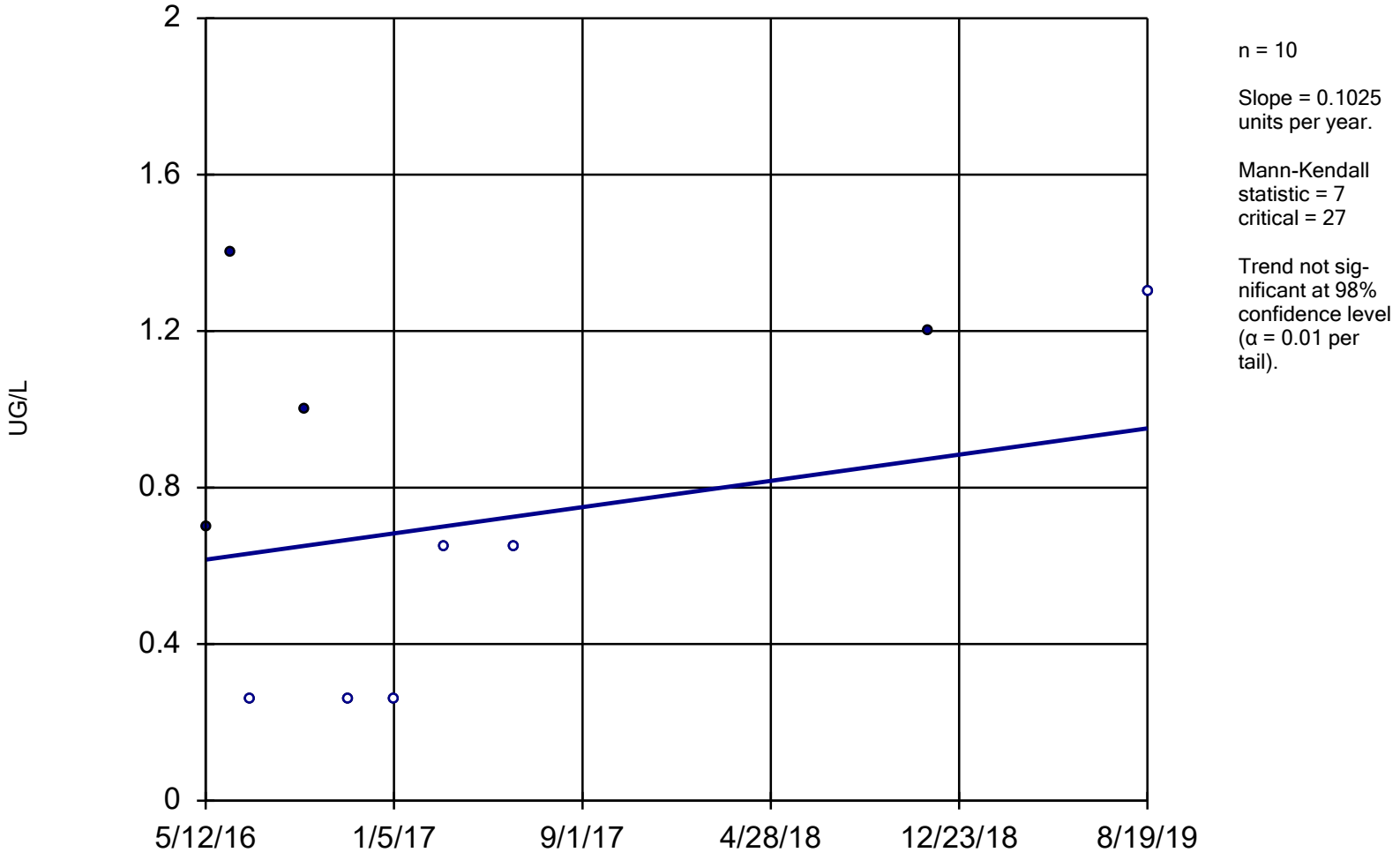
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-DG-1 (bg)



n = 10

Slope = 0.1025 units per year.

Mann-Kendall statistic = 7
critical = 27

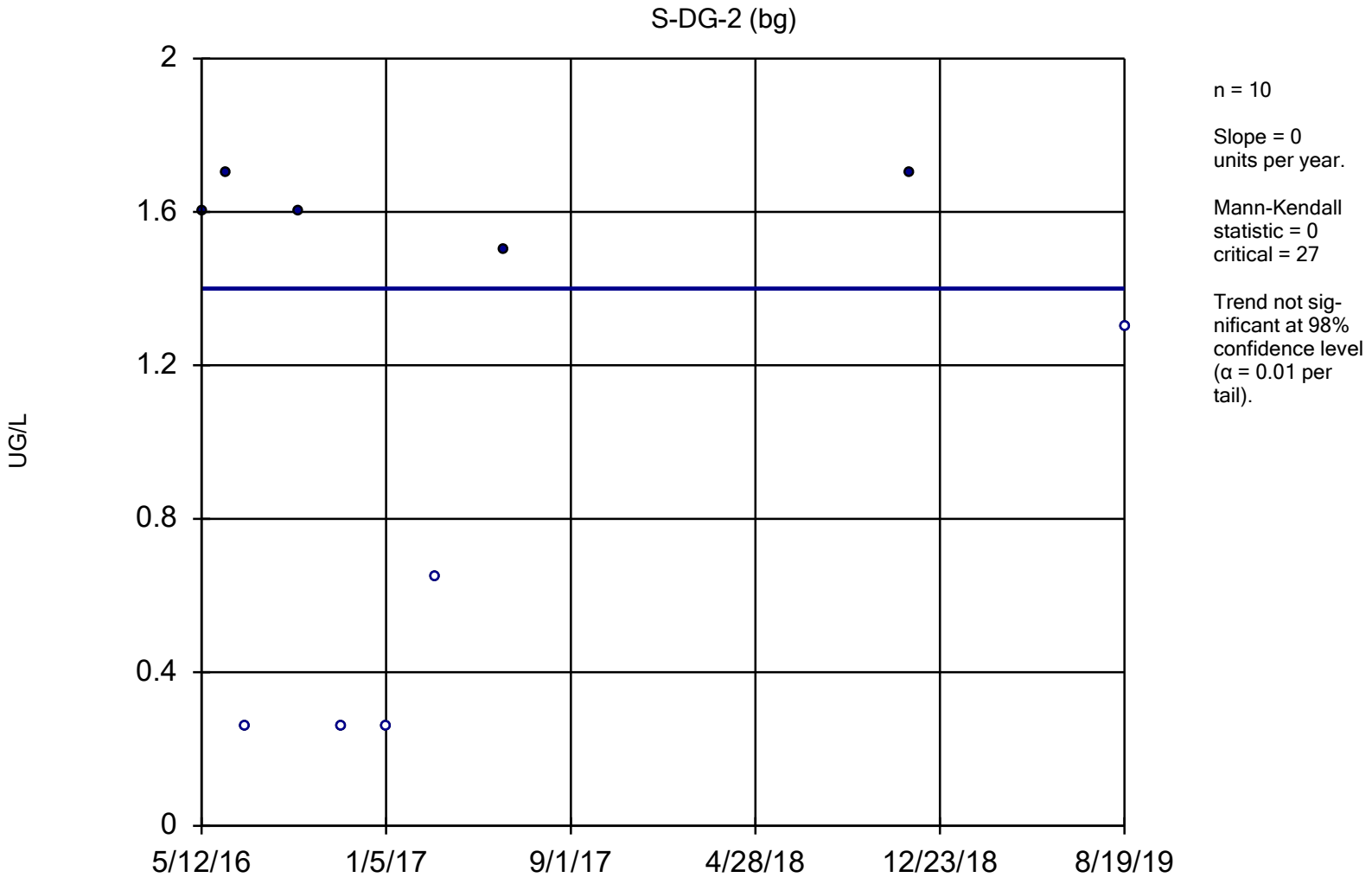
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

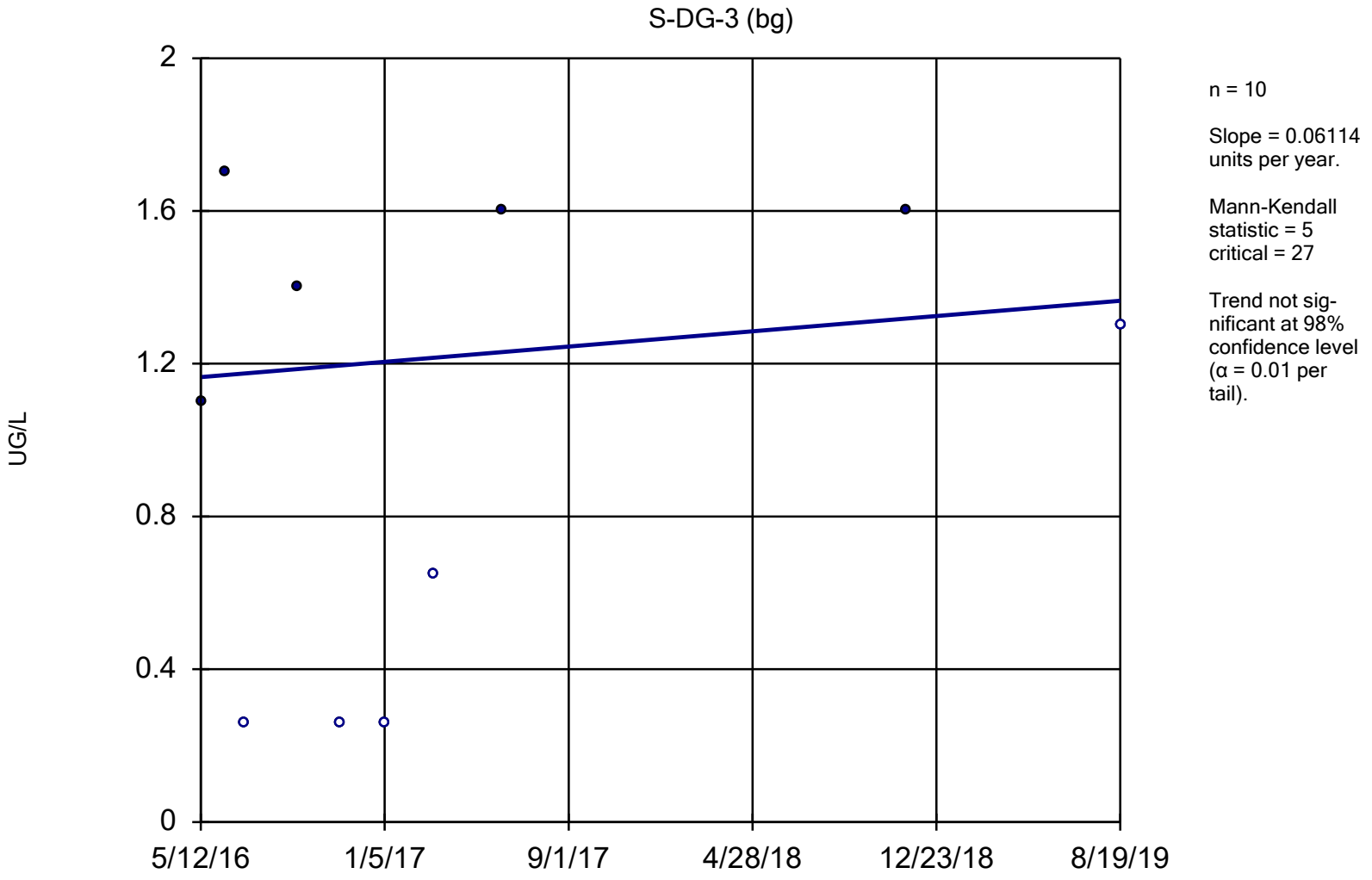


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator



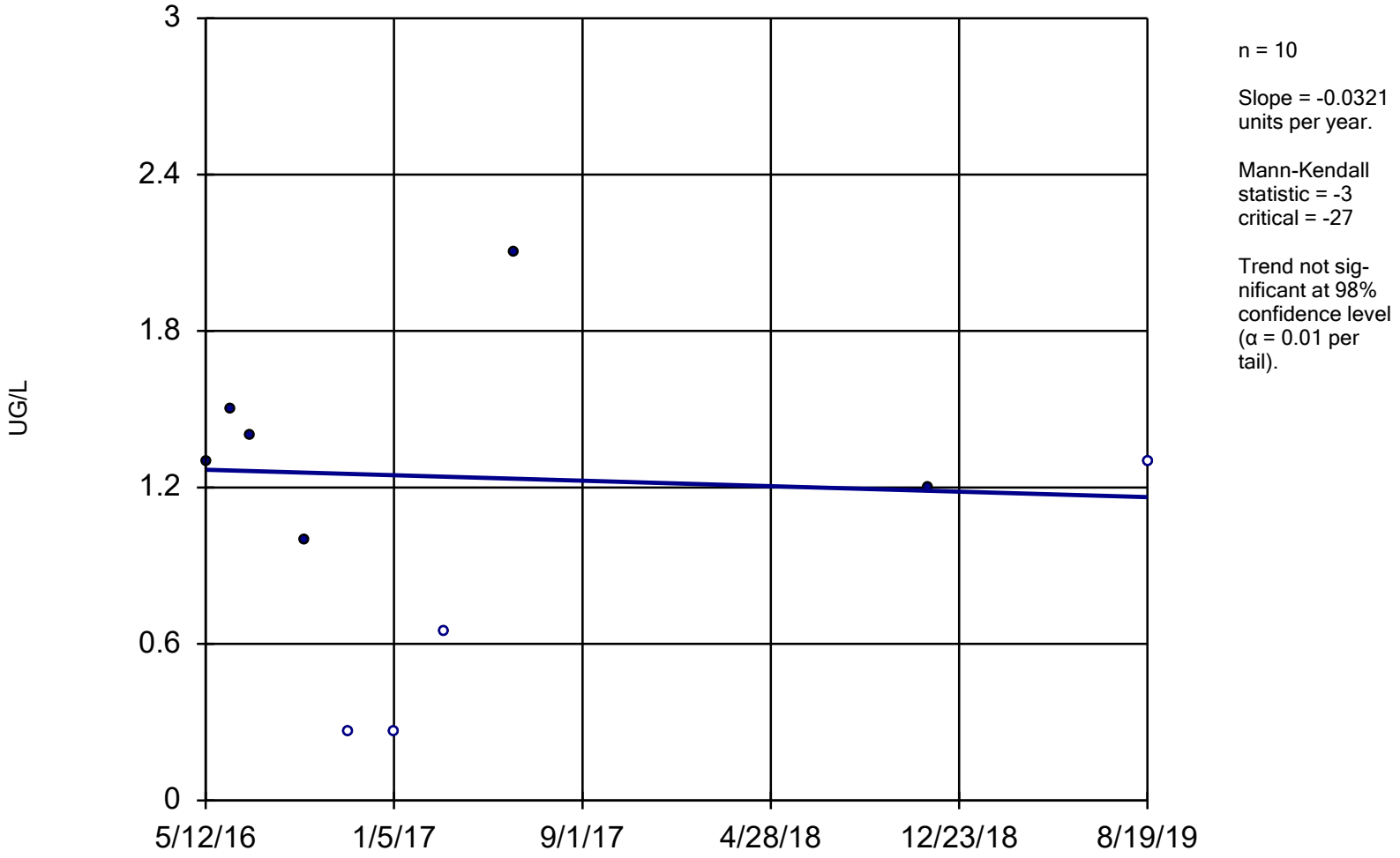
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-DG-4 (bg)



n = 10

Slope = -0.0321 units per year.

Mann-Kendall statistic = -3
critical = -27

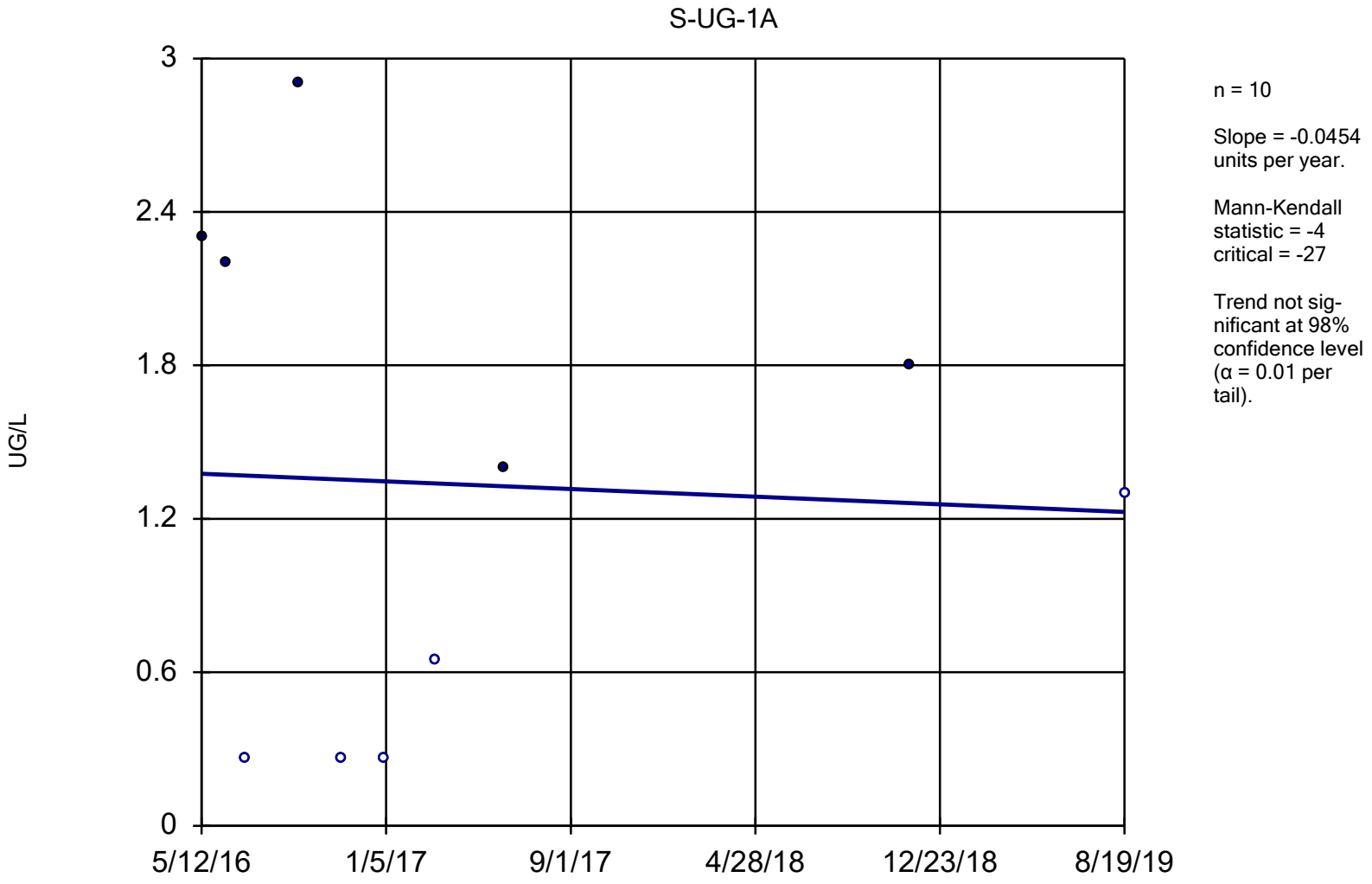
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

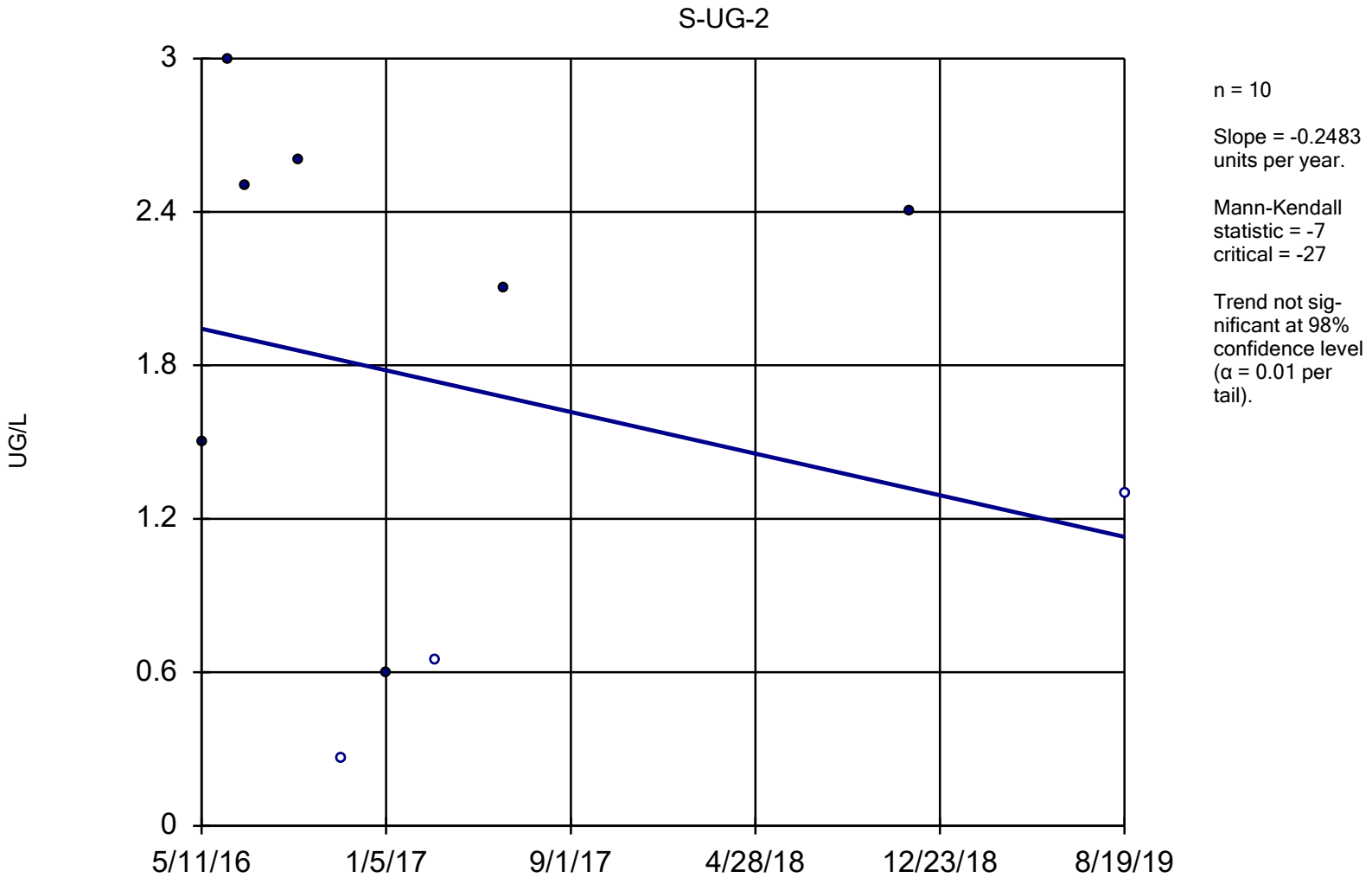


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

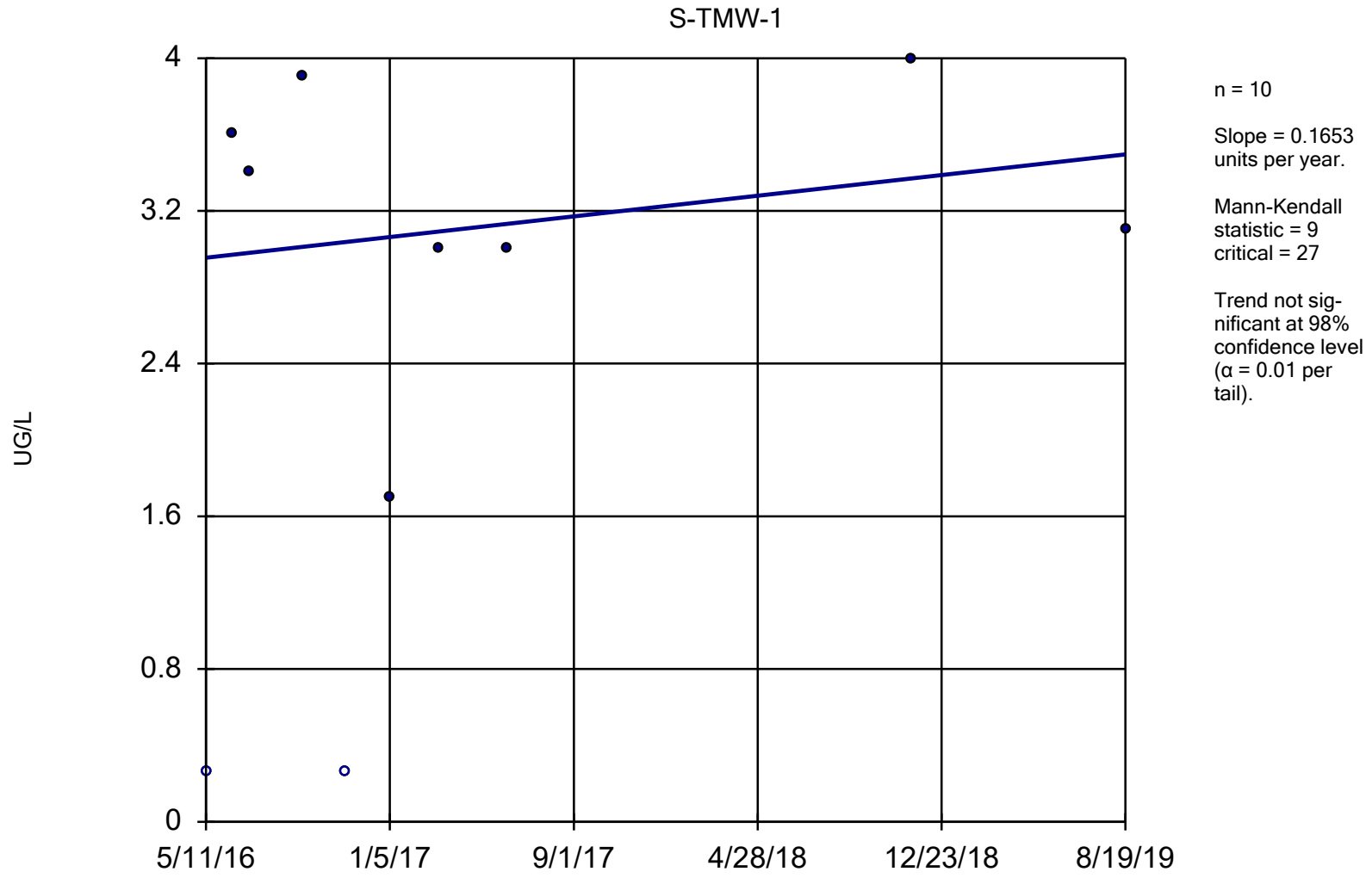


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

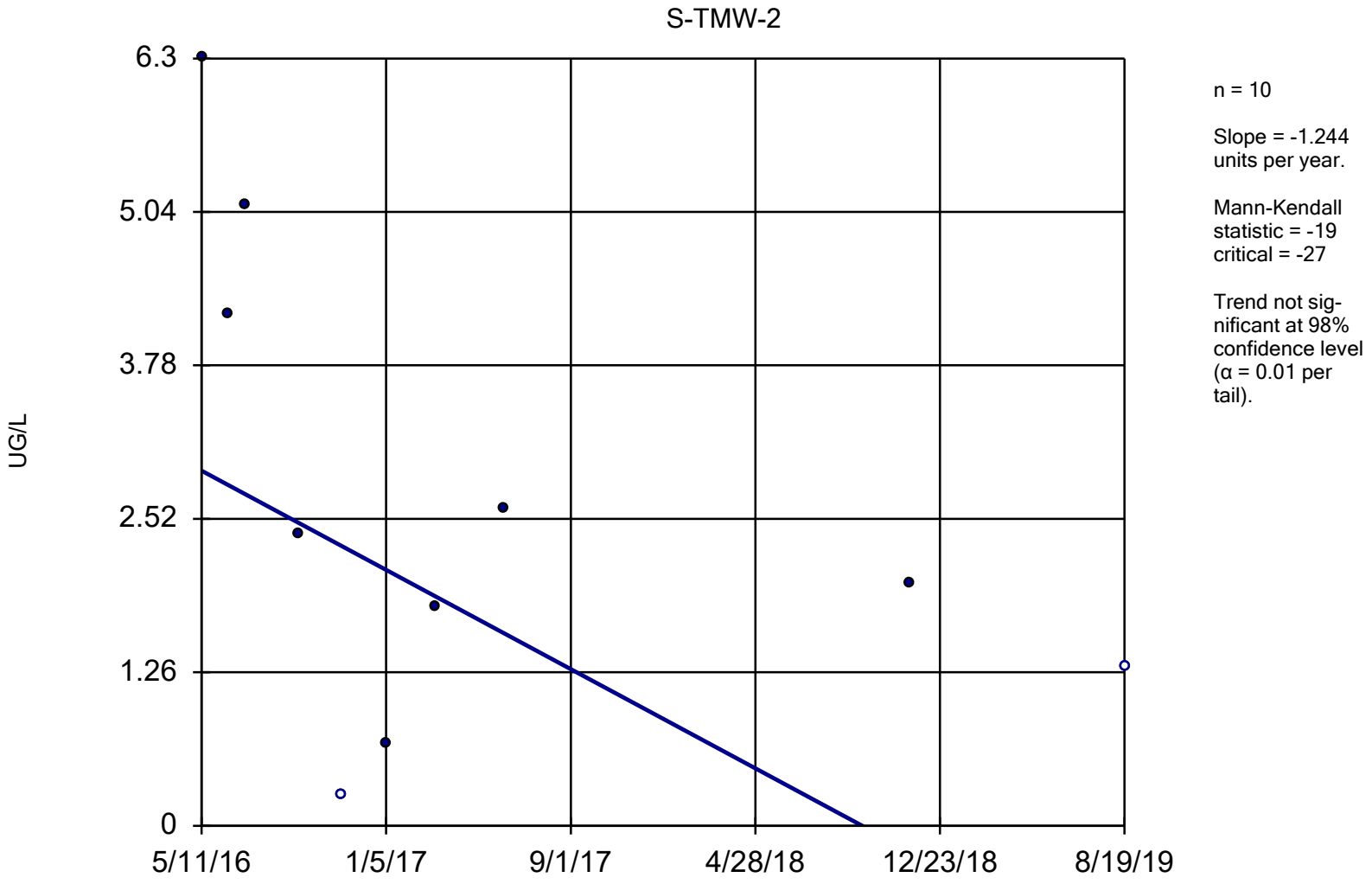


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

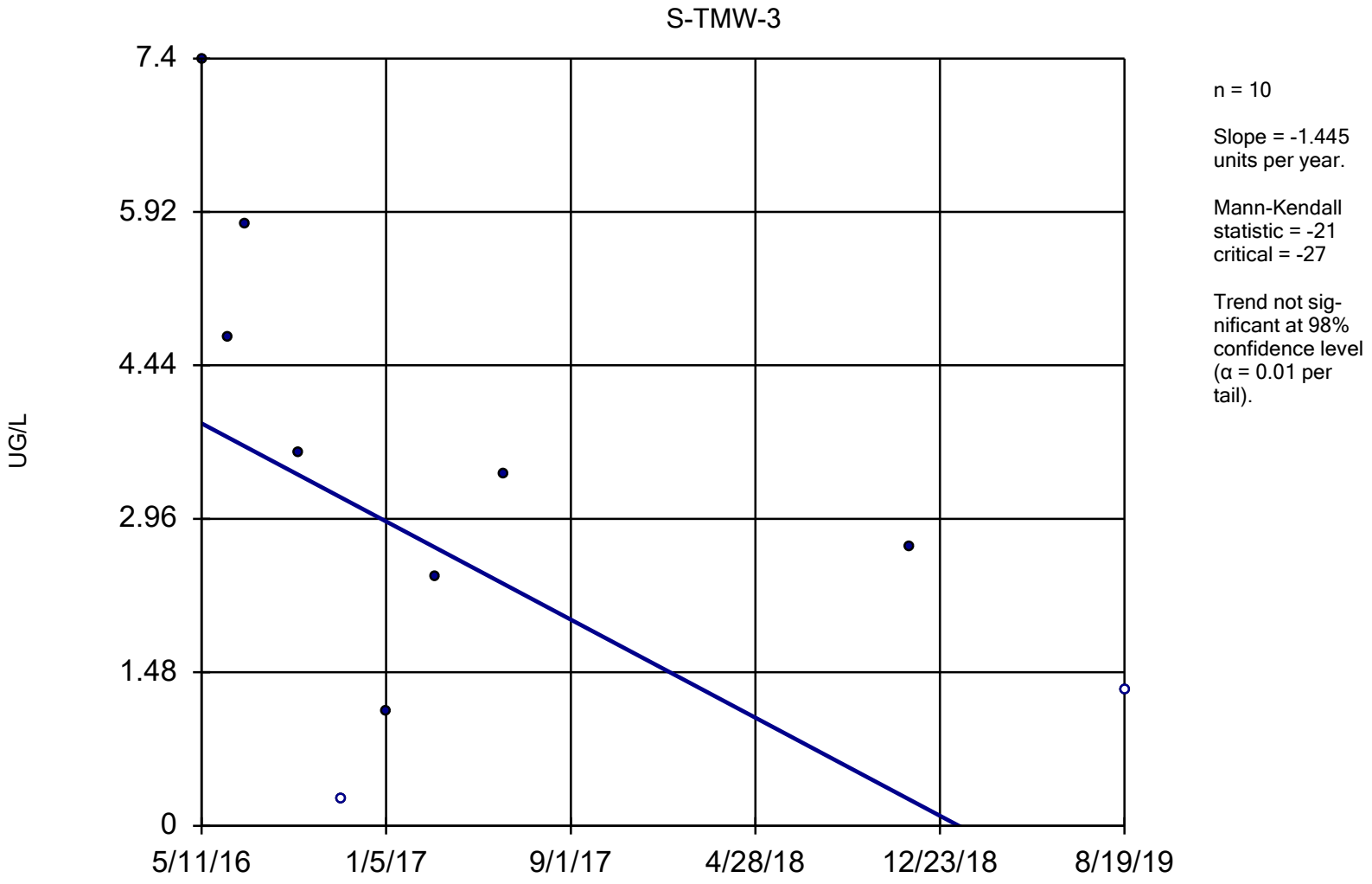


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator



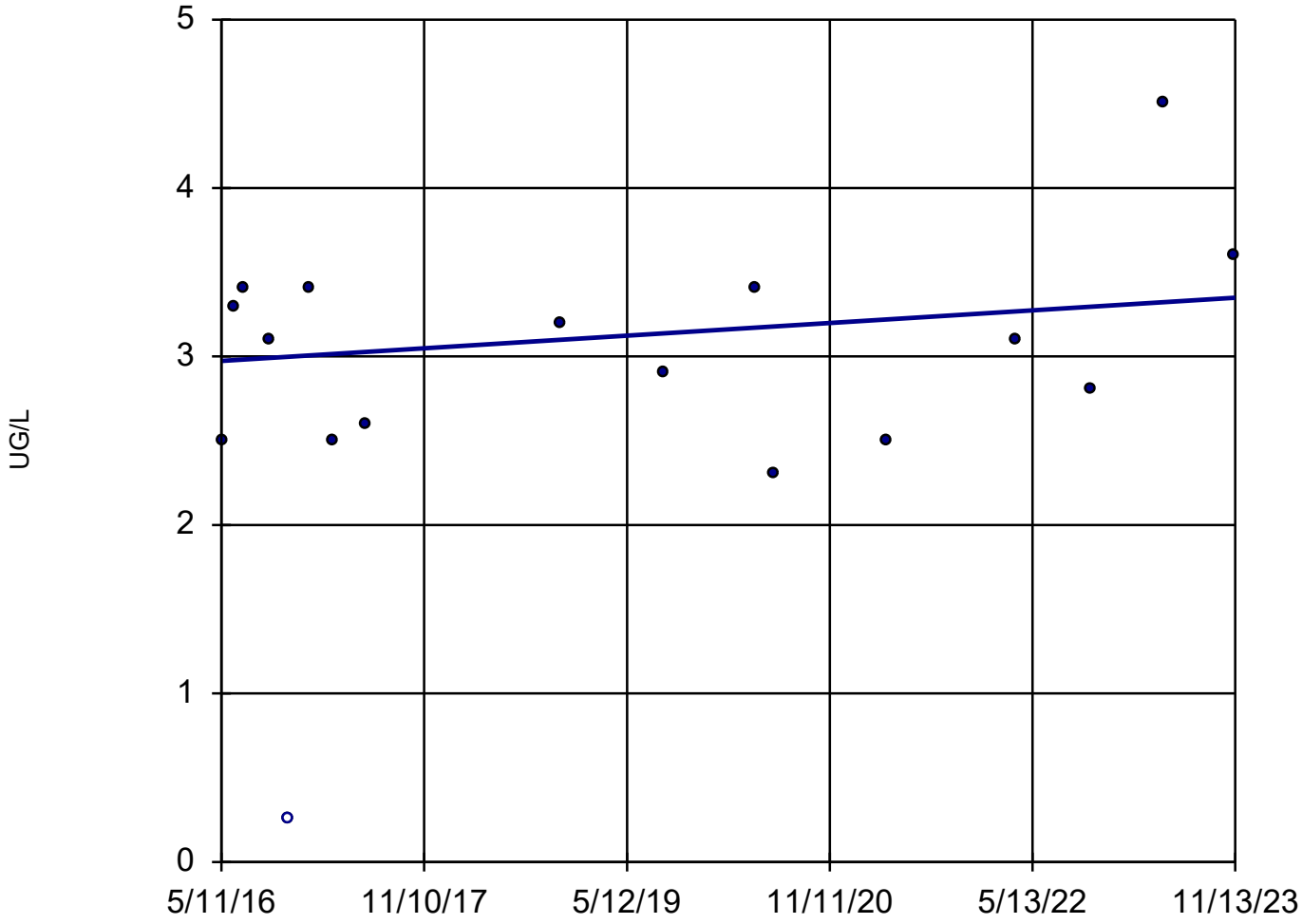
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-UG-3



n = 17

Slope = 0.04994 units per year.

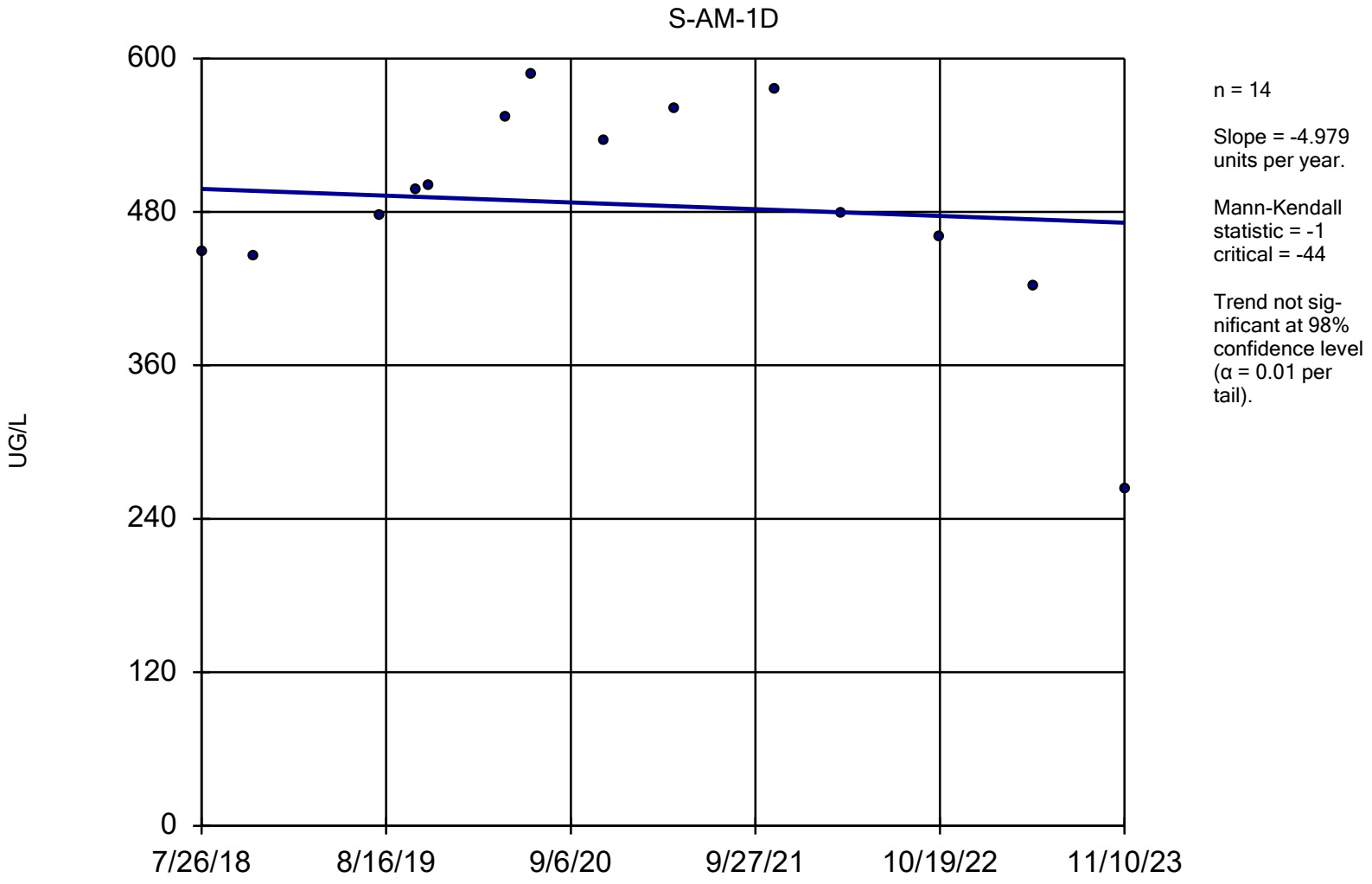
Mann-Kendall statistic = 21
critical = 58

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

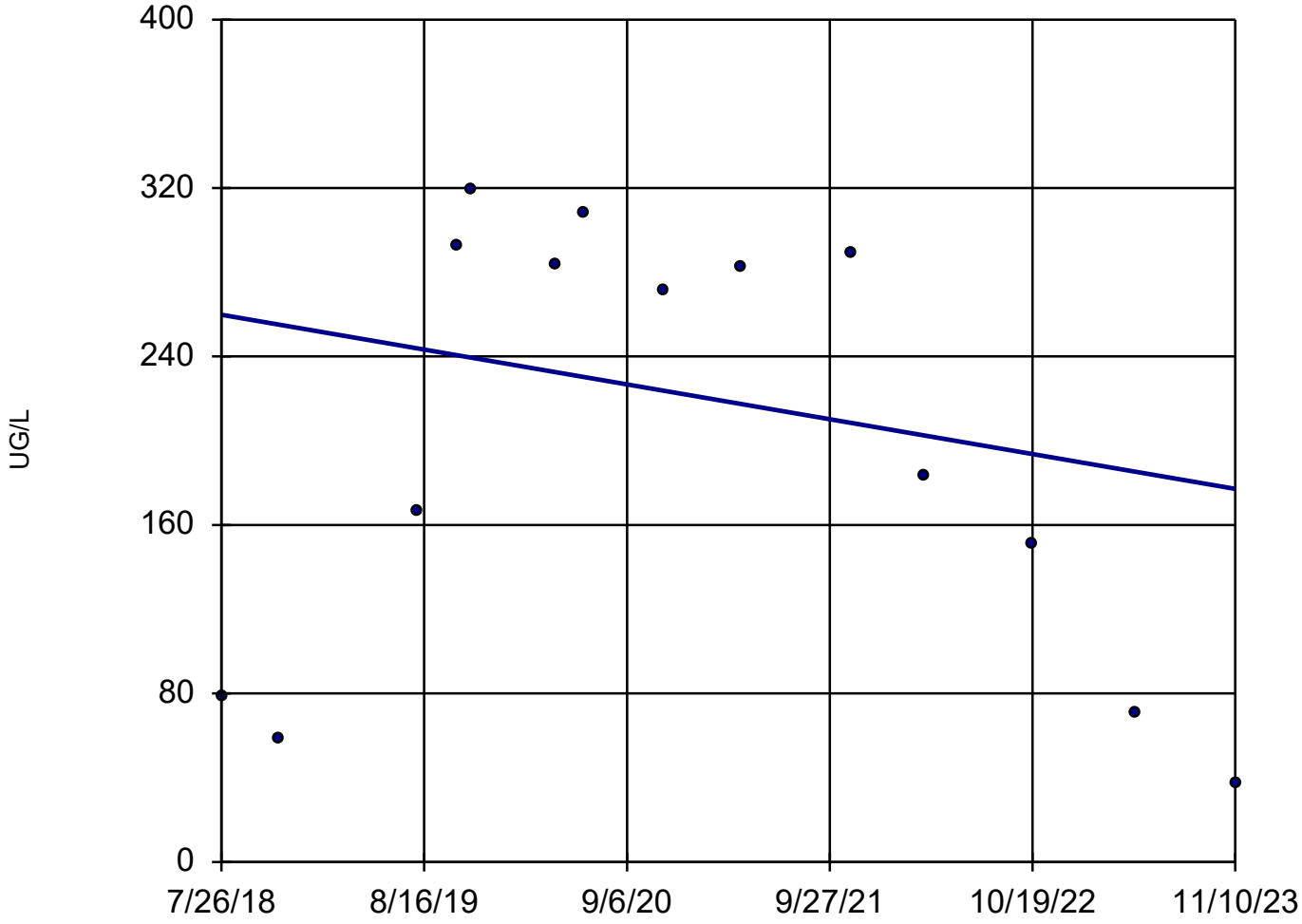


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-AM-1S



n = 14

Slope = -15.61 units per year.

Mann-Kendall statistic = -19 critical = -44

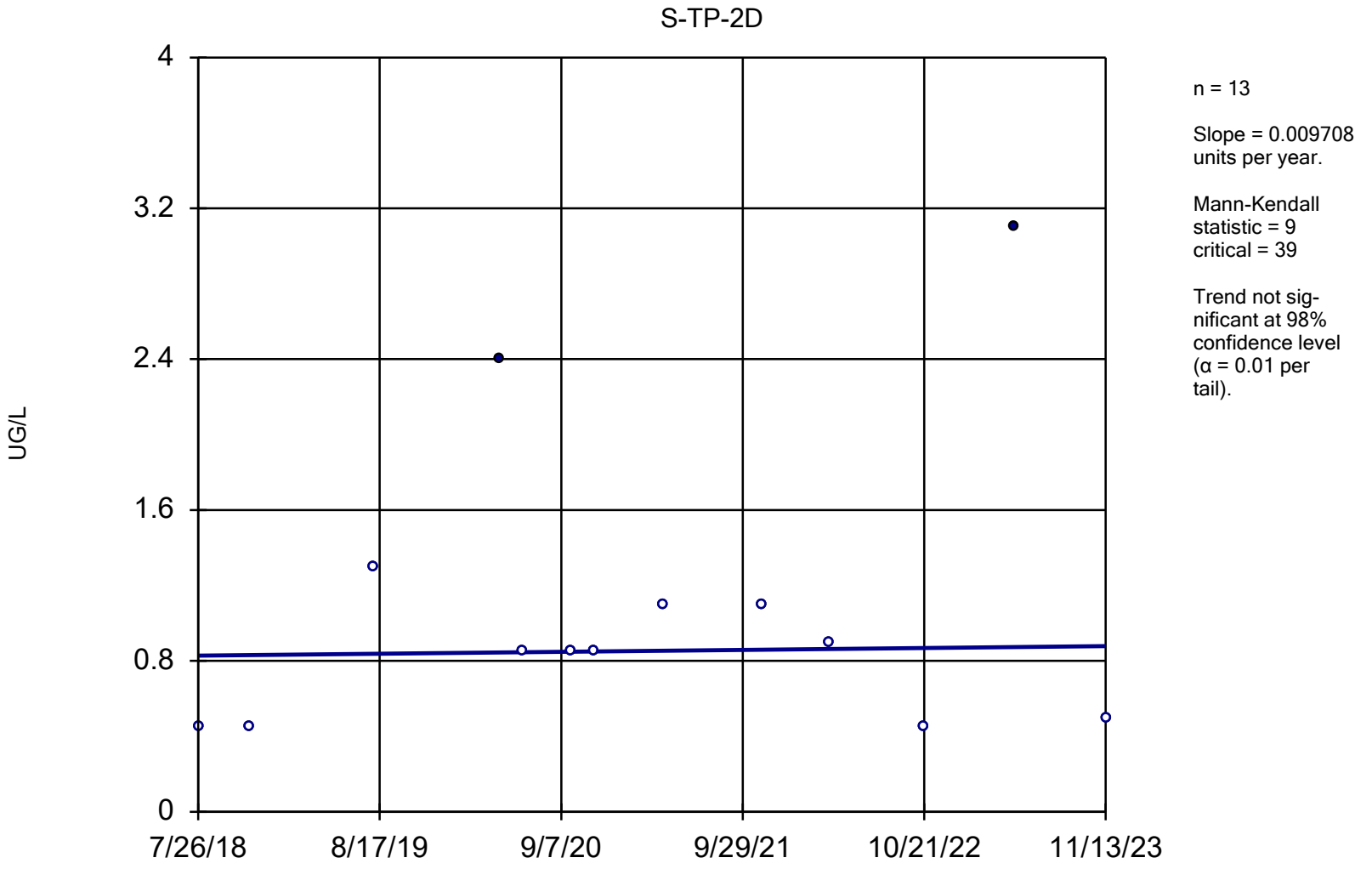
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

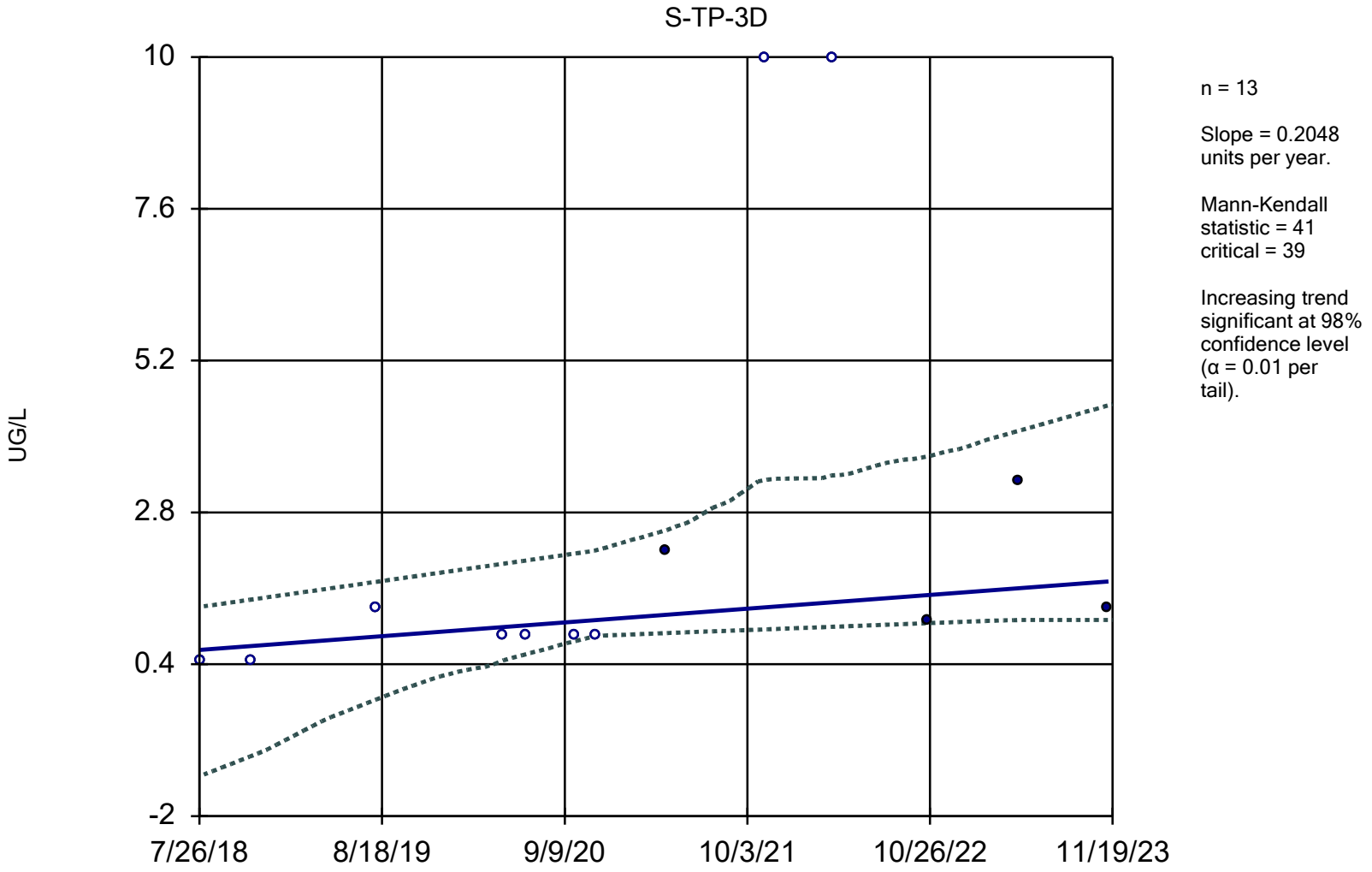


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope and 95% Confidence Band

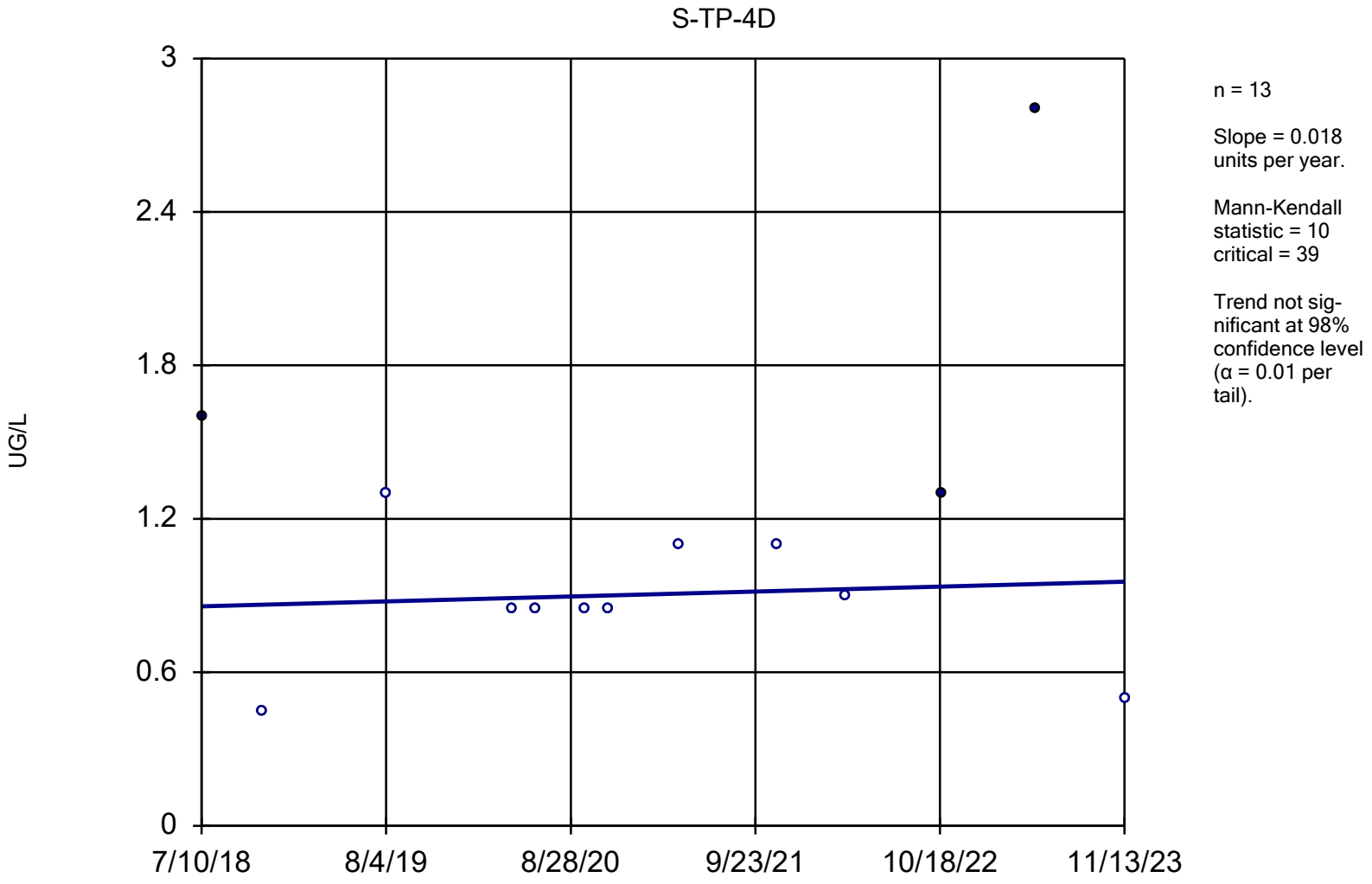


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

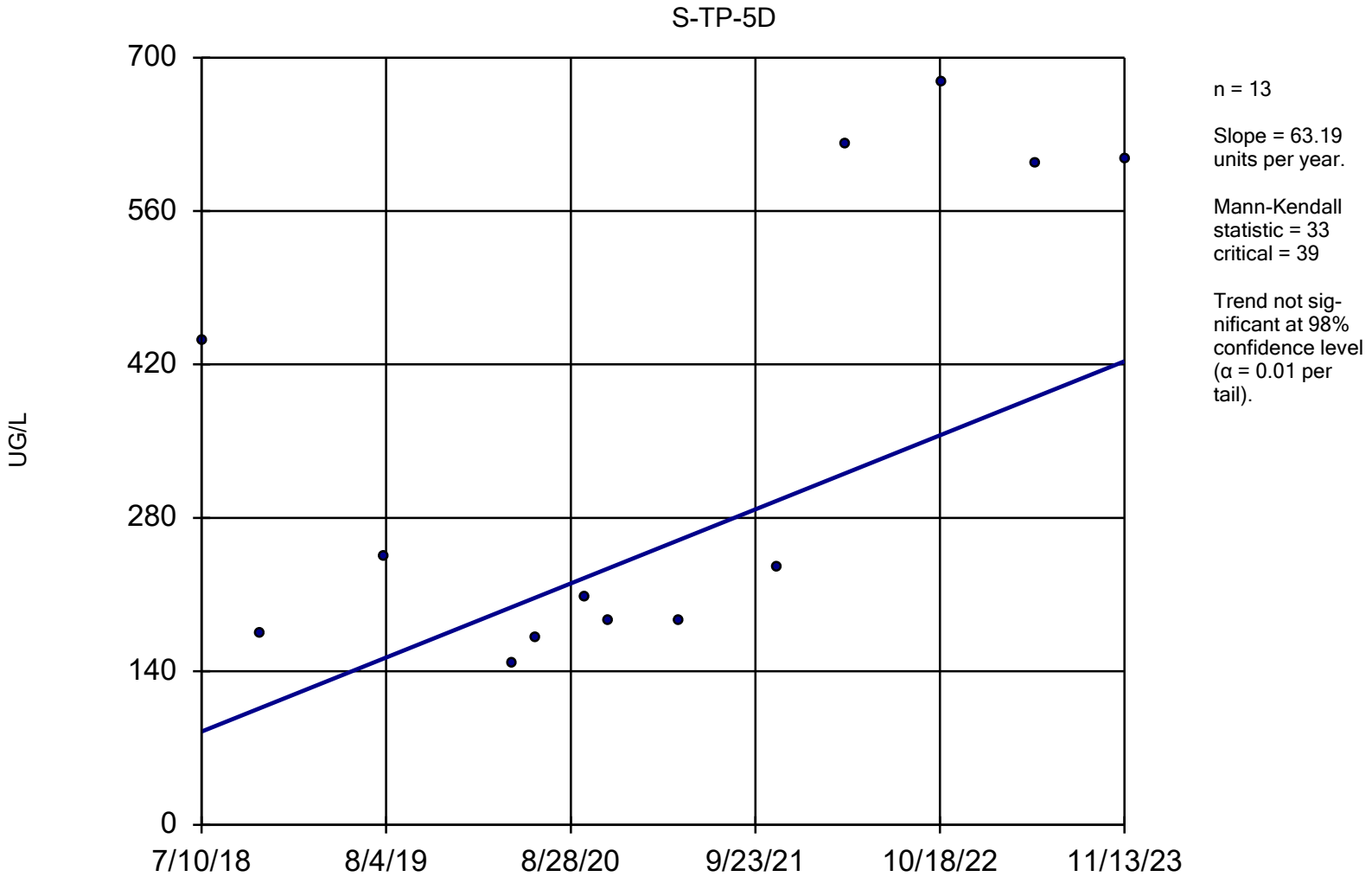
Sen's Slope Estimator



Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

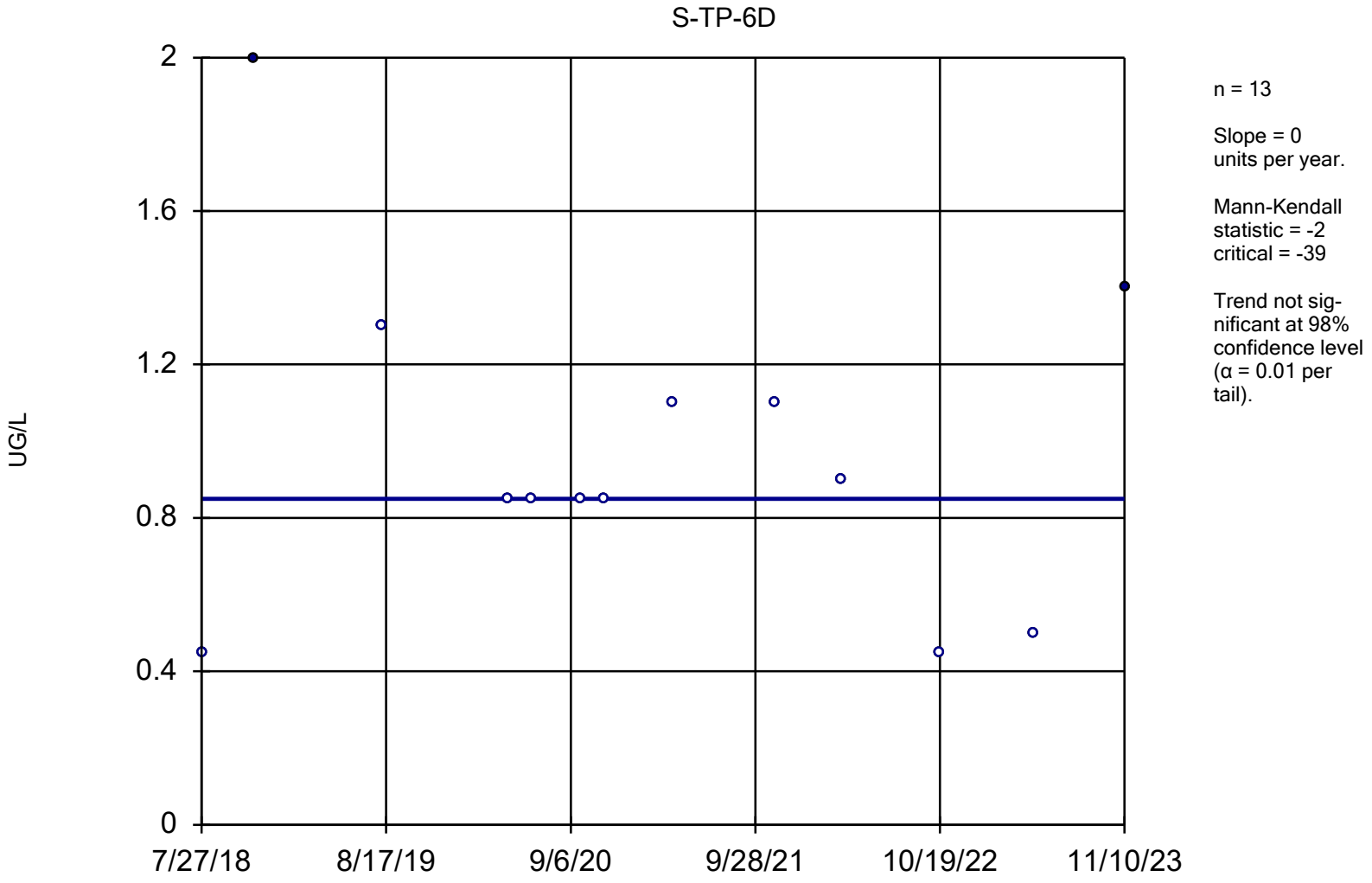


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

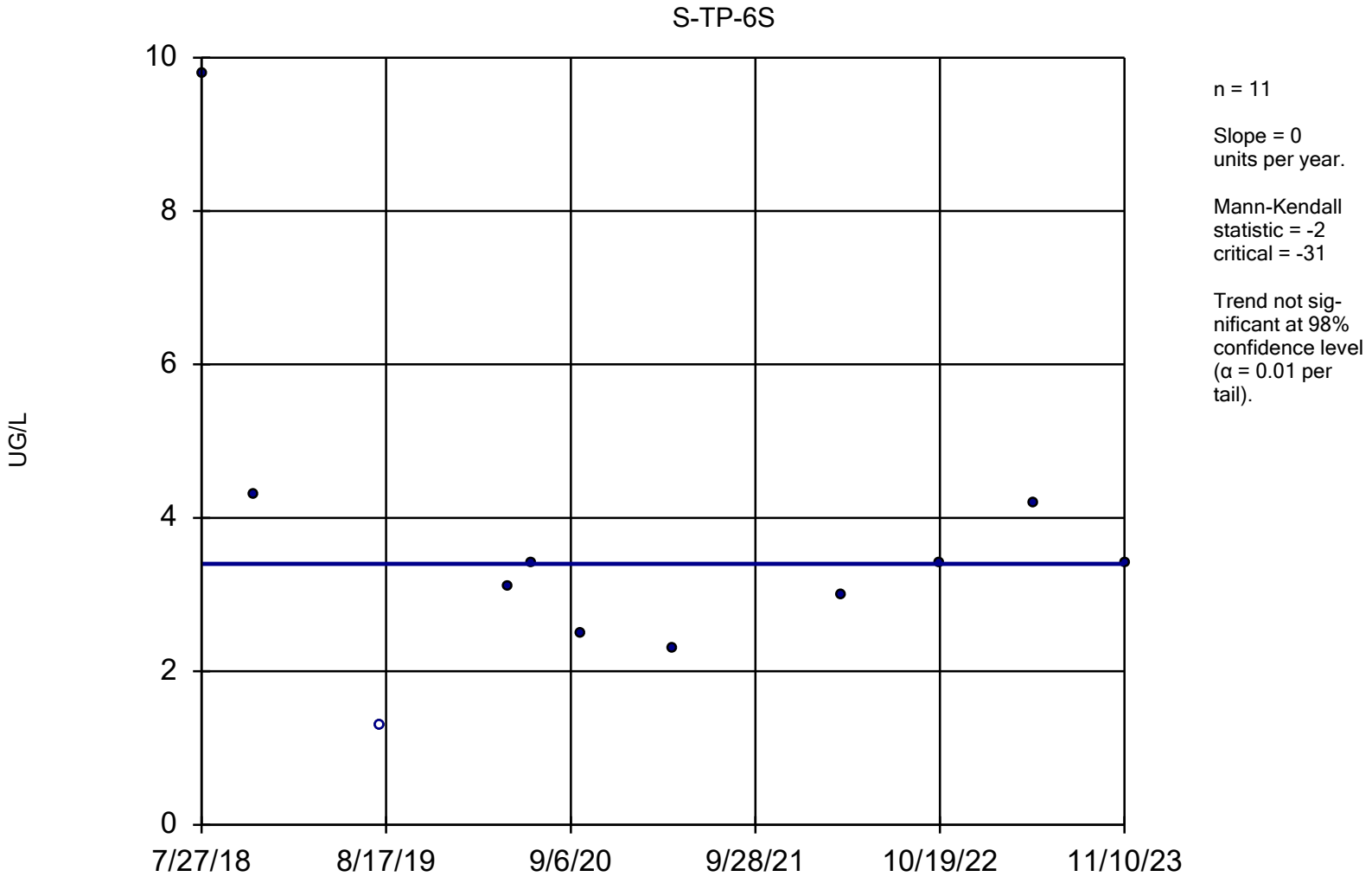


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

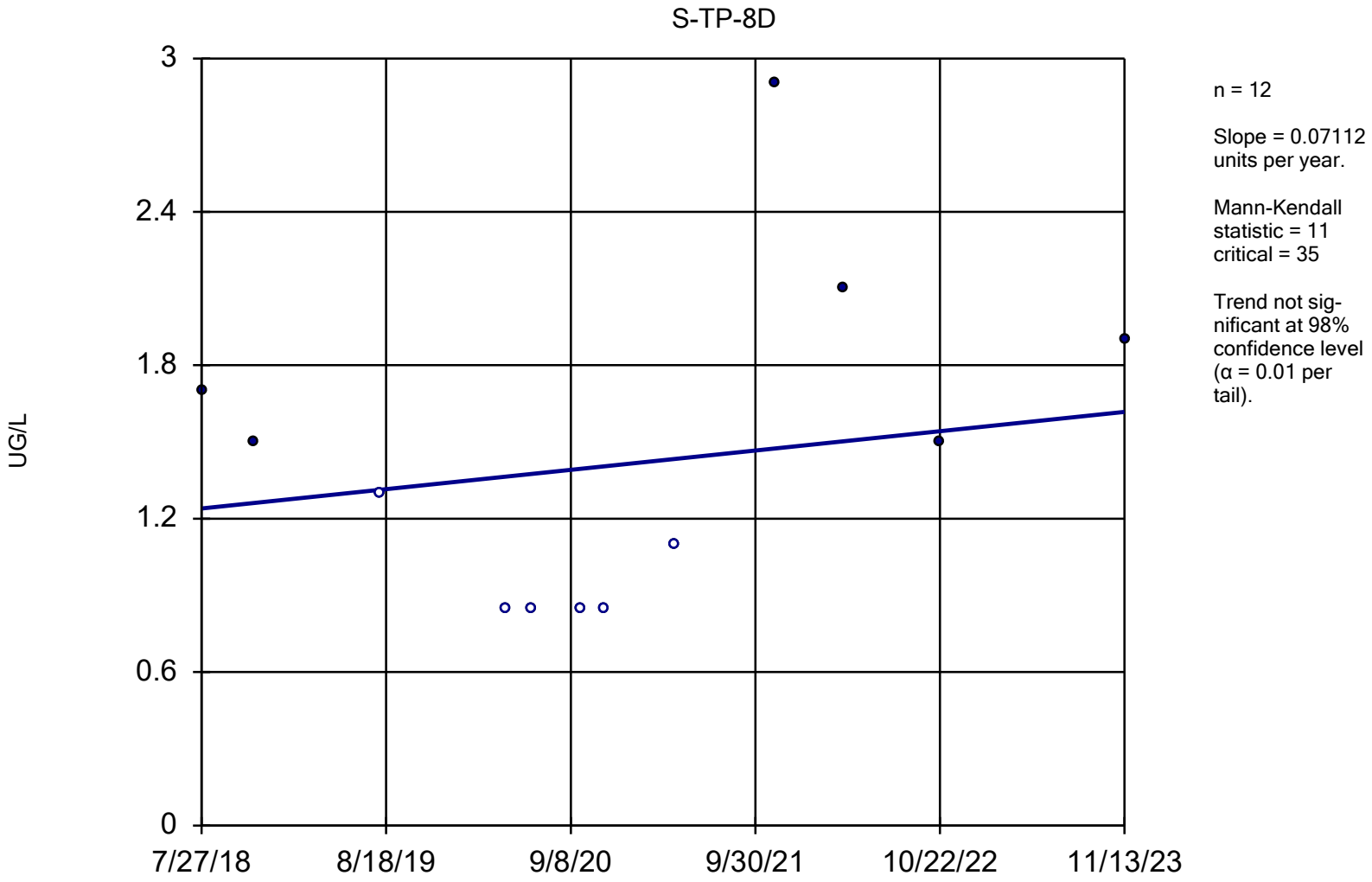


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator



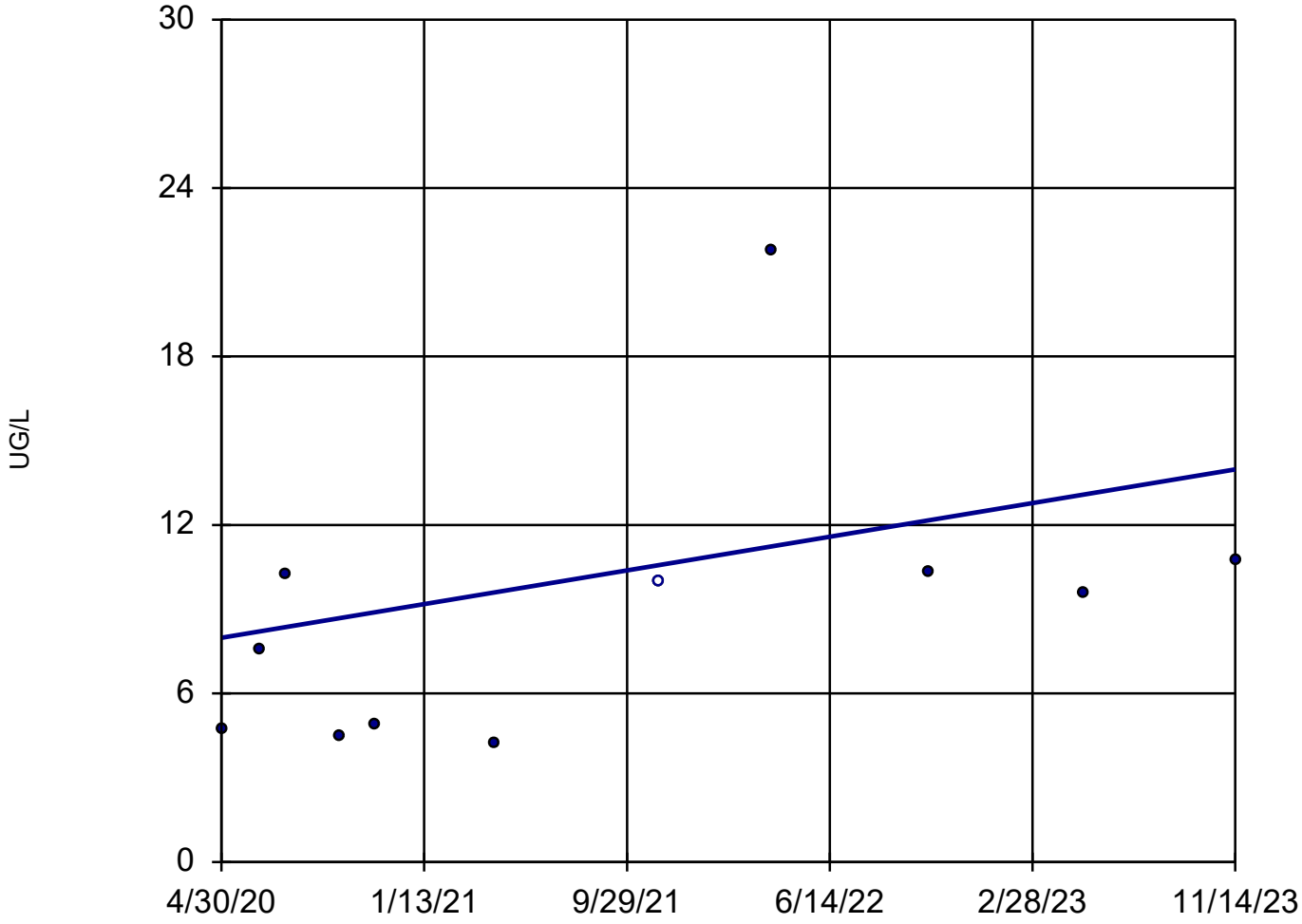
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-PZ-9D



n = 11

Slope = 1.694 units per year.

Mann-Kendall statistic = 21
critical = 31

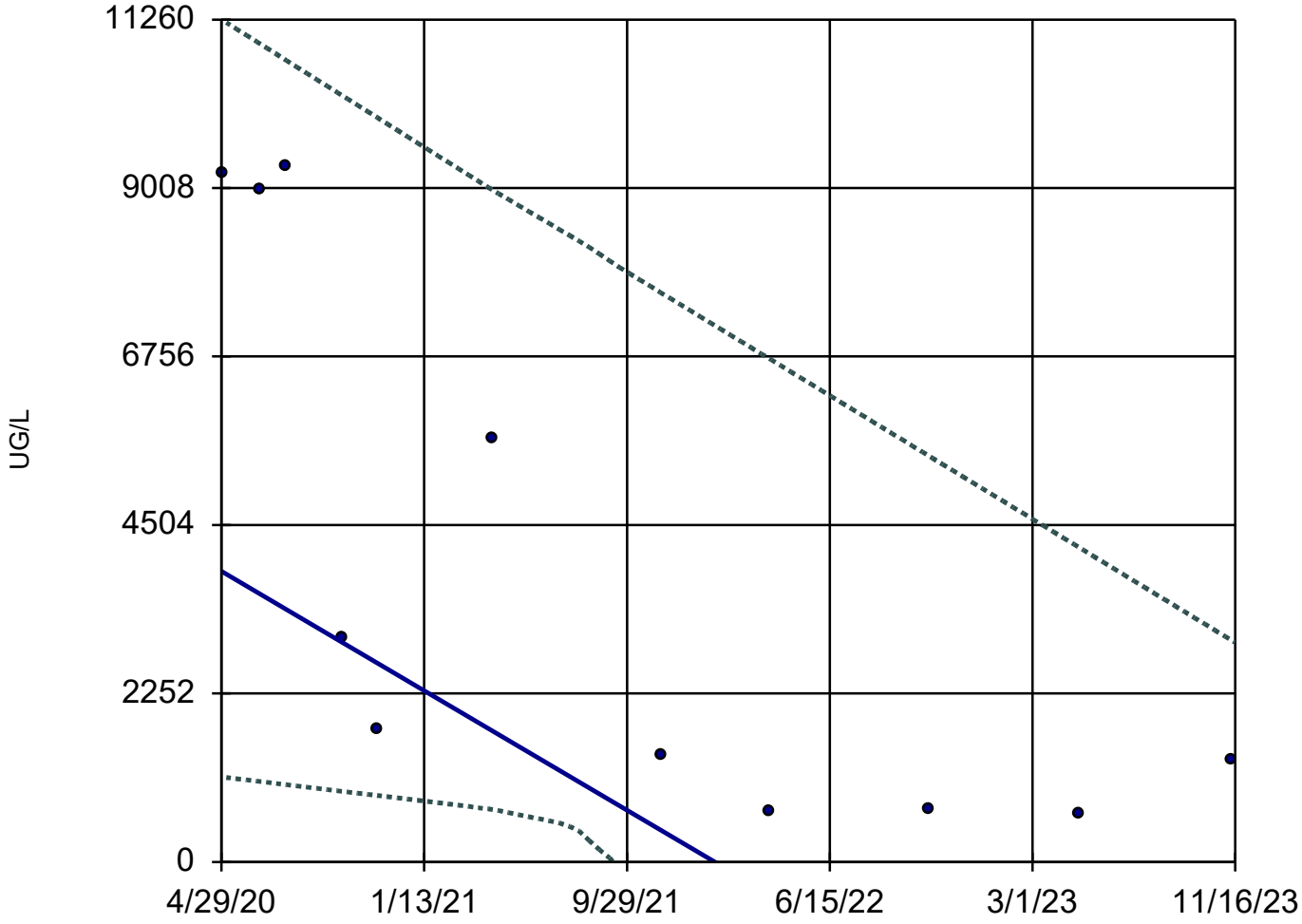
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:14 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-PZ-1S



n = 11

Slope = -2249 units per year.

Mann-Kendall statistic = -39
critical = -31

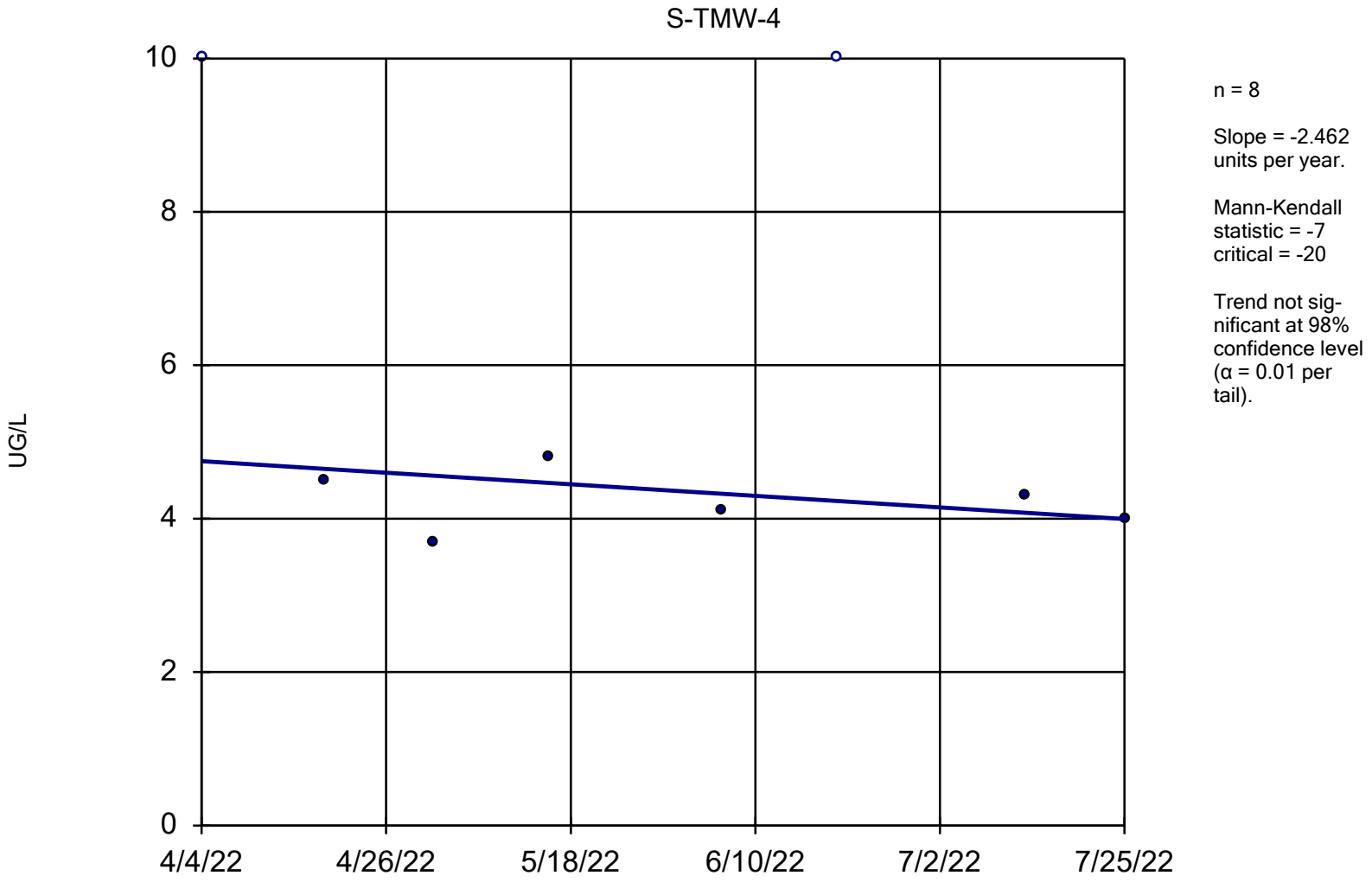
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:15 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

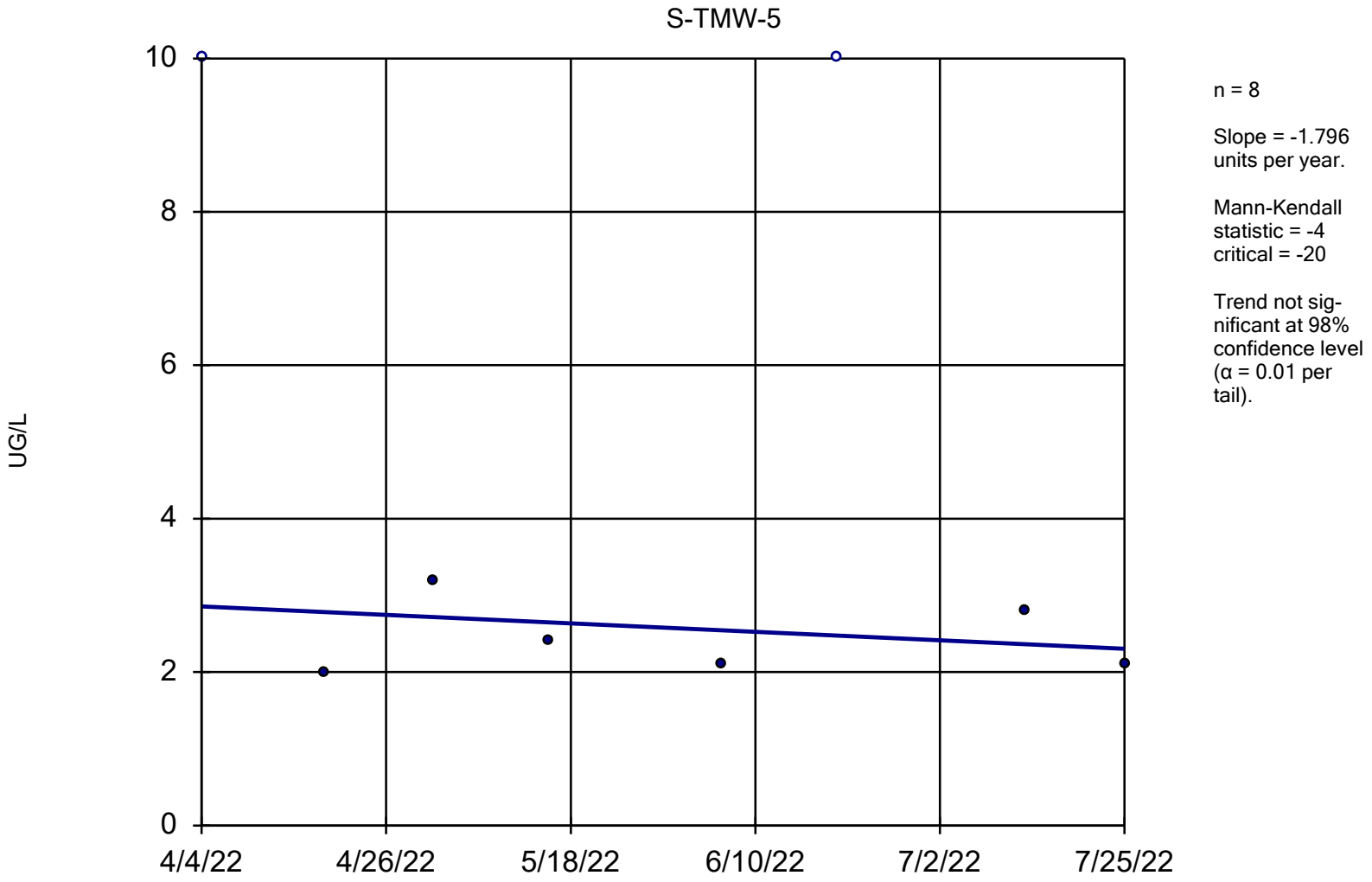


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:15 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

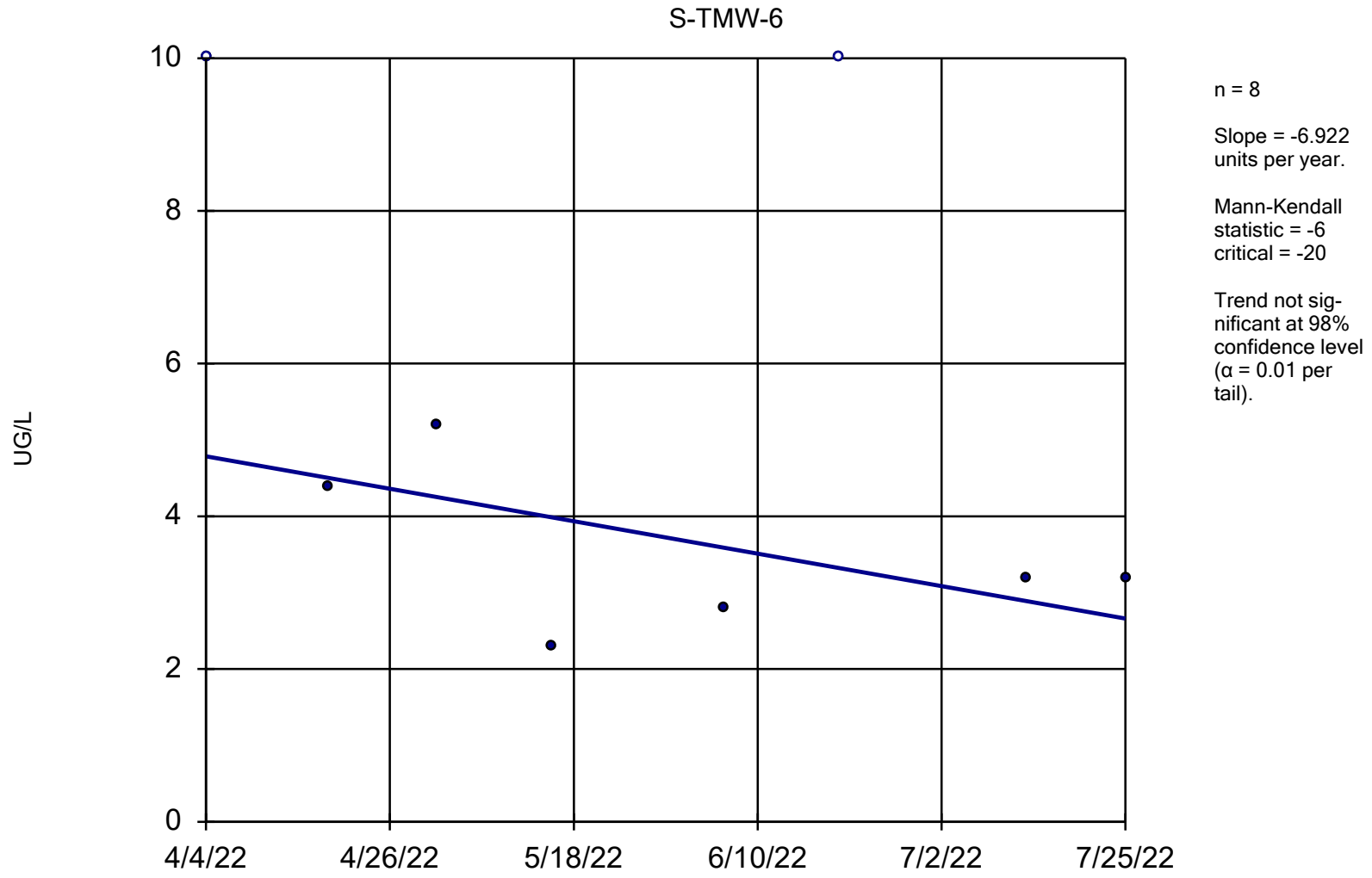


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:15 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator



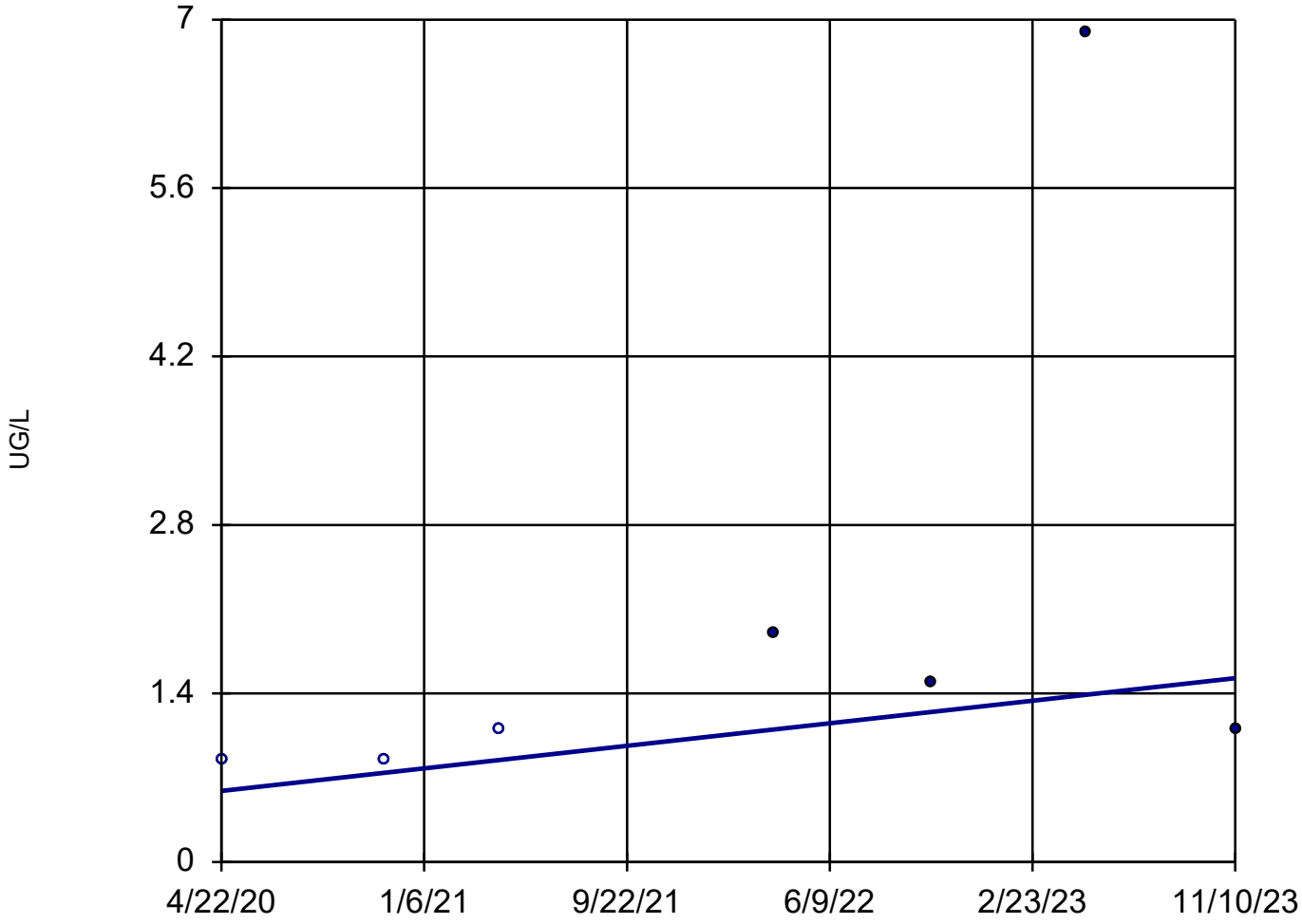
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 3:15 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-BMW-1D (bg)



n = 7

Slope = 0.264 units per year.

Mann-Kendall statistic = 11
critical = 17

Trend not significant at 98% confidence level (α = 0.01 per tail).

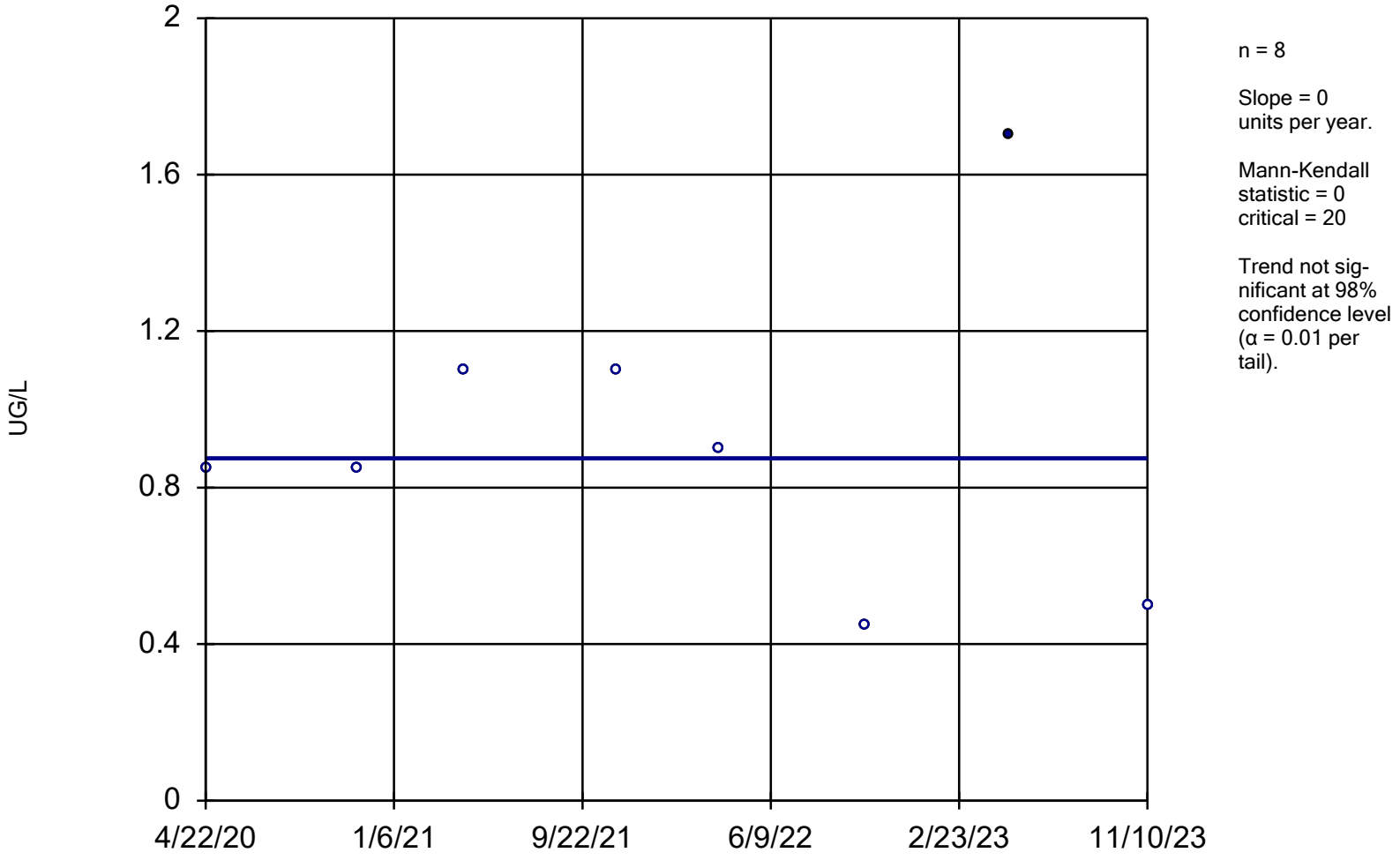
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:31 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-BMW-3D (bg)

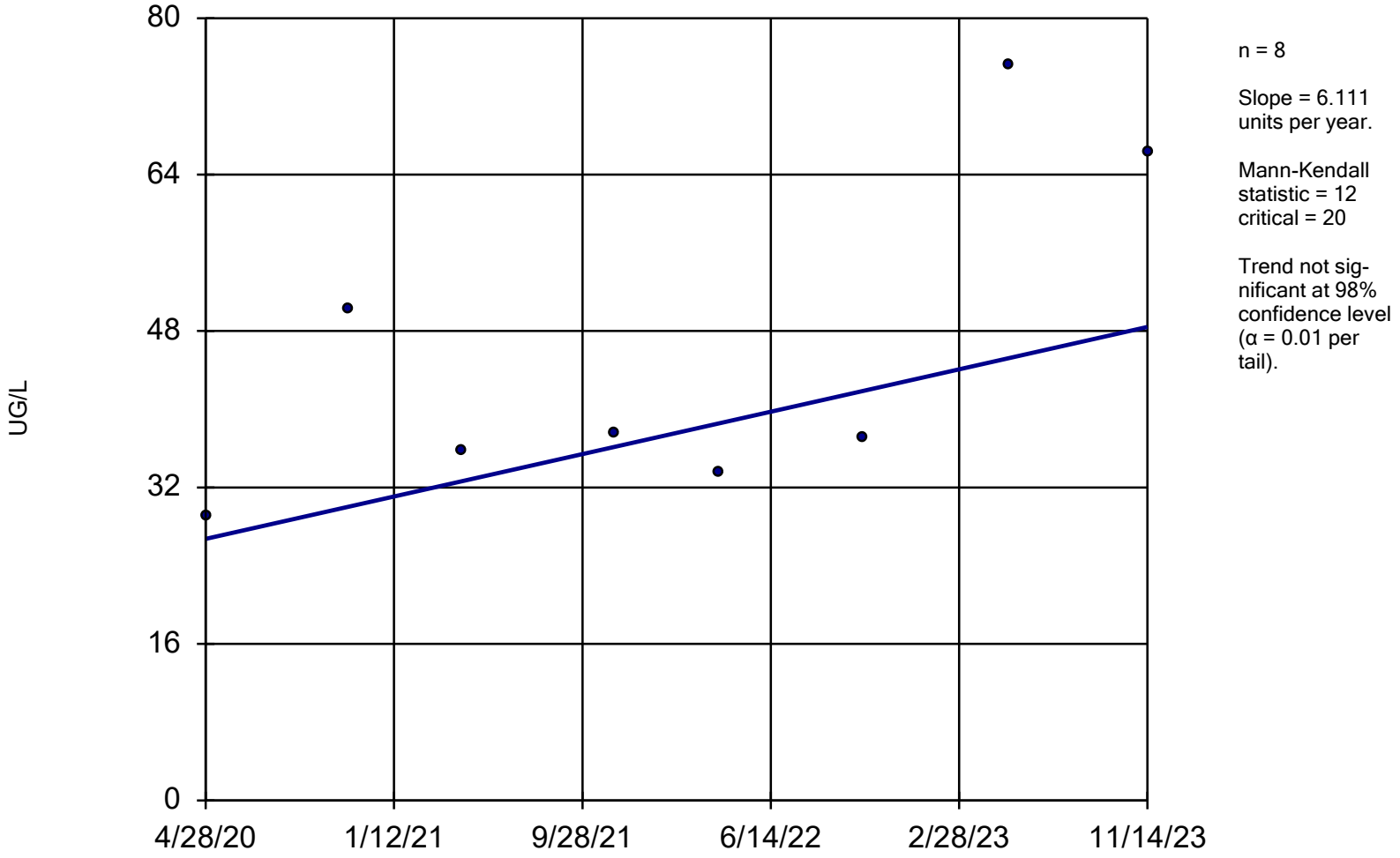


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-UMW-1D



n = 8

Slope = 6.111 units per year.

Mann-Kendall statistic = 12
critical = 20

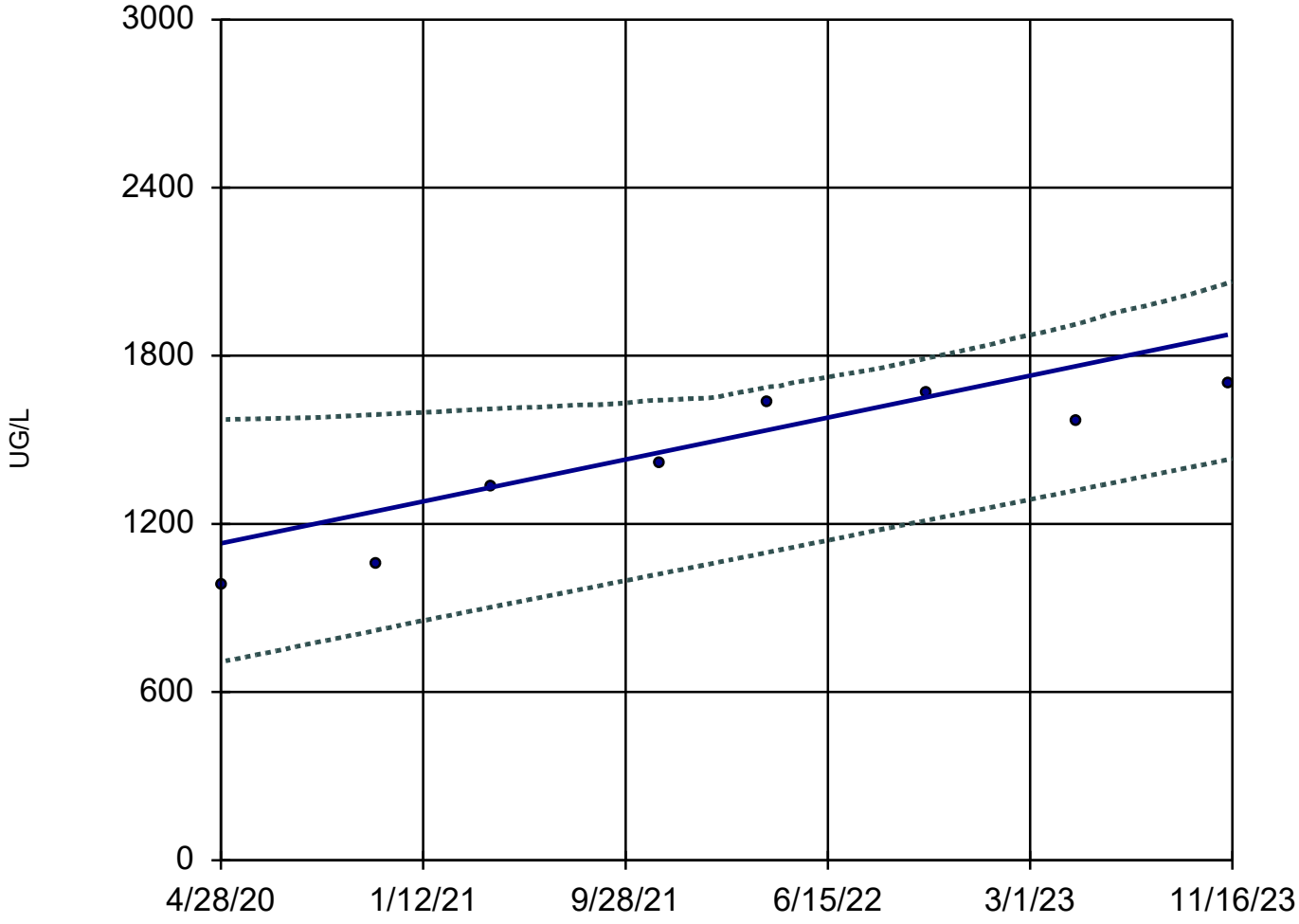
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-UMW-2D



n = 8

Slope = 210.5 units per year.

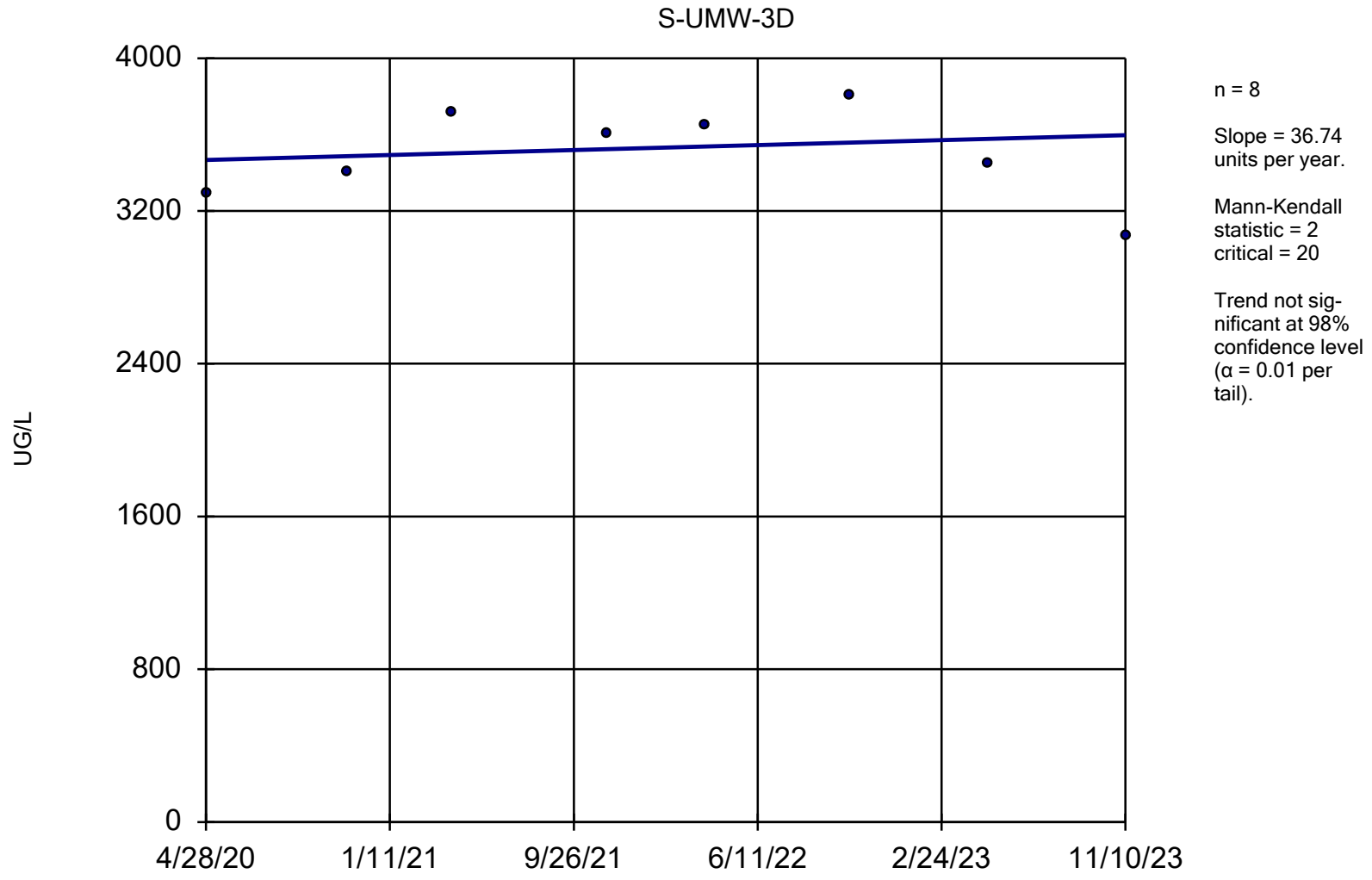
Mann-Kendall statistic = 24
critical = 20

Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

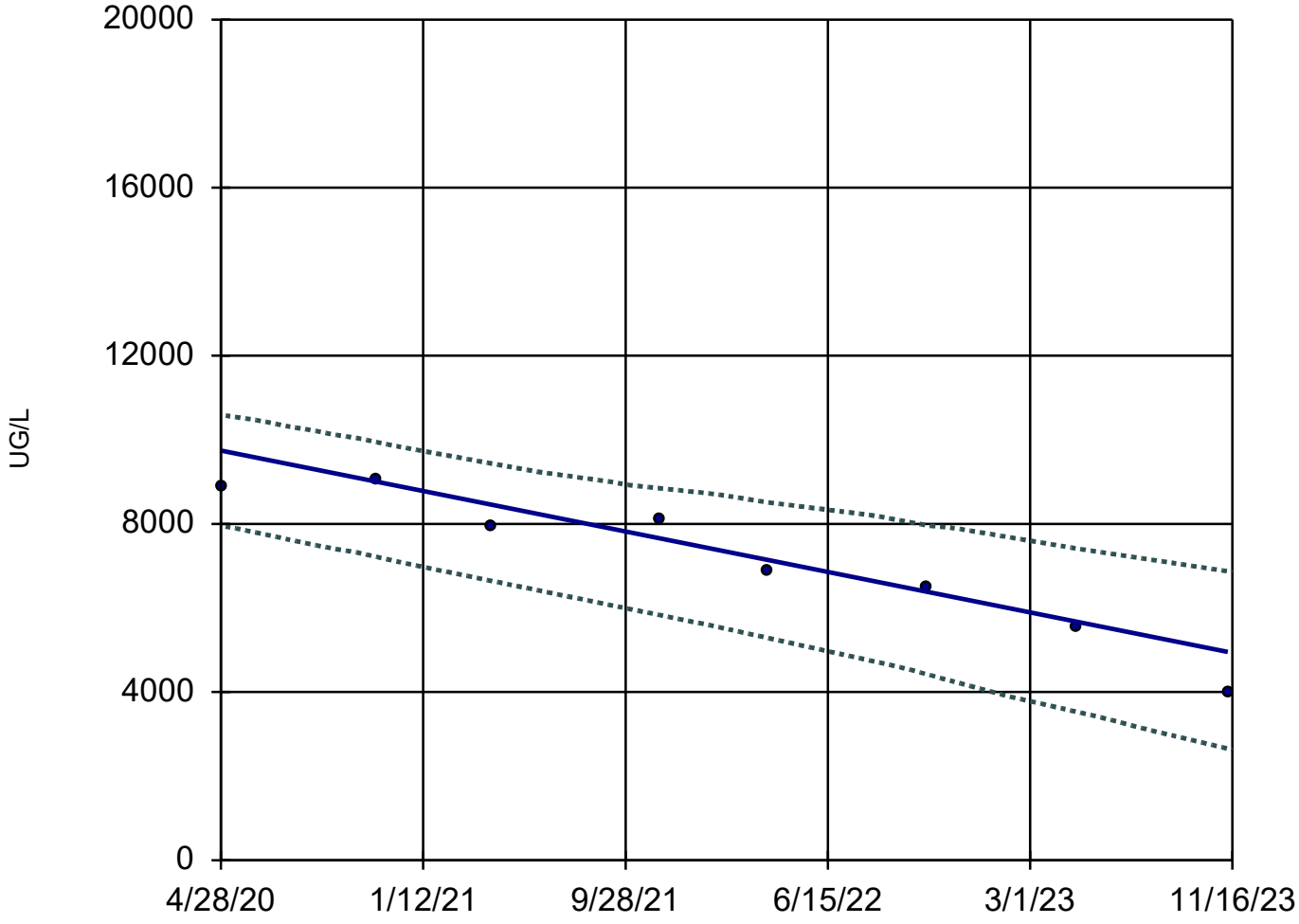


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-UMW-4D



n = 8

Slope = -1354 units per year.

Mann-Kendall statistic = -24 critical = -20

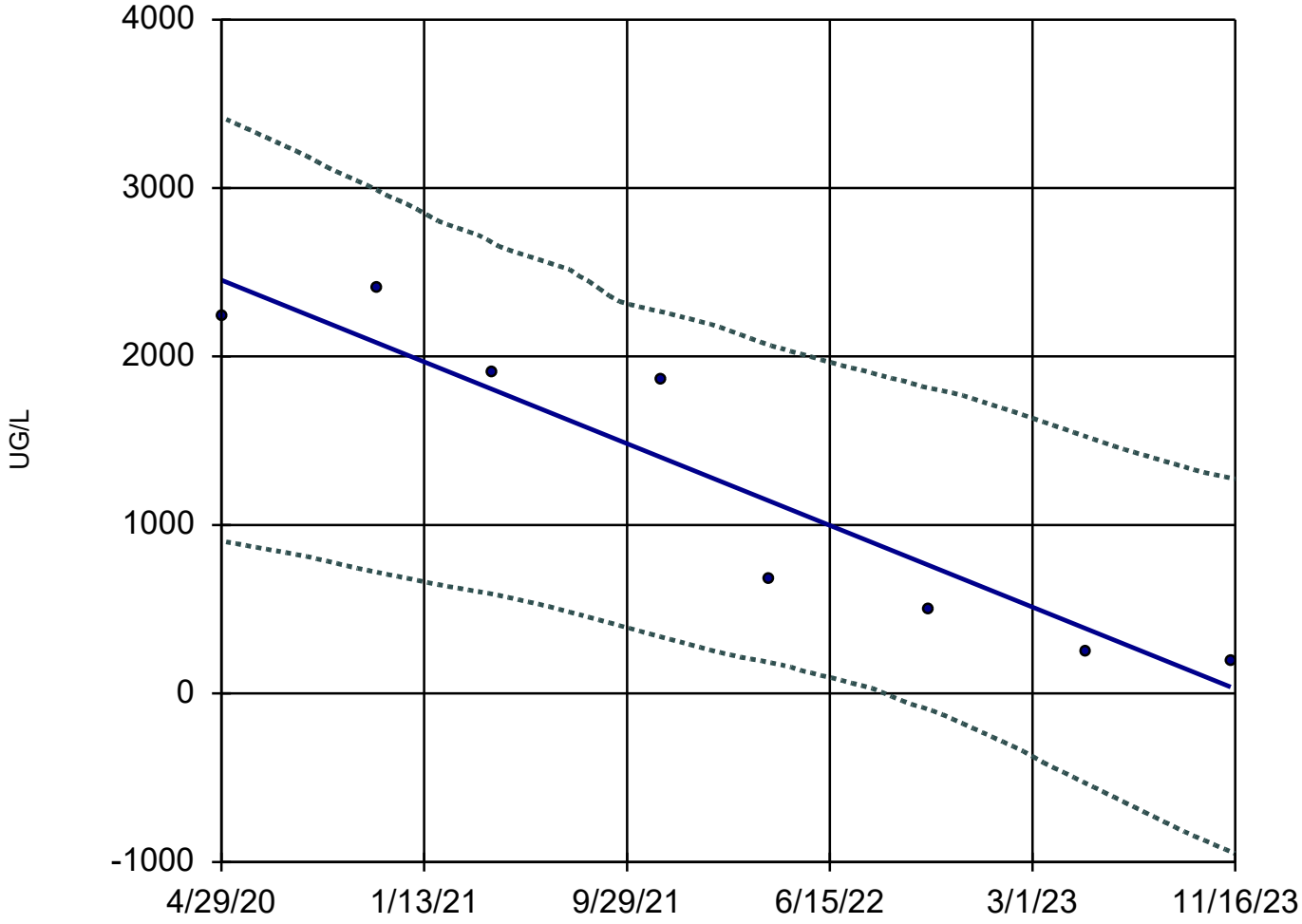
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-UMW-5D



n = 8

Slope = -683.2 units per year.

Mann-Kendall statistic = -26
critical = -20

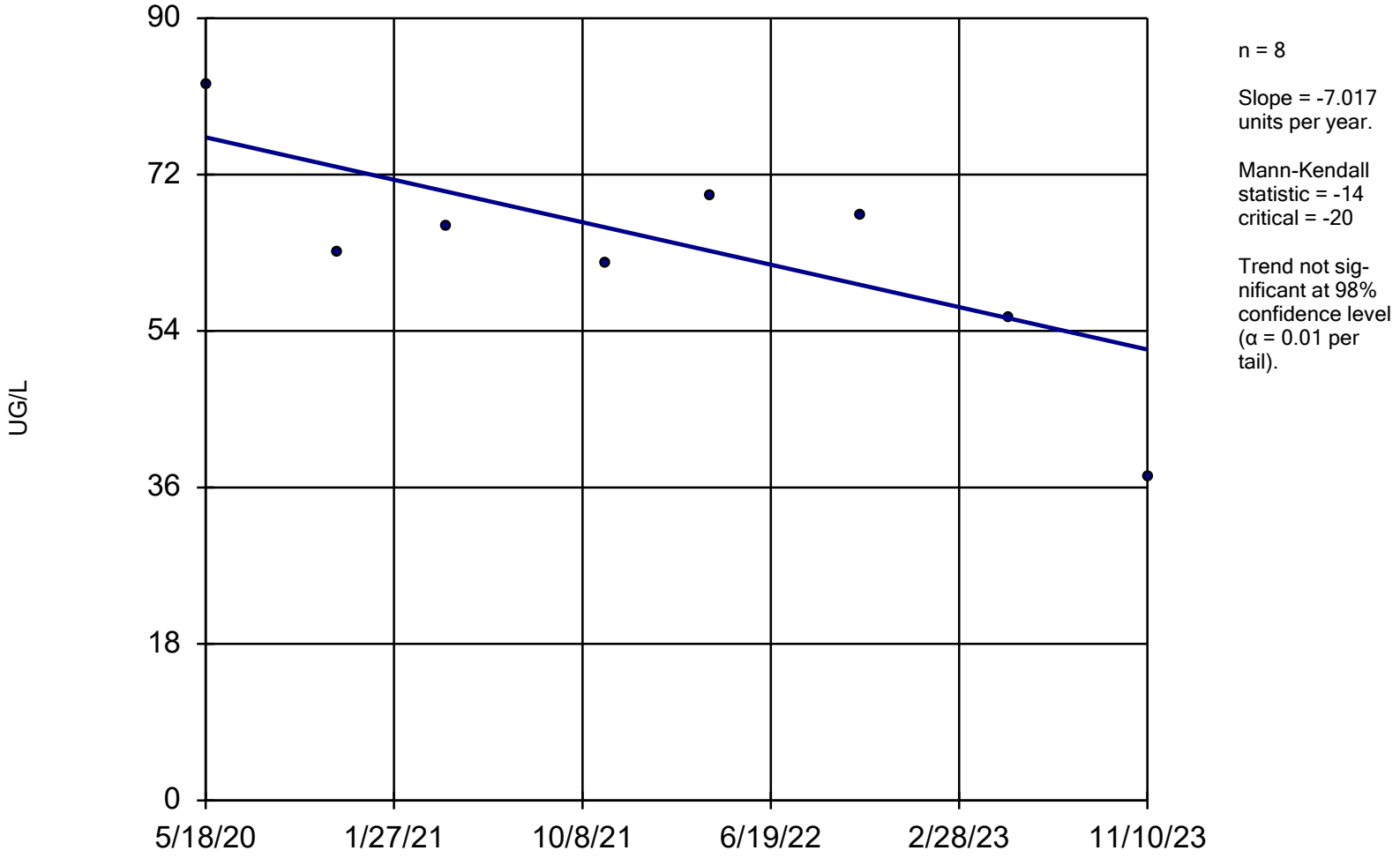
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-UMW-6D



n = 8

Slope = -7.017 units per year.

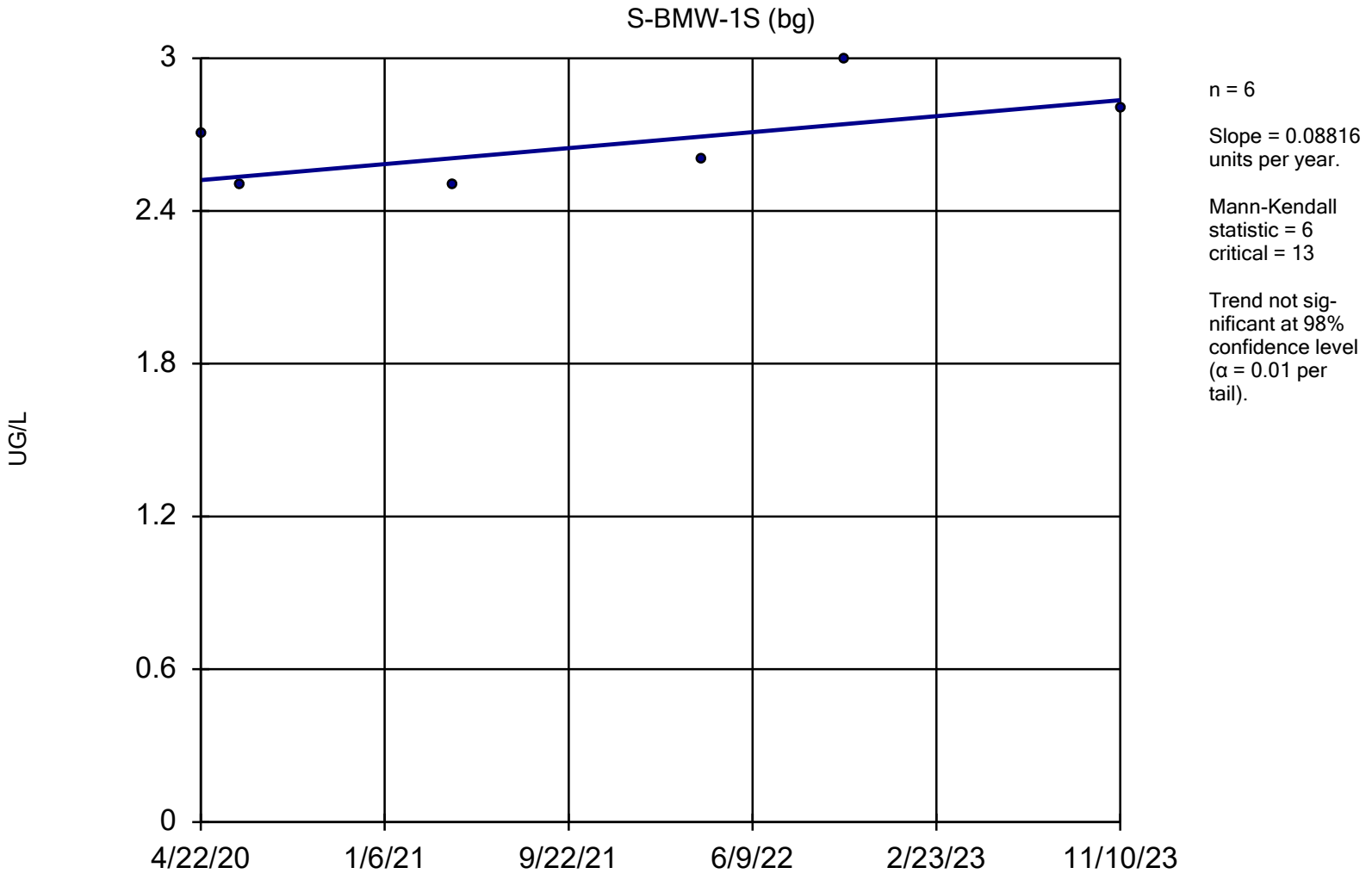
Mann-Kendall statistic = -14
critical = -20

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

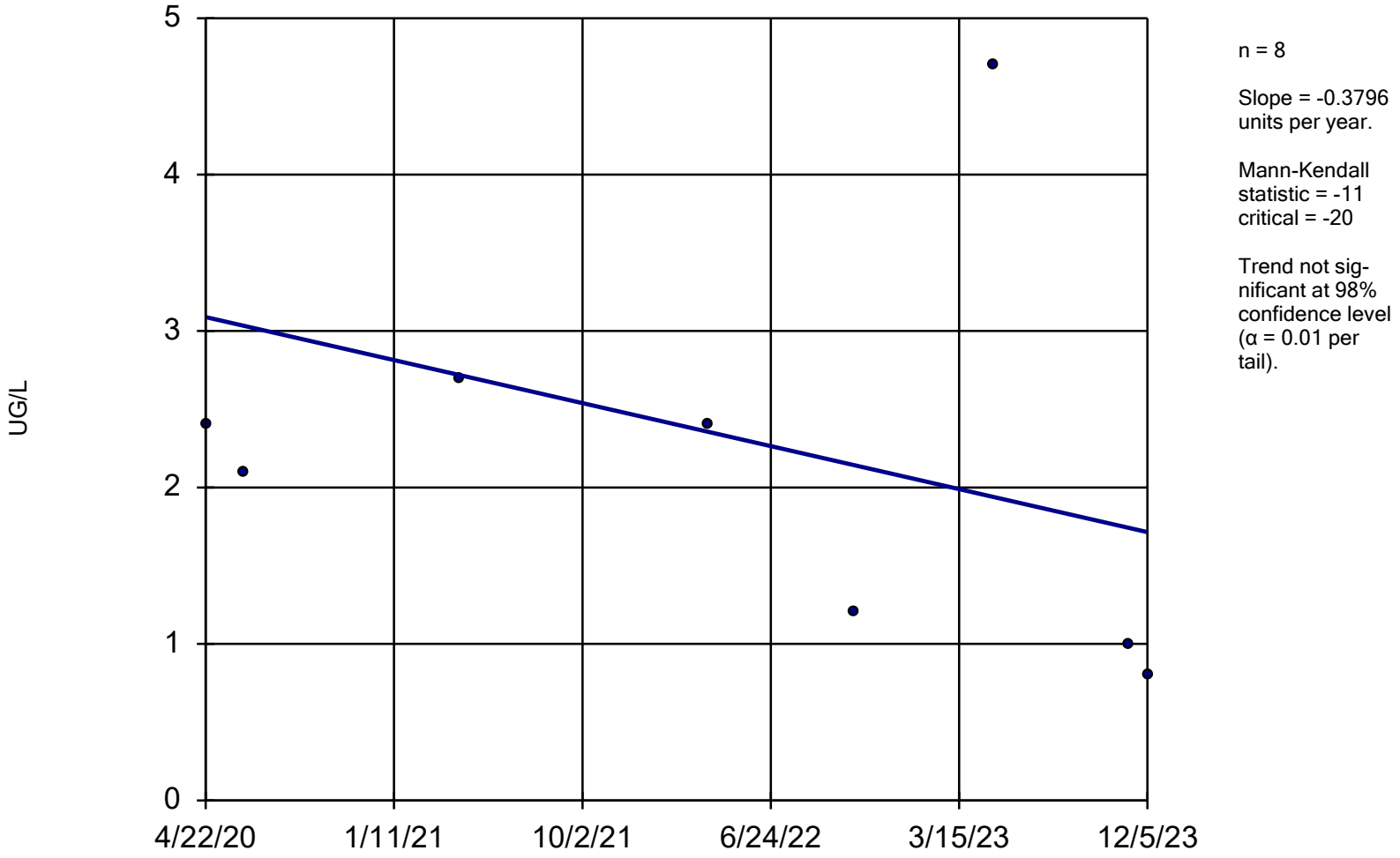


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-BMW-3S (bg)



n = 8

Slope = -0.3796 units per year.

Mann-Kendall statistic = -11
critical = -20

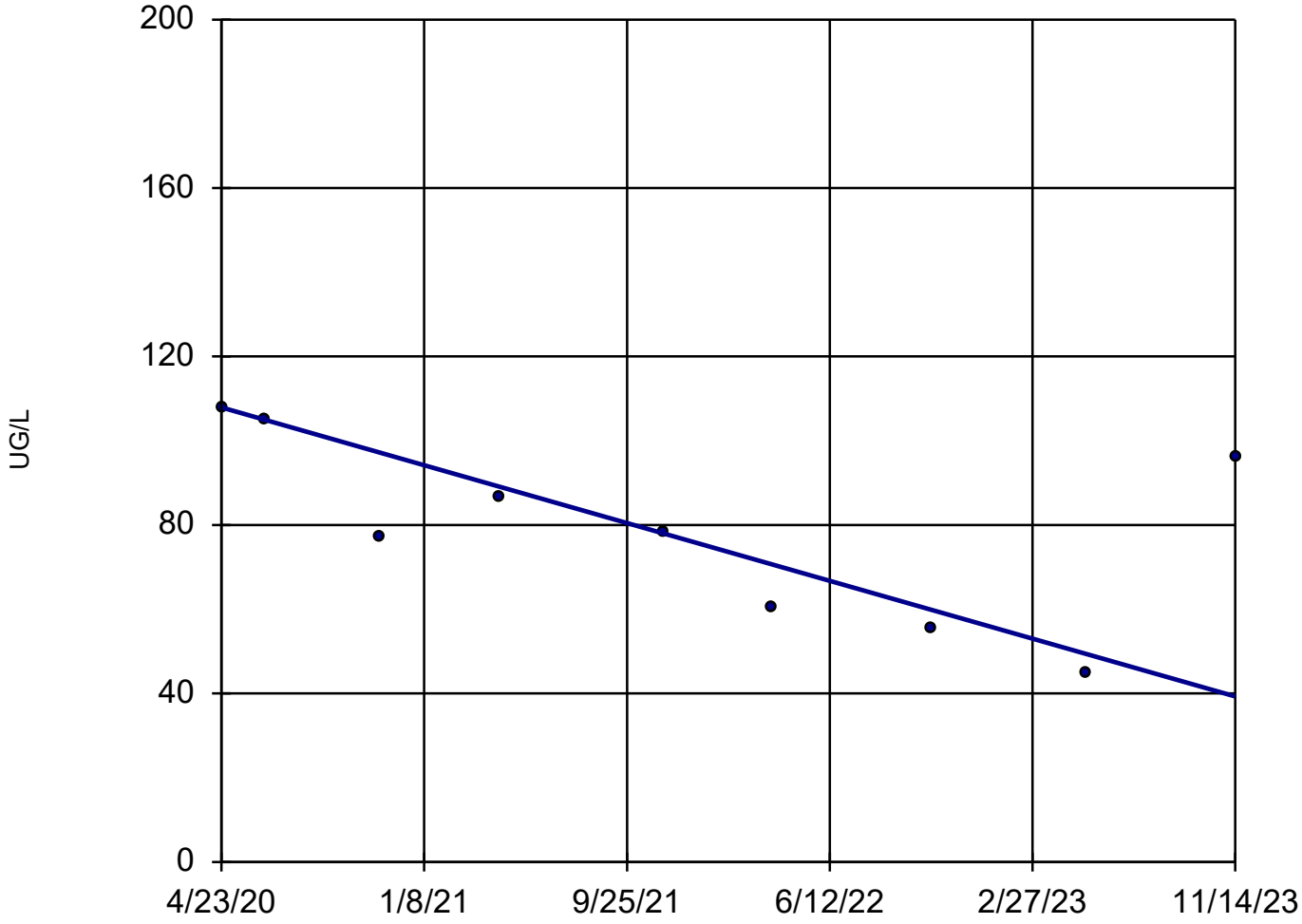
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-LMW-1S



n = 9

Slope = -19.28 units per year.

Mann-Kendall statistic = -20
critical = -23

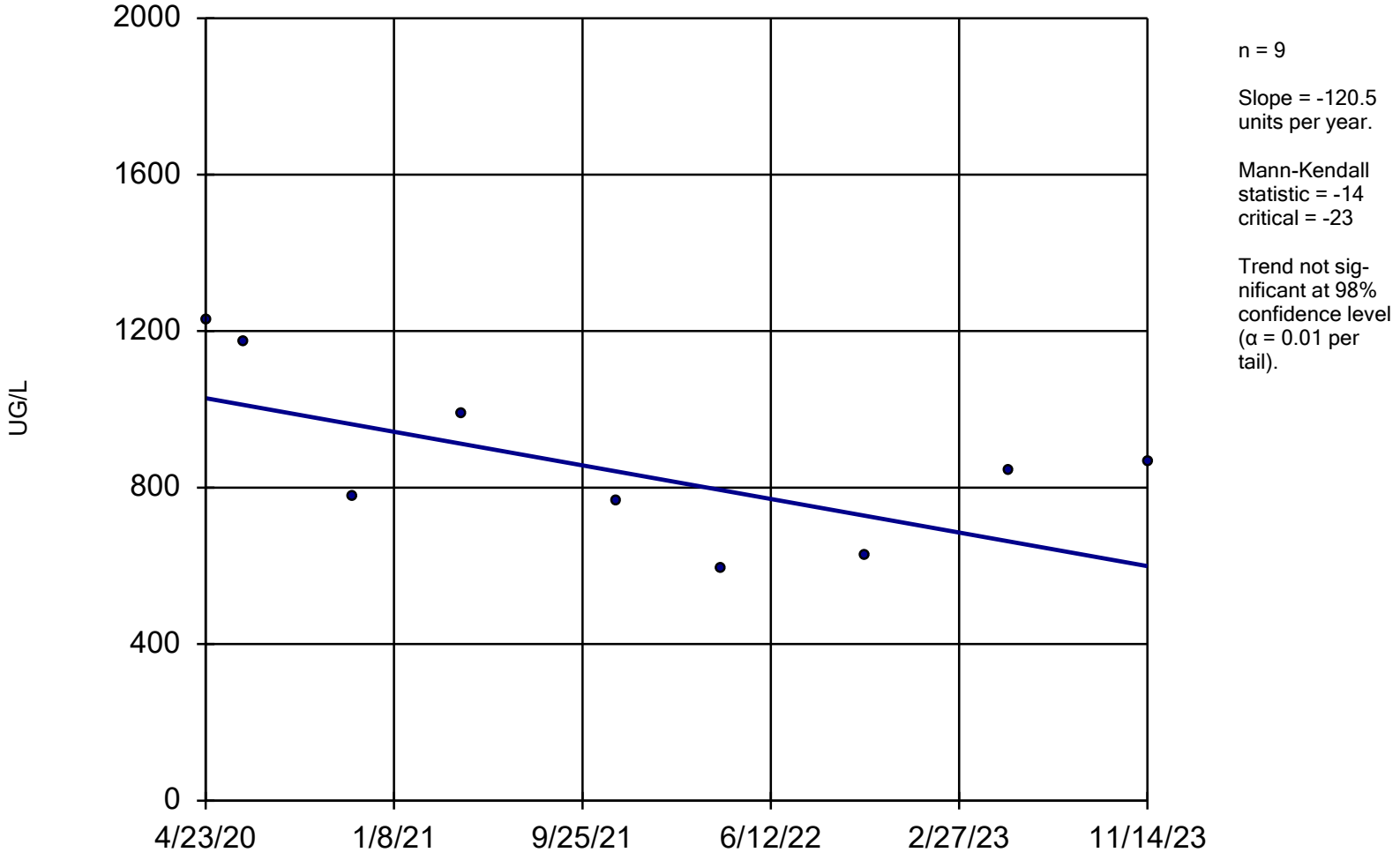
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-LMW-2S



n = 9

Slope = -120.5 units per year.

Mann-Kendall statistic = -14
critical = -23

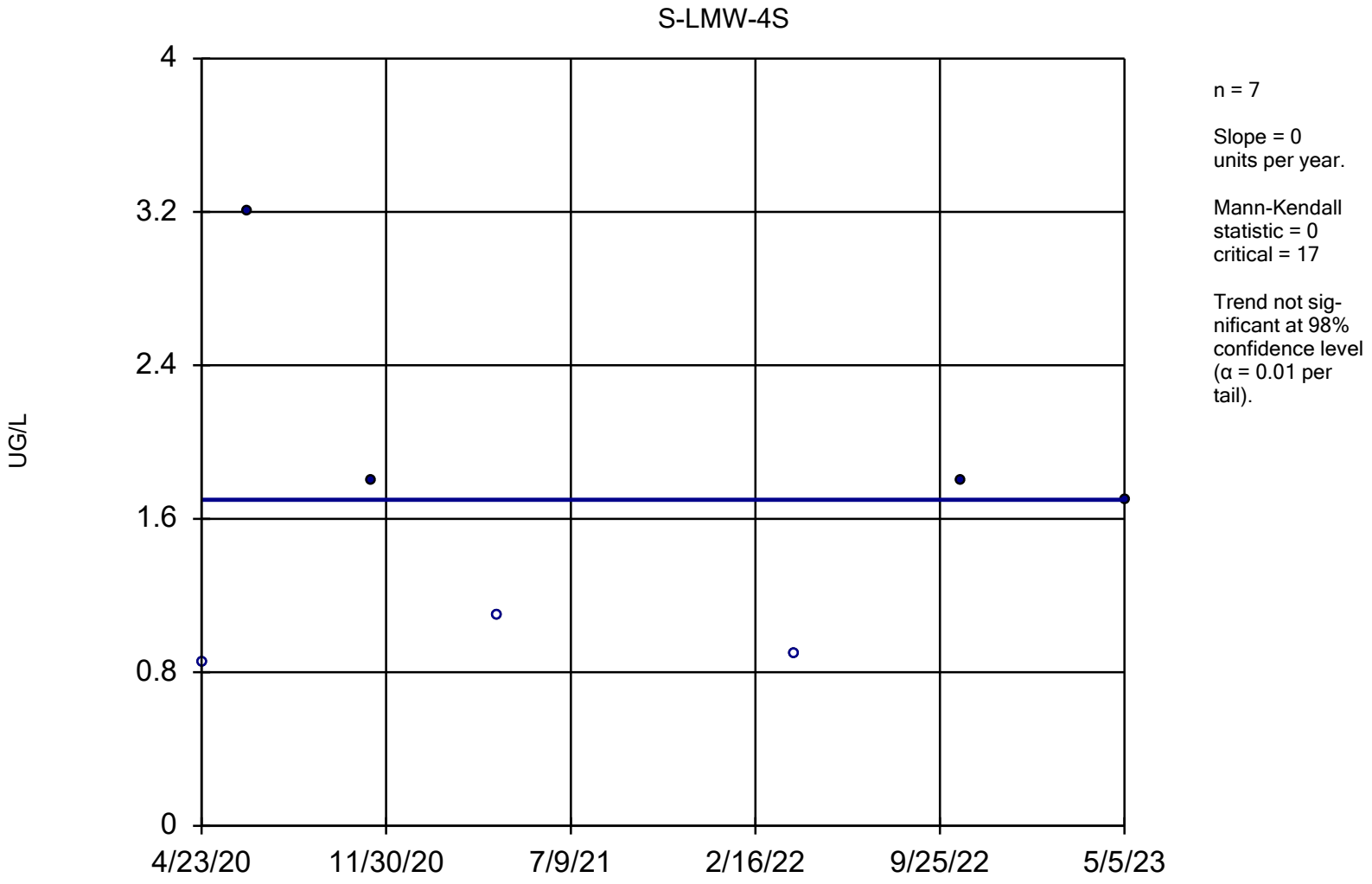
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

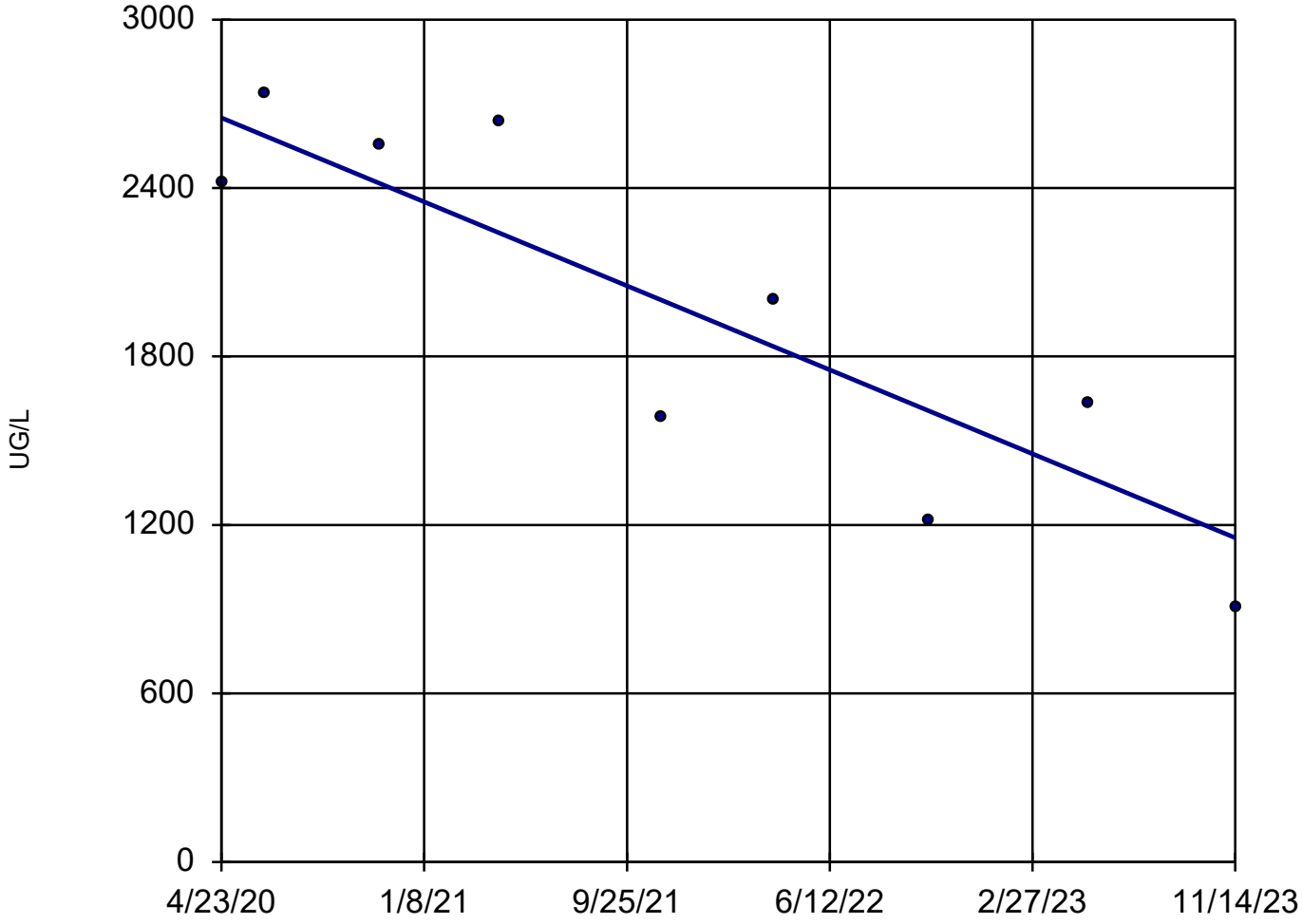


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-LMW-5S



n = 9

Slope = -419.8 units per year.

Mann-Kendall statistic = -22
critical = -23

Trend not significant at 98% confidence level (α = 0.01 per tail).

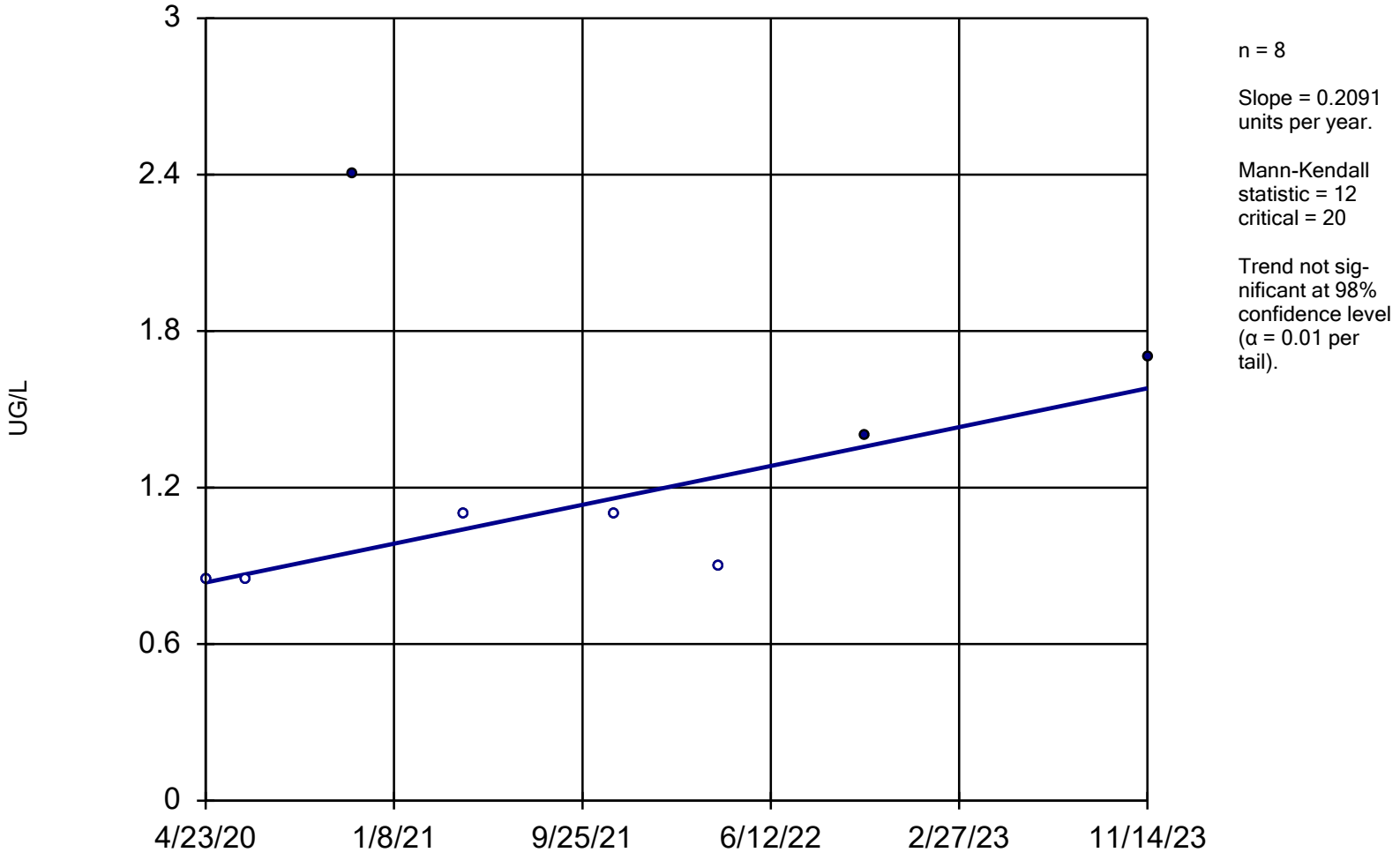
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-LMW-6S



n = 8

Slope = 0.2091 units per year.

Mann-Kendall statistic = 12
critical = 20

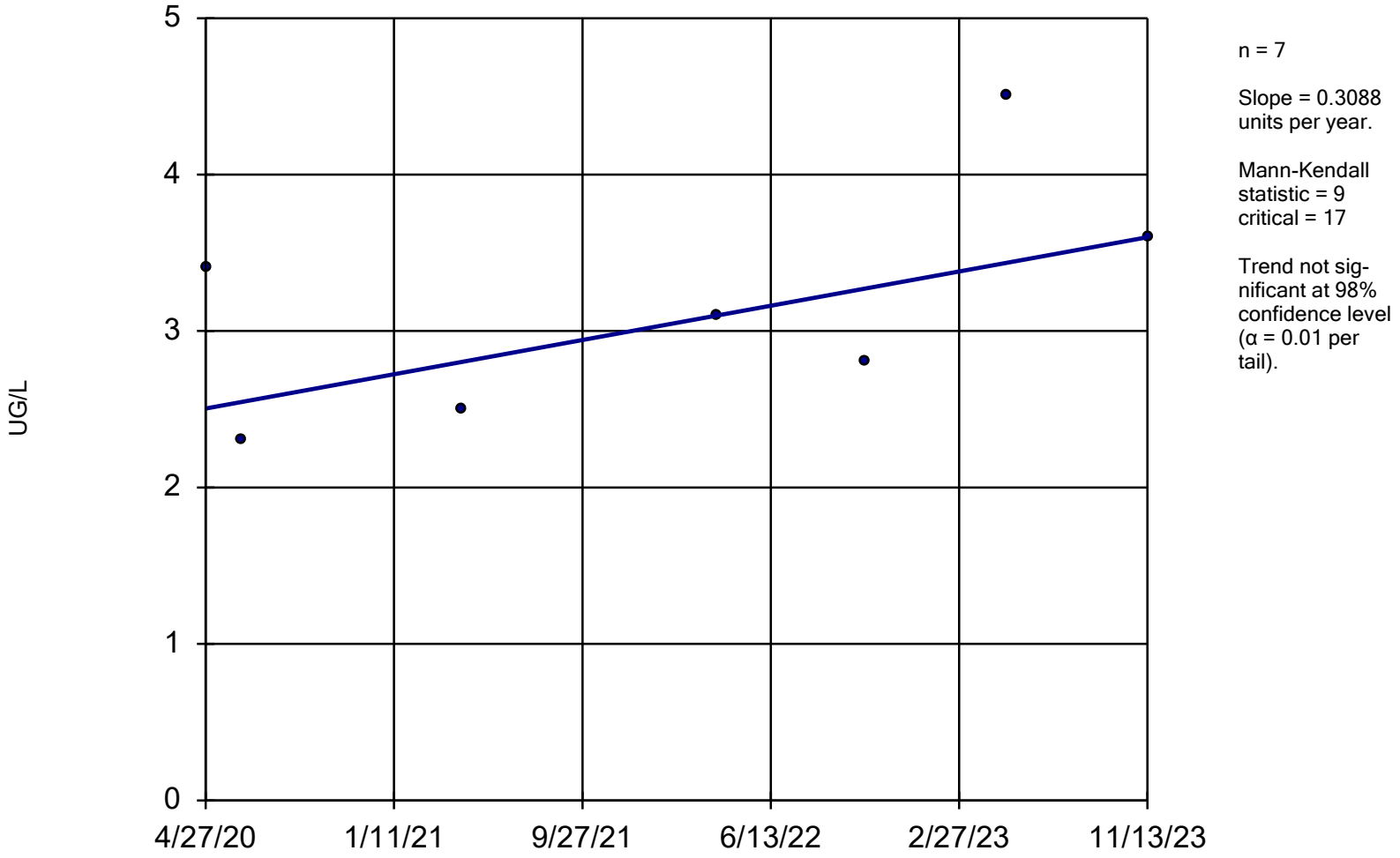
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-UG-3



n = 7

Slope = 0.3088 units per year.

Mann-Kendall statistic = 9
critical = 17

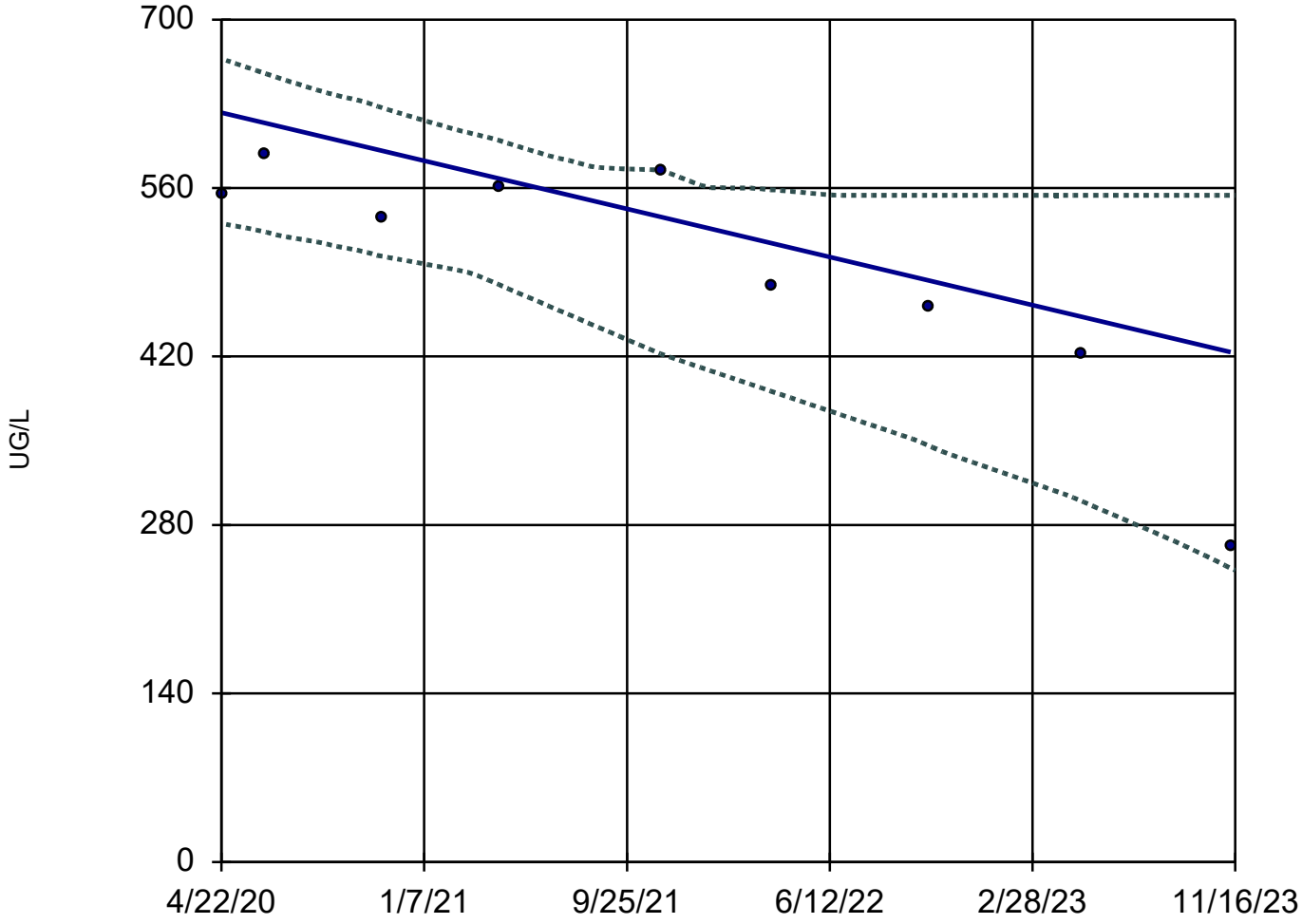
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-AM-1D



n = 9

Slope = -55.99 units per year.

Mann-Kendall statistic = -24
critical = -23

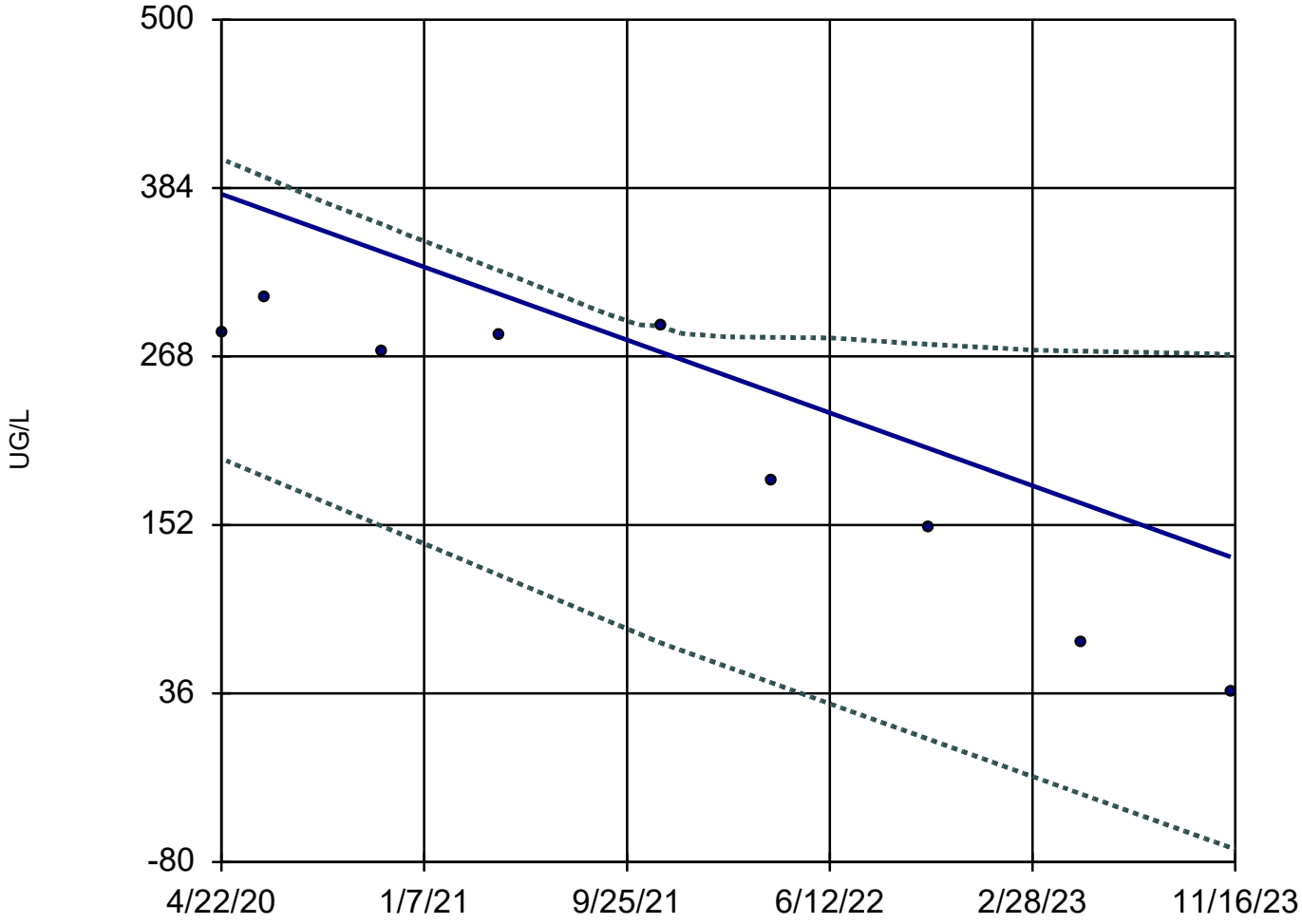
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-AM-1S



n = 9

Slope = -70.27 units per year.

Mann-Kendall statistic = -26
critical = -23

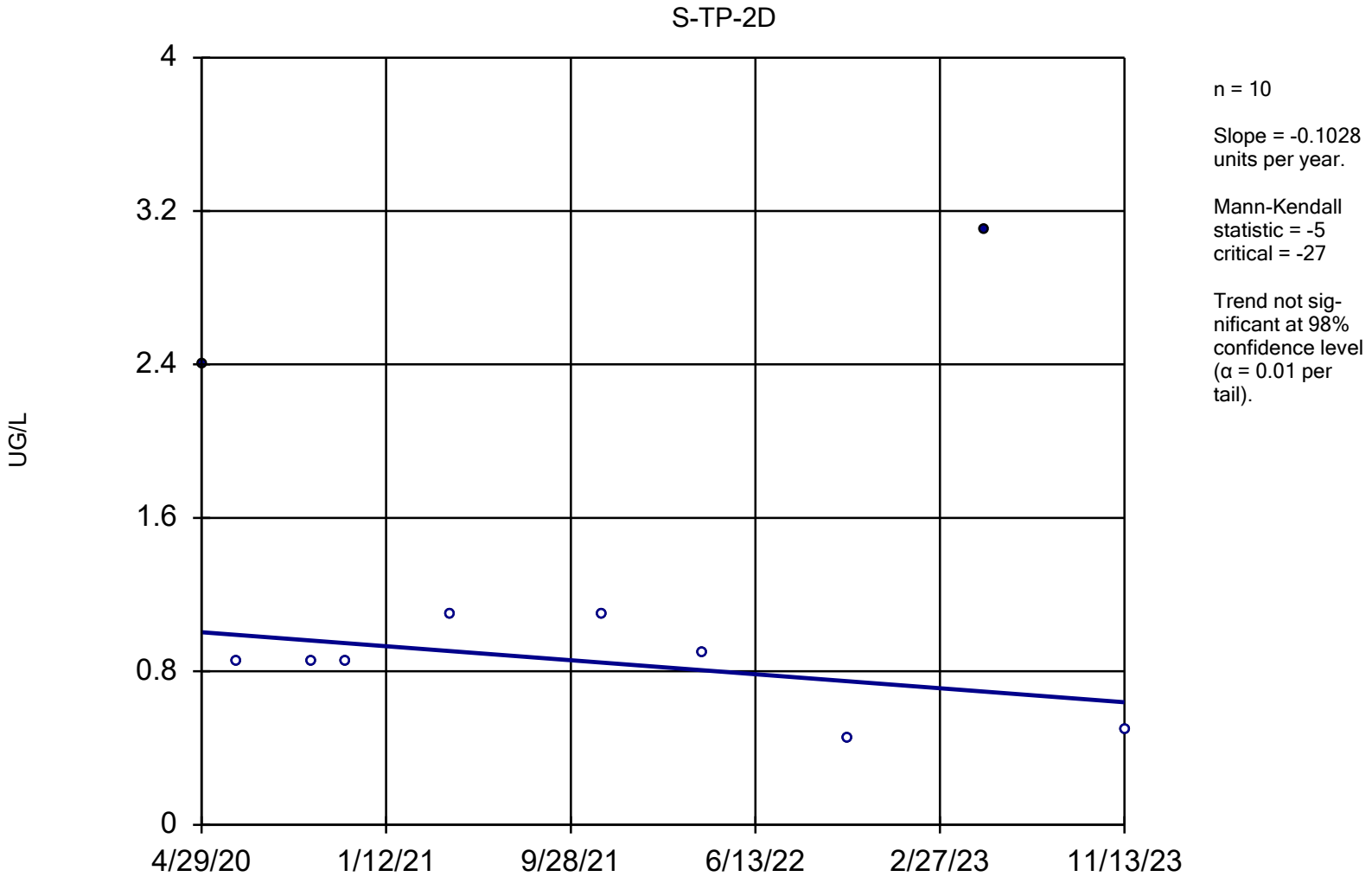
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

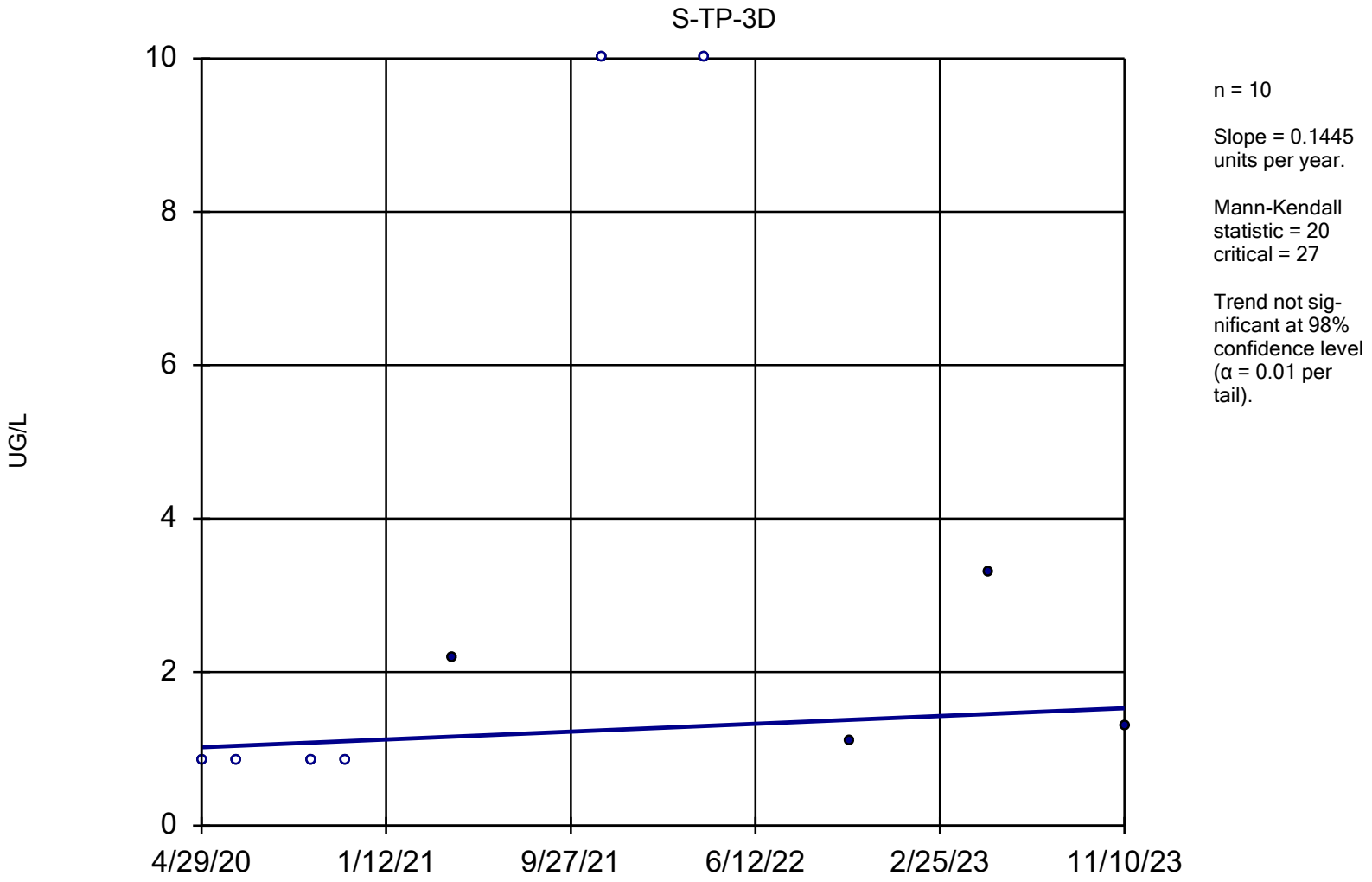


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

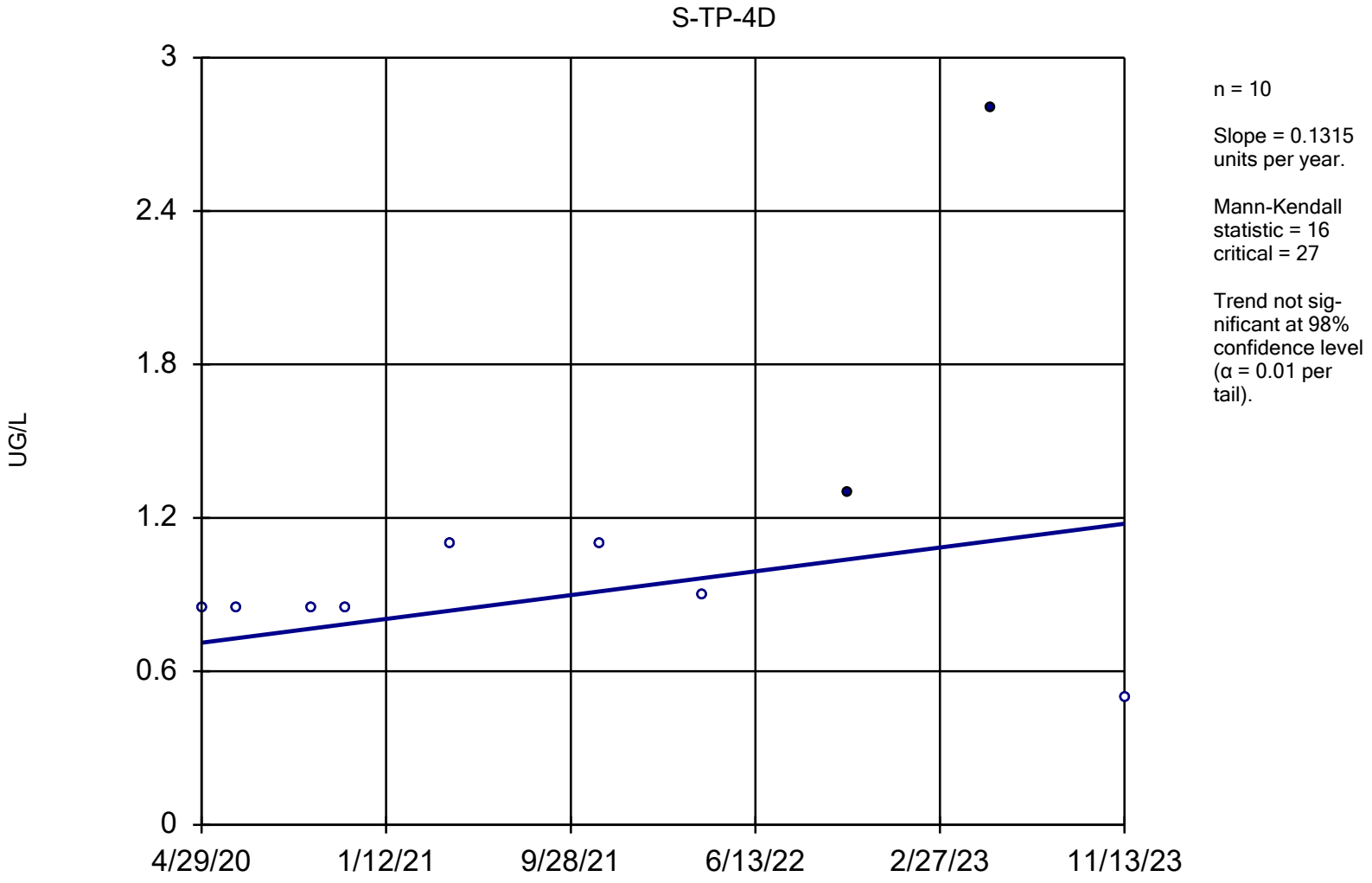


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

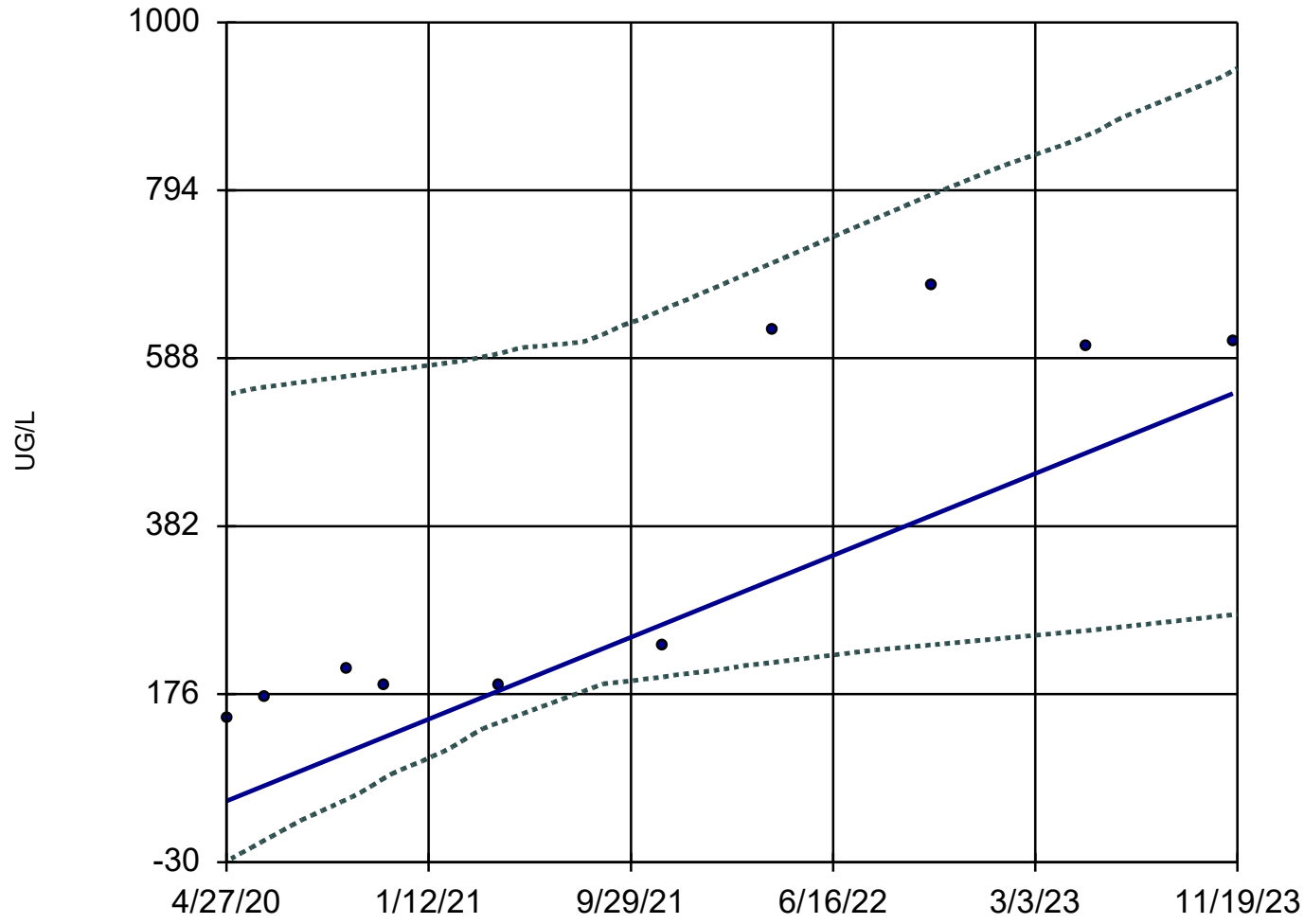


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-TP-5D



n = 10

Slope = 140.8 units per year.

Mann-Kendall statistic = 32
critical = 27

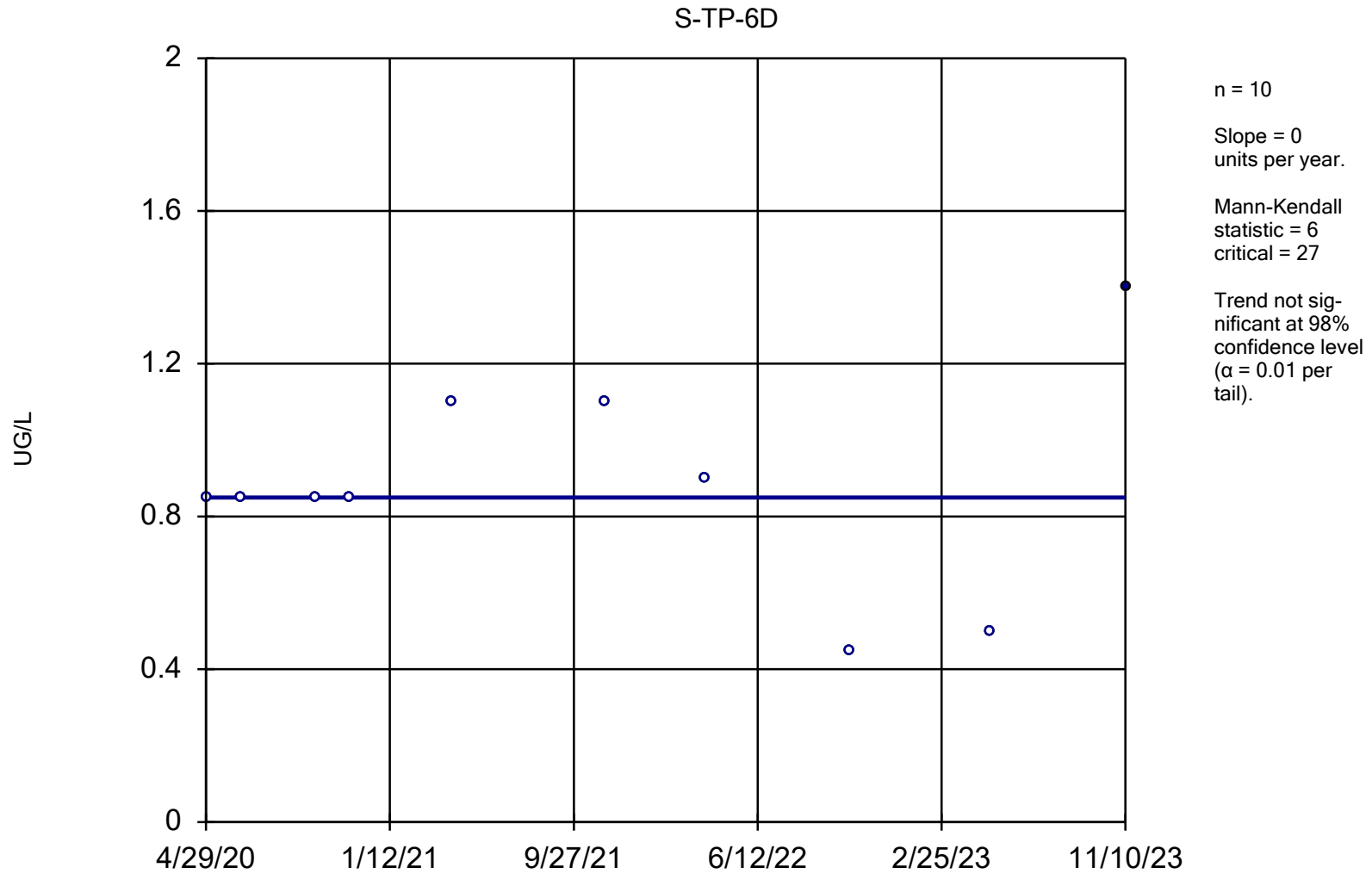
Increasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

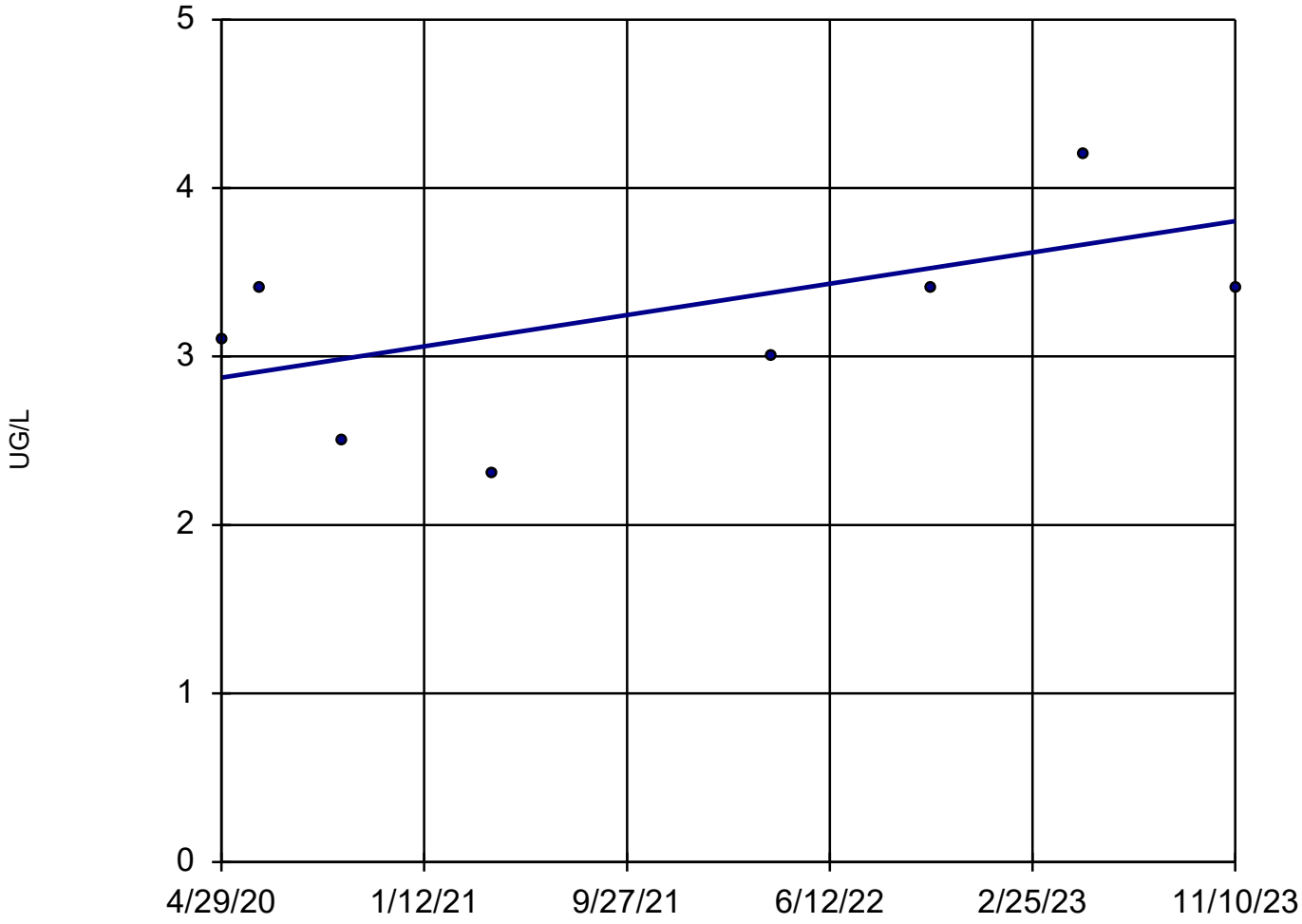


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope Estimator

S-TP-6S



n = 8

Slope = 0.2626 units per year.

Mann-Kendall statistic = 9
critical = 20

Trend not significant at 98% confidence level (α = 0.01 per tail).

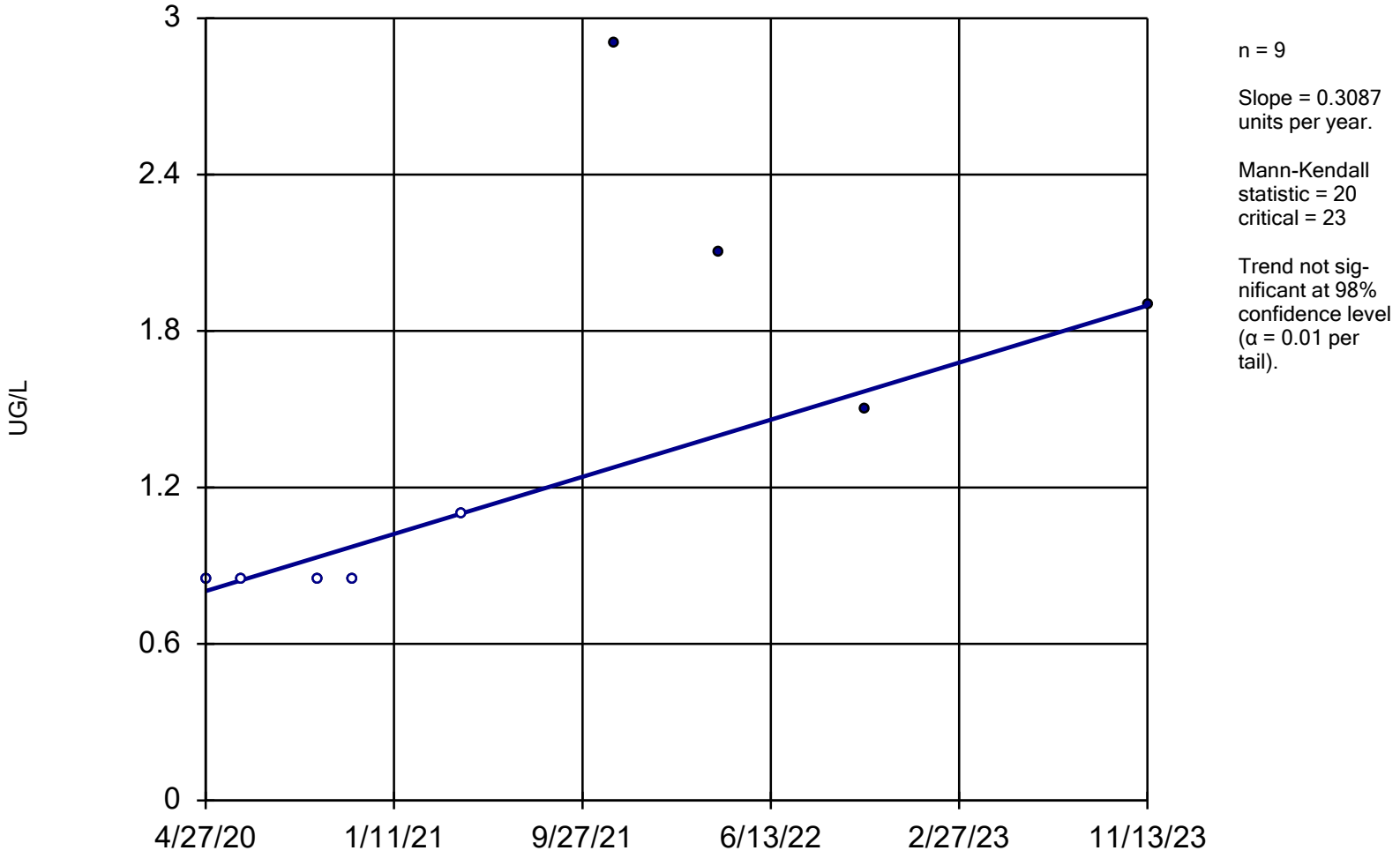
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-TP-8D



n = 9

Slope = 0.3087 units per year.

Mann-Kendall statistic = 20
critical = 23

Trend not significant at 98% confidence level (α = 0.01 per tail).

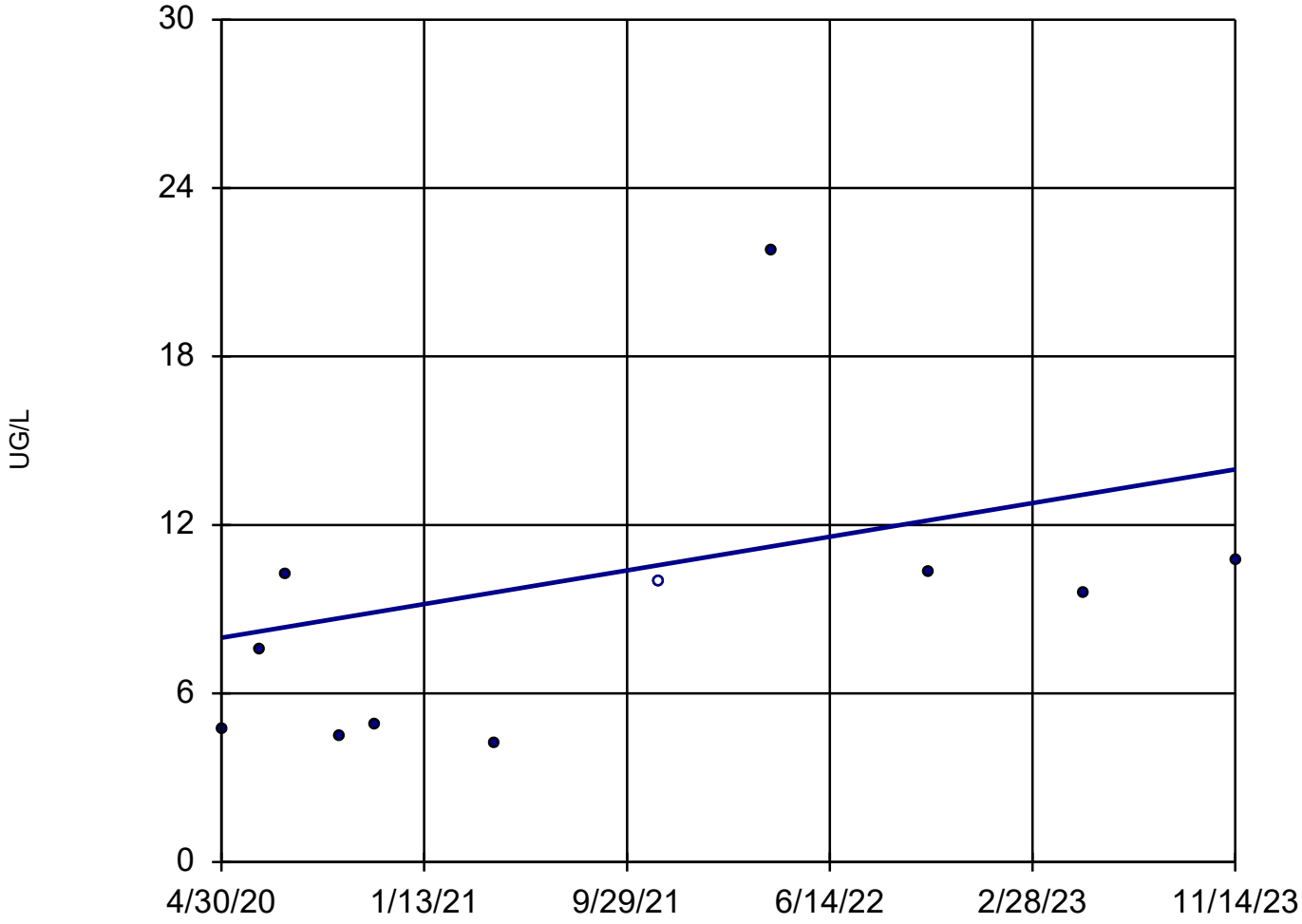
Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

S-PZ-9D



n = 11

Slope = 1.694 units per year.

Mann-Kendall statistic = 21
critical = 31

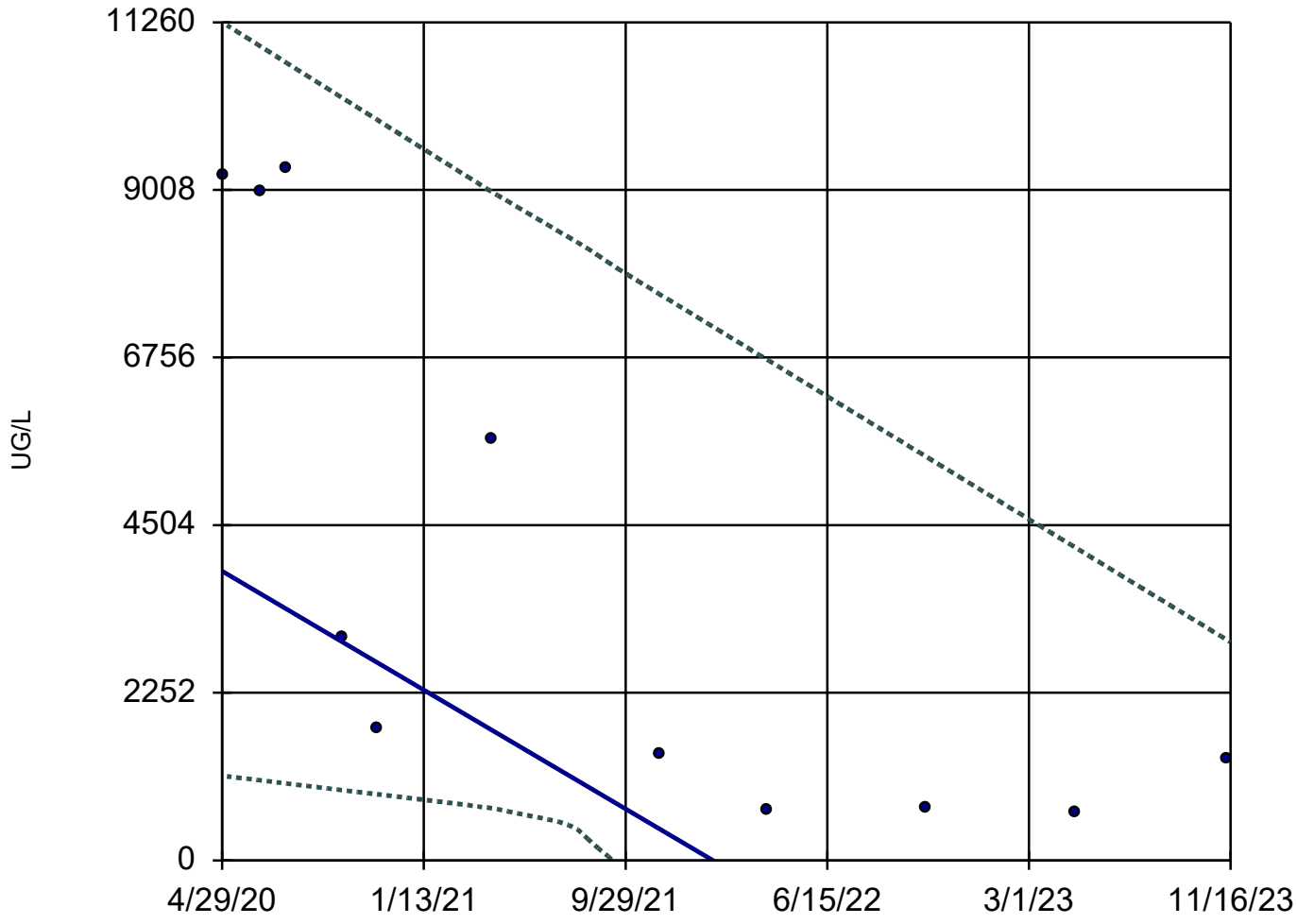
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Sen's Slope and 95% Confidence Band

S-PZ-1S



n = 11

Slope = -2249 units per year.

Mann-Kendall statistic = -39
critical = -31

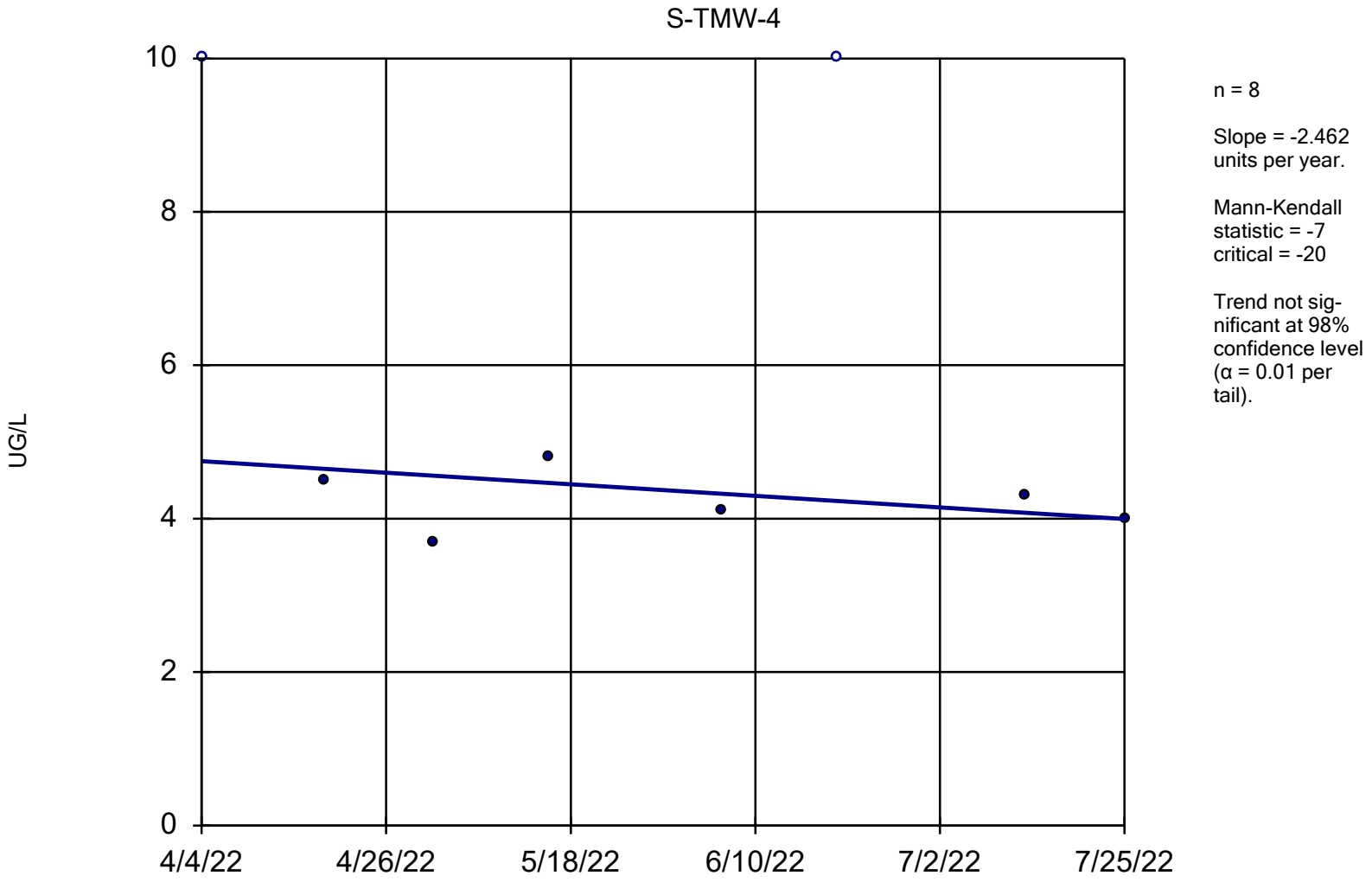
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

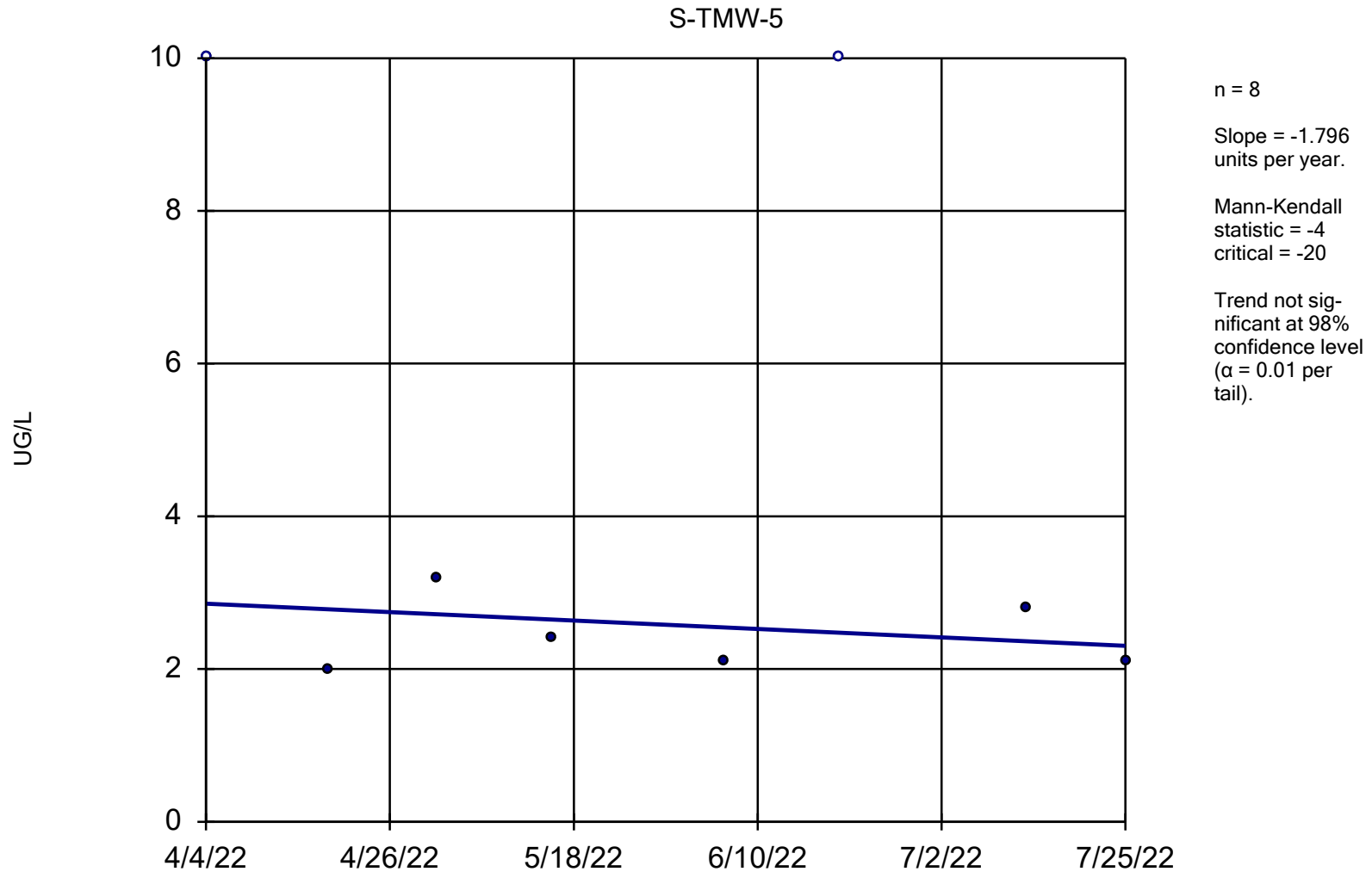


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator

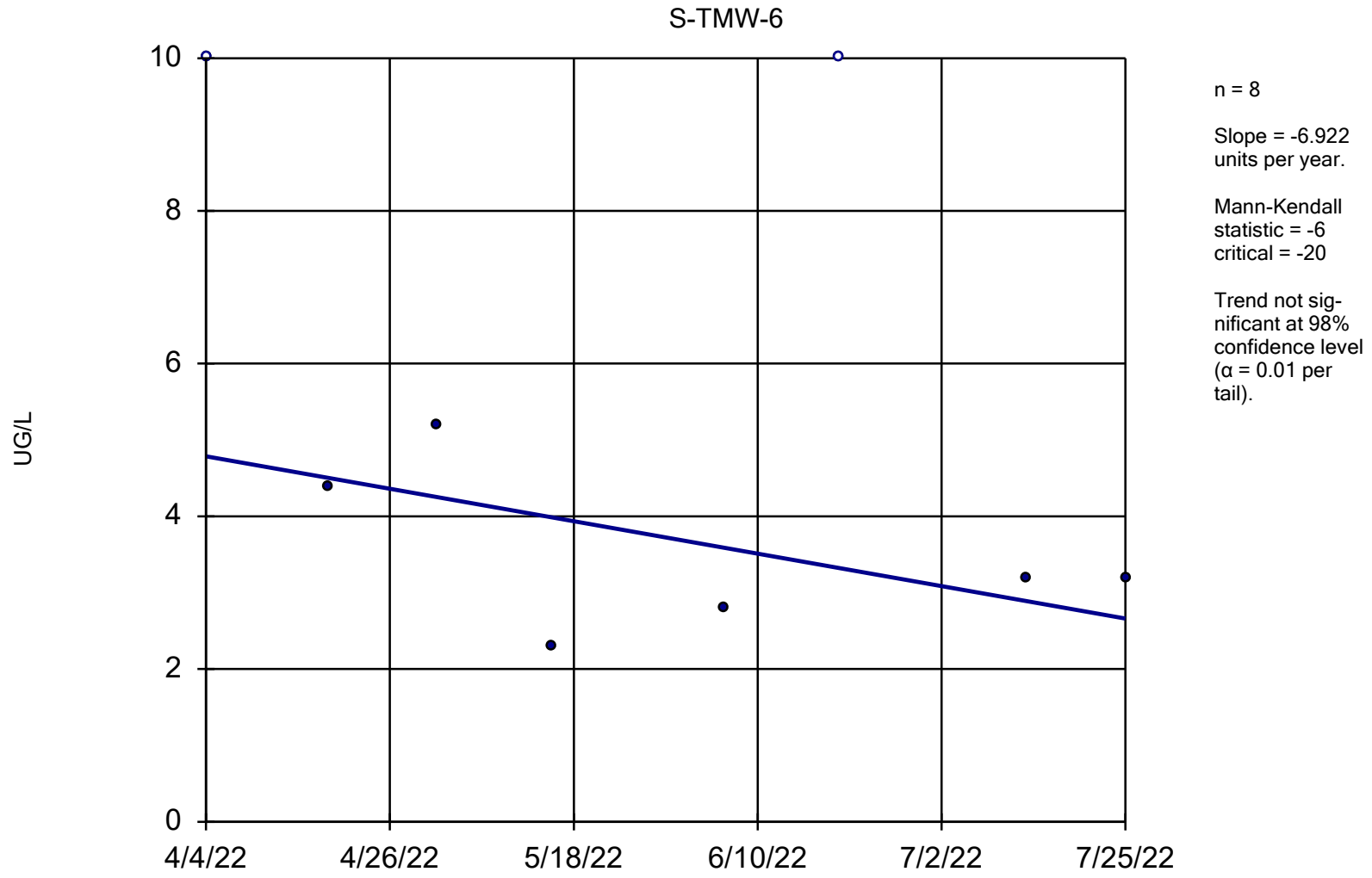


Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

Hollow symbols indicate censored values.

Sen's Slope Estimator



Constituent: MOLYBDENUM, TOTAL Analysis Run 3/26/2024 4:32 PM View: Detection Monitoring

Sioux E.C. Client: Ameren Data: SEC DATA

APPENDIX B

Mineralogical Analyses Laboratory Report

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Golder Associates Inc.*
Project Number/ LIMS No.	*18502-02/MI7006-MAY21*
Sample Receipt:	*May 10, 2021*
Sample Analysis:	*June 7, 2021*
Reporting Date:	*June 30, 2021*

Instrument:	Panalytical X'pert Pro Diffractometer
Test Conditions:	Co radiation, 40 kV, 45 mA Regular Scanning: Step: 0.033°, Step time:0.15s, 2θ range: 6-70°
Interpretations :	PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPIus Eva and Topas software.
Detection Limit :	0.5-2%. Strongly dependent on crystallinity.

Contents:

Ben Eaton, B.Sc.
Junior Mineralogist

Huyun Zhou, Ph.D., P.Geo.
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involves matching the diffraction pattern of an unknown material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) database and released on software as Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds, except when internal standards have been added by request. Mineral proportions may be strongly influenced by crystallinity, crystal structure and preferred orientations. Mineral or compound identification and quantitative analysis results should be accompanied by supporting chemical assay data or other additional tests.

Quantitative Rietveld Analysis:

Quantitative Rietveld Analysis is performed by using Topas 4.2 (Bruker AXS), a graphics based profile analysis program built around a non-linear least squares fitting system, to determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile until it matches the obtained experimental patterns.

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.05wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

Summary of Rietveld Quantitative Analysis X-Ray Diffraction Results

Mineral/Compound	IW-2S MAY7006-01 (wt %)	IW-2M MAY7006-02 (wt %)	IW-2D MAY7006-03 (wt %)	EW-3S MAY7006-04 (wt %)	EW-3M MAY7006-05 (wt %)
Quartz	68.7	63.4	60.7	61.8	66.5
Plagioclase	13.8	17.4	15.6	16.5	12.7
K-Feldspar	7.1	6.8	8.4	10.1	12.6
Muscovite	3.2	3.8	1.8	4.5	3.9
Chlorite	2.1	1.7	3.2	2.1	-
Actinolite	1.4	1.7	2.5	0.8	1.1
Diopside	1.4	2.9	2.6	2.6	2.8
Pyrite	0.1	0.1	-	0.2	-
Hematite	0.6	-	-	-	-
Montmorillonite	1.6	-	-	-	-
Baryte	-	0.2	-	-	-
Rhodochrosite	-	0.4	-	0.6	0.4
Calcite	-	1.7	2.7	1.0	-
Dolomite	-	-	2.5	-	-
Grossular	-	-	-	-	-
Maghemite	-	-	-	-	-
Paragonite	-	-	-	-	-
Anhydrite	-	-	-	-	-
Andalusite	-	-	-	-	-
TOTAL	100	100	100	100	100

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Mineral/Compound	EW-3D MAY7006-06 (wt %)	S-BH-01 S MAY7006-08 (wt %)	S-BH-01 M MAY7006-09 (wt %)	S-BH-01 D MAY7006-10 (wt %)	S-BH-01 (93-96) MAY7006-11 (wt %)
Quartz	40.1	72.4	58.2	68.5	60.4
Plagioclase	8.3	13.8	19.6	13.5	15.8
K-Feldspar	7.0	6.5	10.4	5.4	11.1
Muscovite	3.9	2.1	3.6	3.2	2.7
Chlorite	1.6	1.9	2.3	1.9	1.5
Actinolite	1.2	0.8	0.3	1.3	0.6
Diopside	-	1.2	2.5	2.2	3.1
Pyrite	-	0.1	0.3	0.1	-
Hematite	2.7	0.3	0.2	0.3	-
Montmorillonite	-	0.9	1.1	-	-
Baryte	-	-	-	-	-
Rhodochrosite	0.4	-	-	0.6	0.1
Calcite	25.8	-	1.5	3.1	1.9
Dolomite	7.4	-	-	-	2.8
Grossular	1.6	-	-	-	-
Maghemite	-	-	-	-	-
Paragonite	-	-	-	-	-
Anhydrite	-	-	-	-	-
Andalusite	-	-	-	-	-
TOTAL	100	100	100	100	100.0

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.

Sample EW-3-FA (10-17) - MAY7006-07 had visibly high amorphous content in the diffraction pattern and was reported qualitatively.

Mineral/Compound	EW-3-FA (10-17) MAY7006-07 (wt %)*
Quartz	Minor
Plagioclase	Moderate
K-Feldspar	Minor
Muscovite	Moderate
Chlorite	-
Actinolite	-
Diopside	-
Pyrite	-
Hematite	Moderate
Montmorillonite	-
Baryte	-
Rhodochrosite	-
Calcite	Minor
Dolomite	-
Grossular	-
Maghemite	Moderate
Paragonite	Trace
Anhydrite	Minor
Andalusite	Trace
TOTAL	-

The qualitative abundances are: Major (>30% Wt), Moderate (10% -30% Wt), Minor(2% -10% Wt), Trace (<2% Wt).

Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

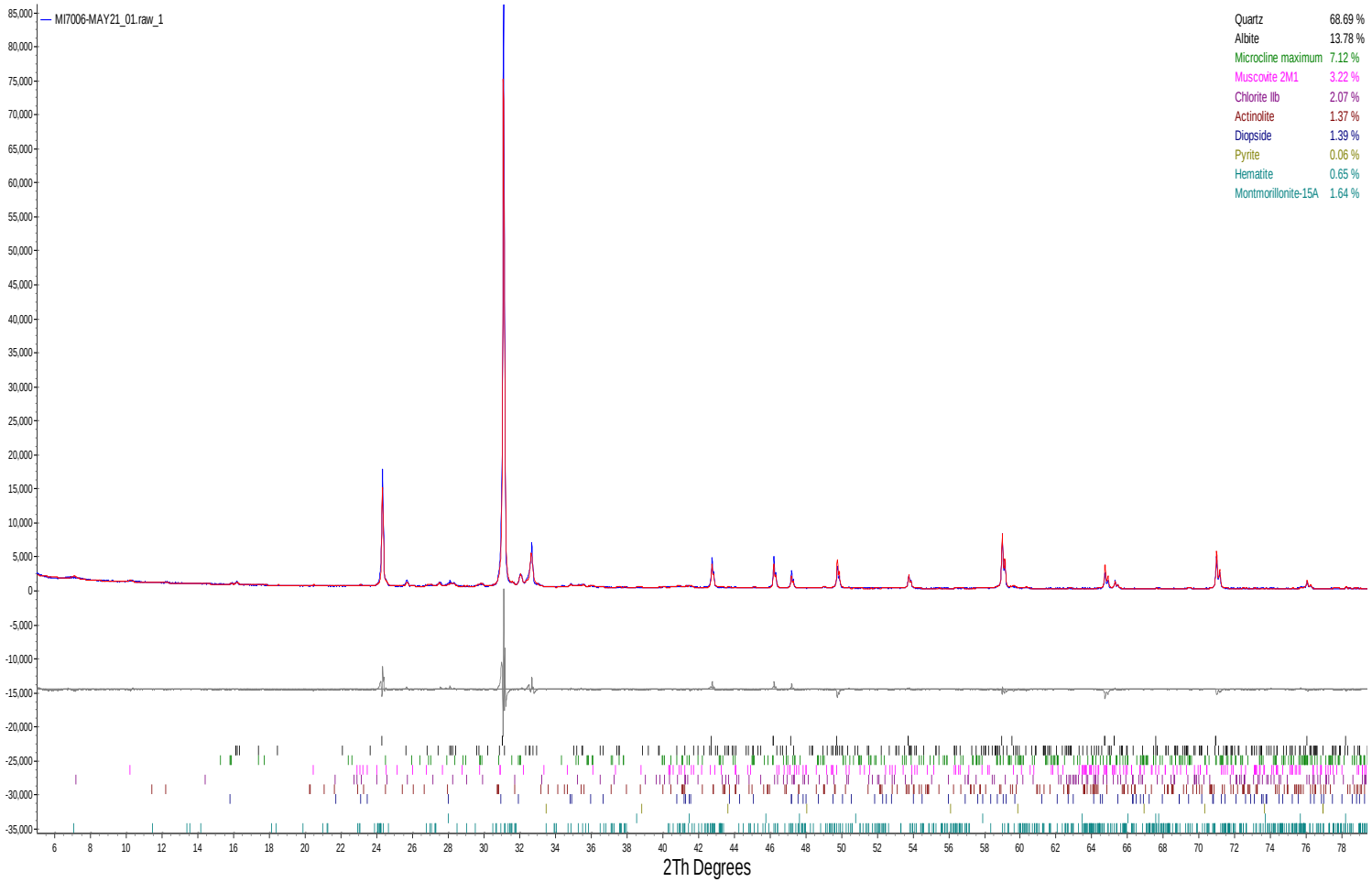
The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.

Mineral/Compound	Formula
Quartz	SiO_2
Plagioclase	$(NaSi,CaAl)AlSi_2O_8$
k-Feldsapr	$KAlSi_3O_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Chlorite	$(Fe,(Mg,Mn)_5,Al)(Si_3Al)O_{10}(OH)_8$
Actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Diopside	$CaMgSi_2O_6$
Pyrite	FeS_2
Hematite	Fe_2O_3
Montmorillonite	$(Na,Ca)_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 \cdot nH_2O$
Baryte	$BaSO_4$
Rhodochrosite	$MnCO_3$
Calcite	$CaCO_3$

Mineral/ Compound	Formula
Dolomite	$CaMg(CO_3)_2$
Grossular	$Ca_3Al_2Si_3O_{12}$
Maghemite	$\gamma\text{-}Fe_2O_3$
Paragonite	$NaAl_2(AlSi_3O_{10})(OH)_2$
Anhydrite	$CaSO_4$
Andalusite	Al_2SiO_5

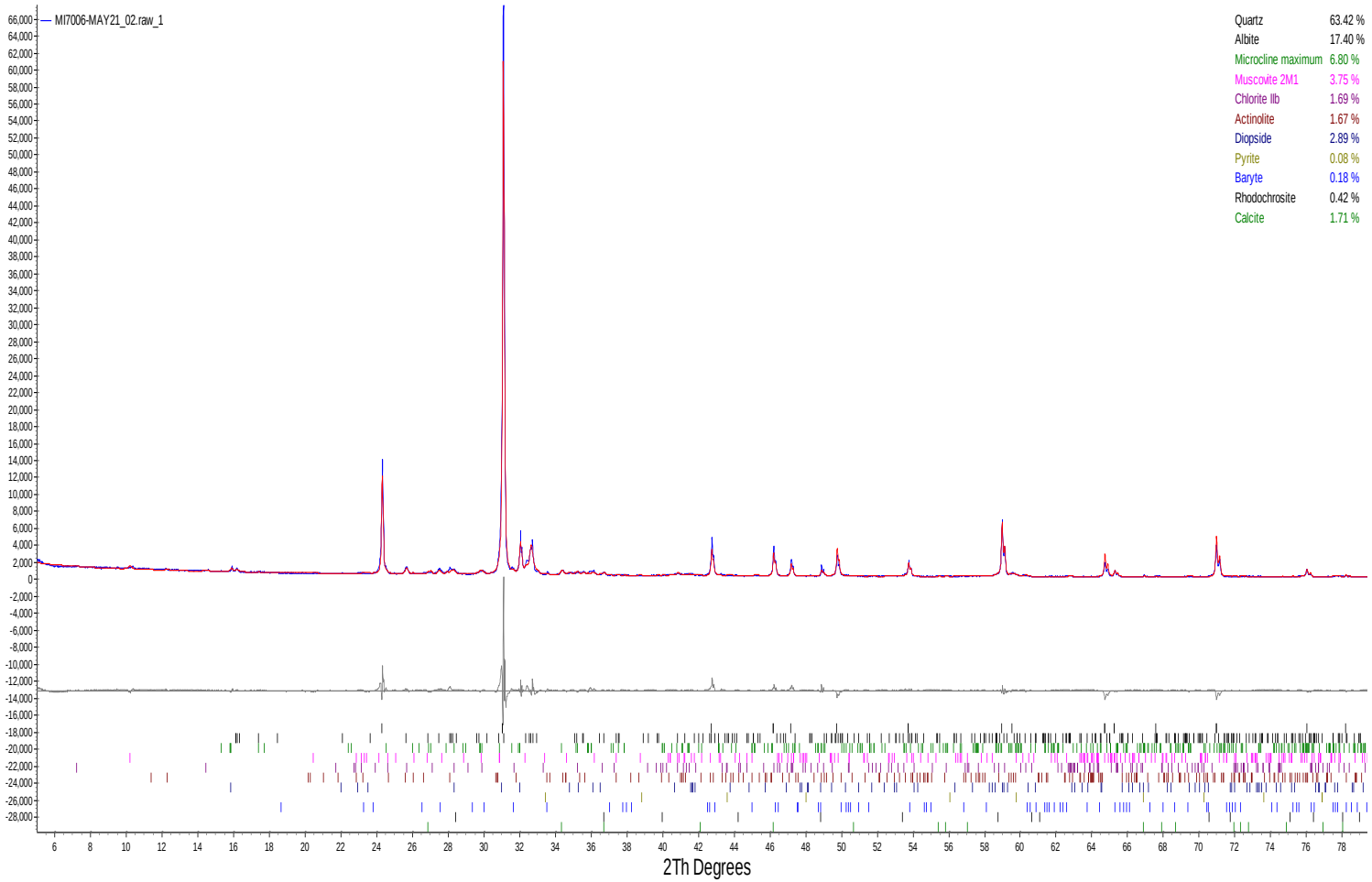
Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

IW-2S

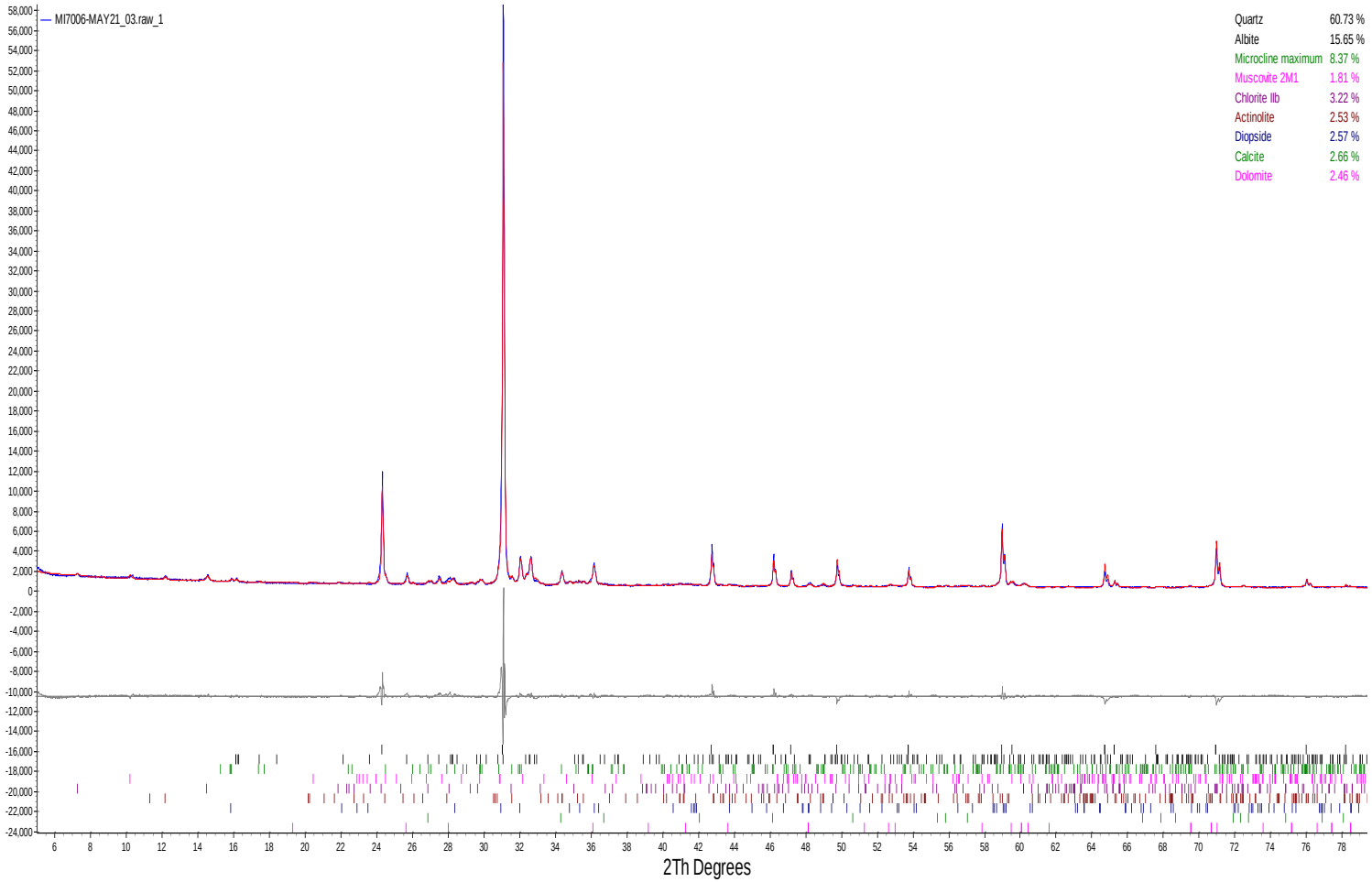


Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

IW-2M

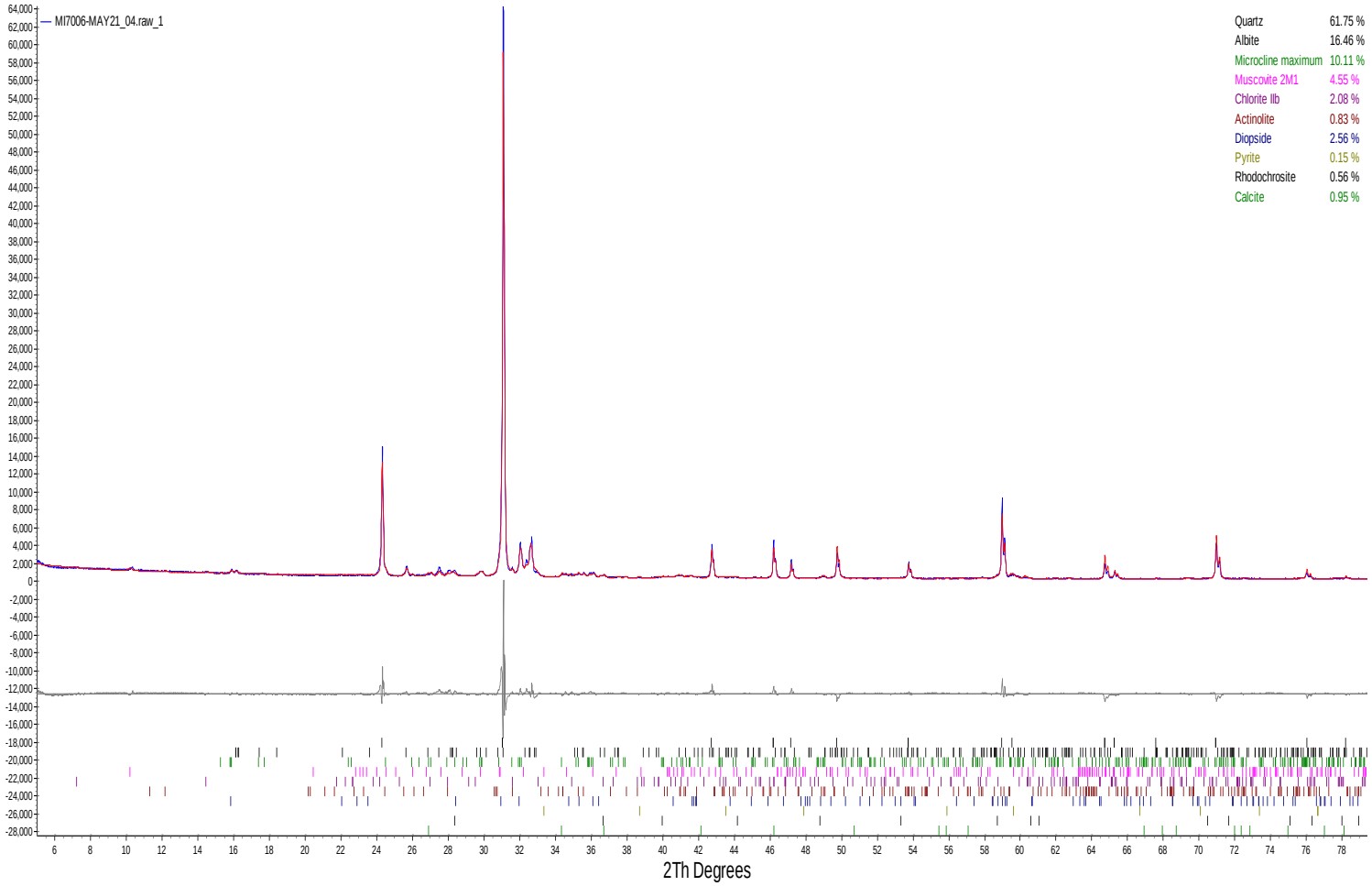


IW-2D


MI7006-MAY21_03.raw_1
Quartz 60.73 %
Albite 15.65 %
Microcline maximum 8.37 %
Muscovite 2M1 1.81 %
Chlorite IIb 3.22 %
Actinolite 2.53 %
Diopside 2.57 %
Calcite 2.66 %
Dolomite 2.46 %
2Th Degrees

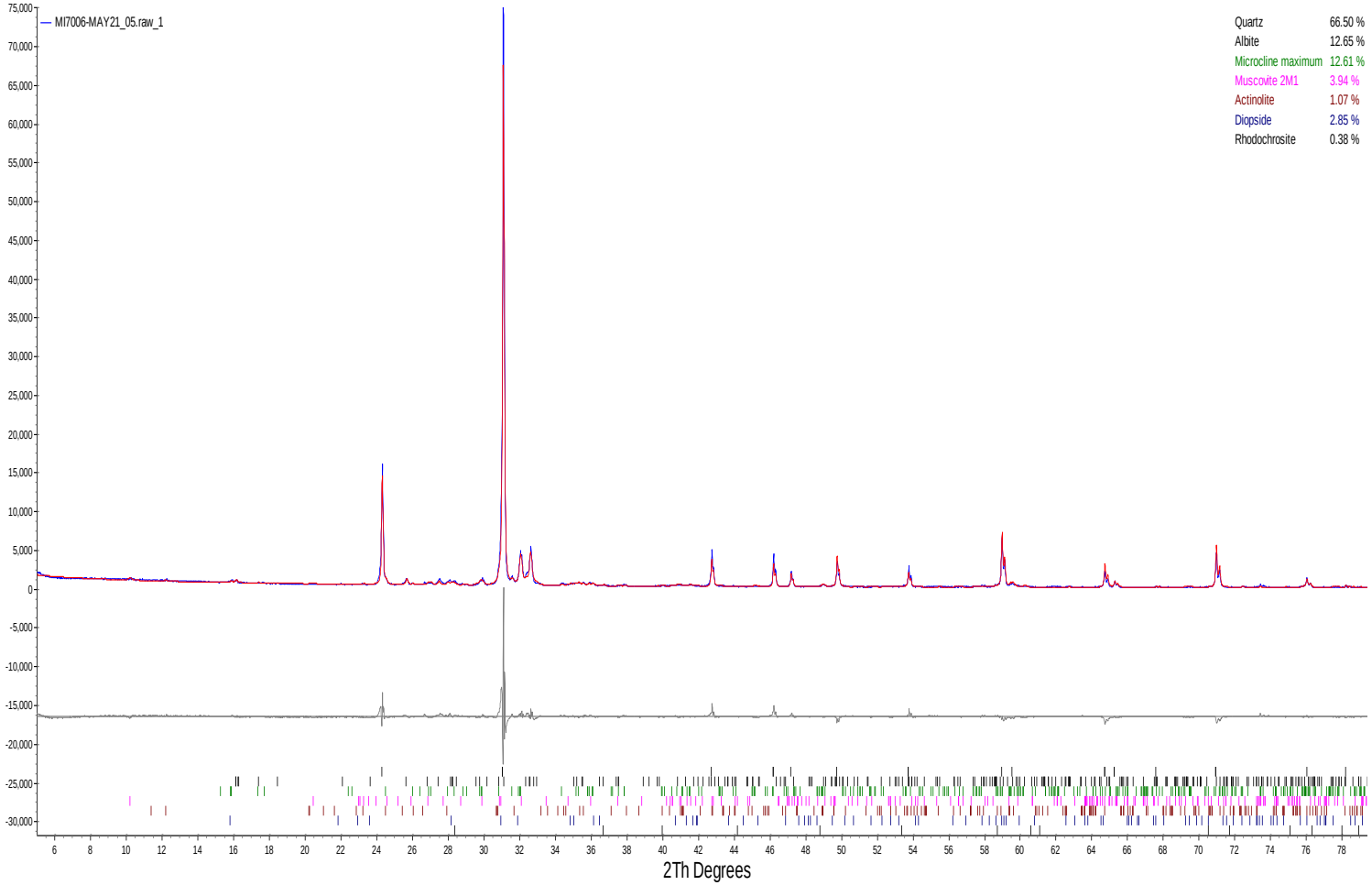
Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

EW-3S



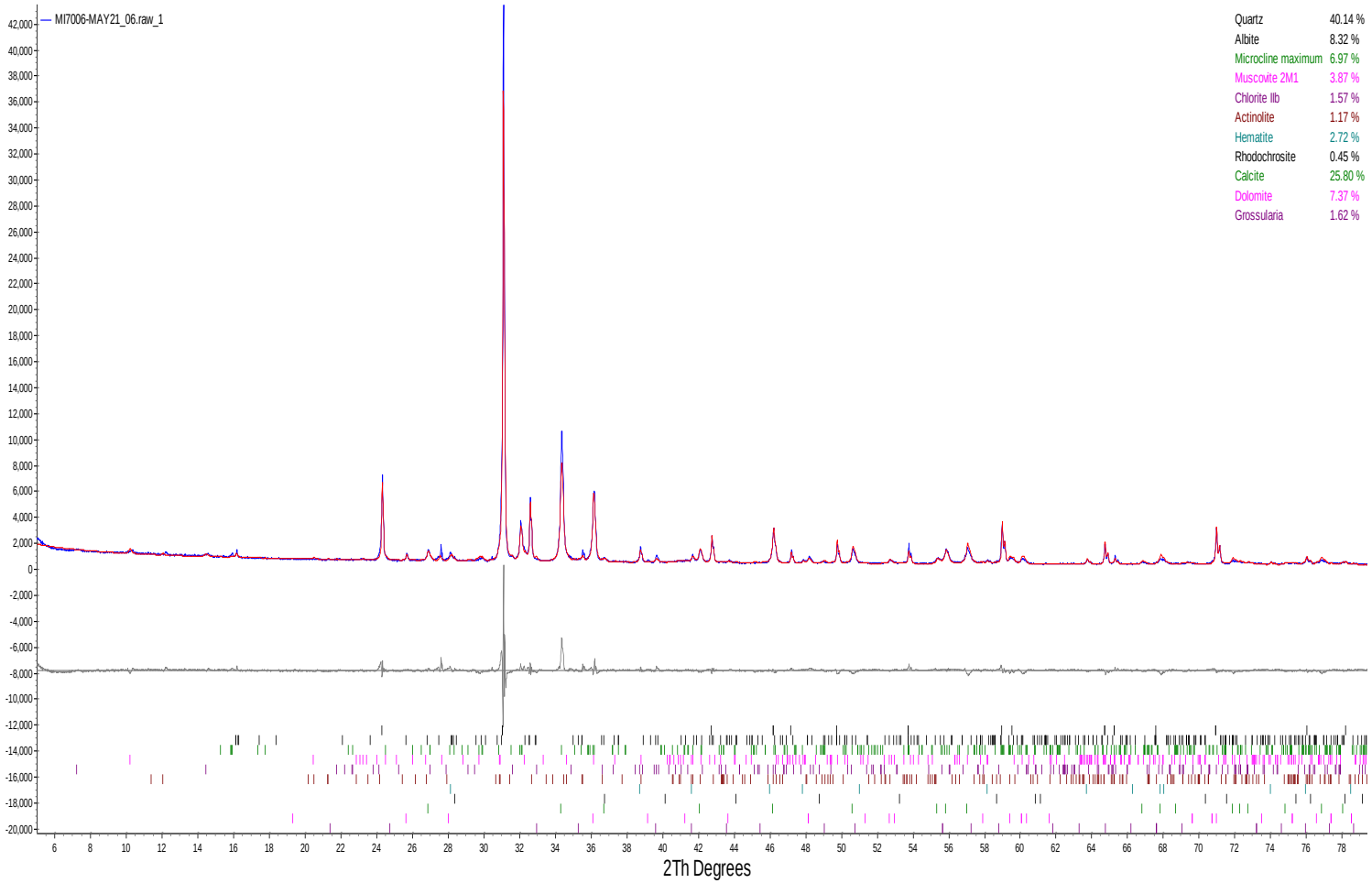
Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

EW-3M



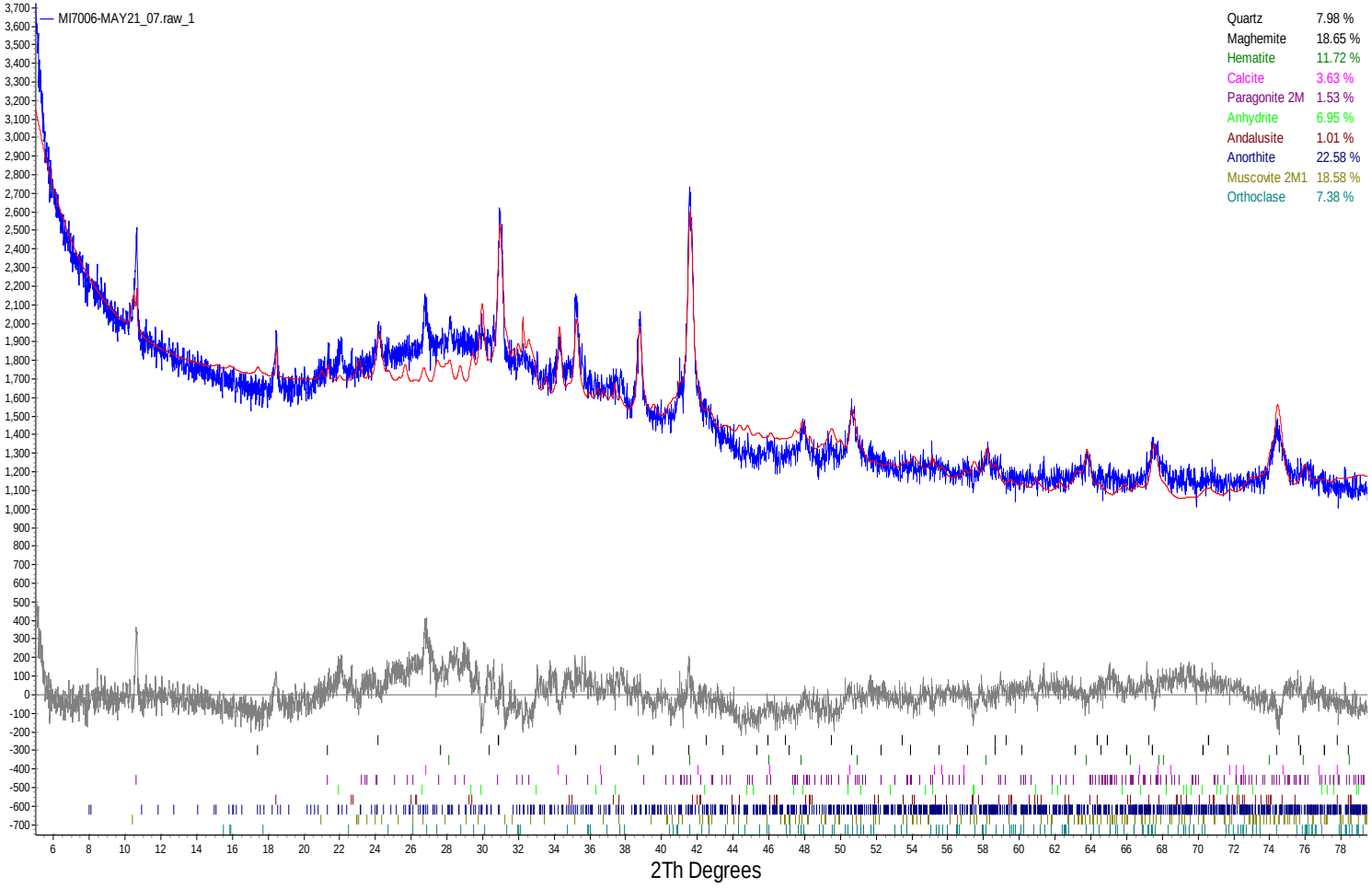
Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

EW-3D

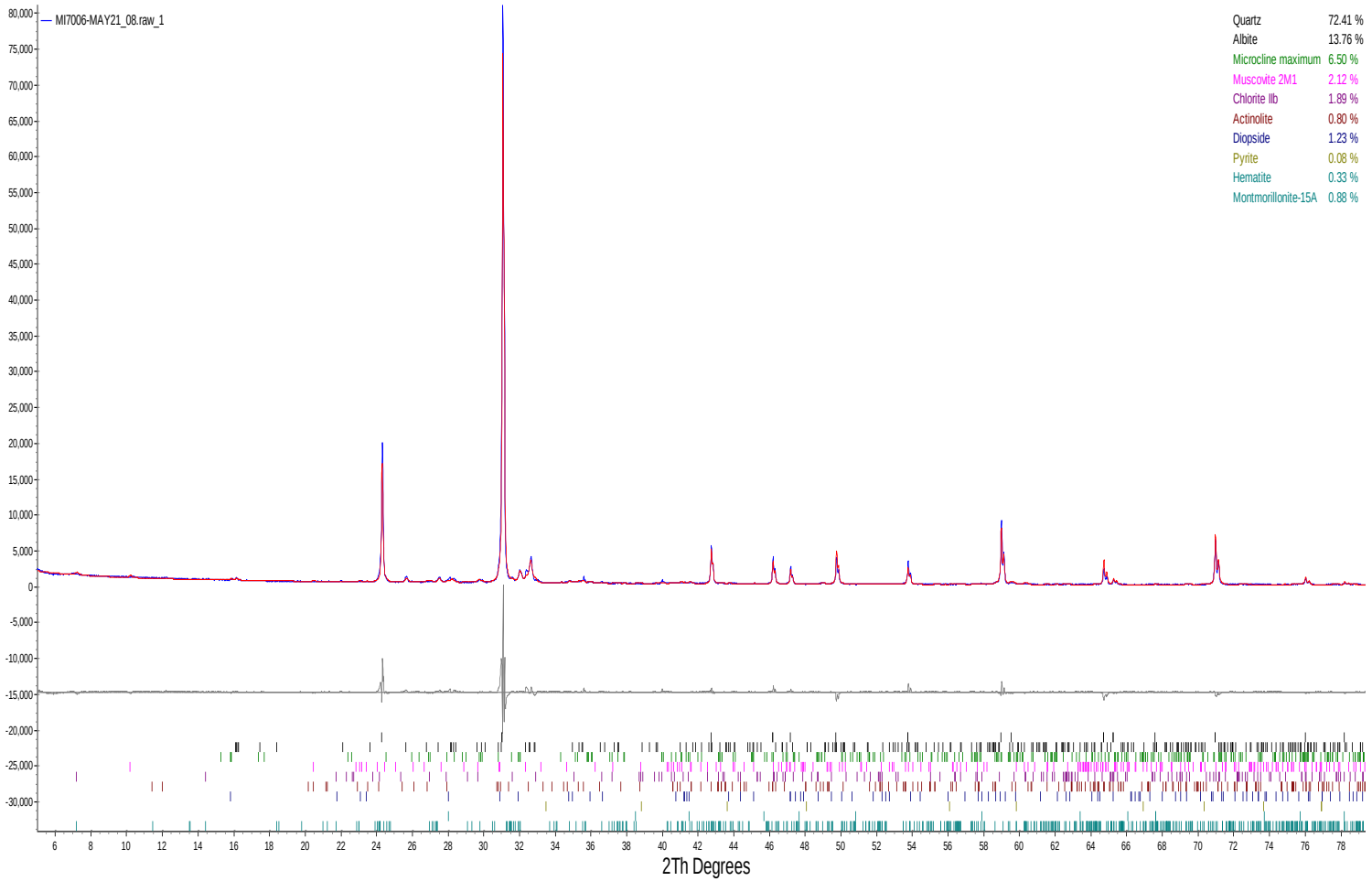


Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

EW-3-FA (10-17)

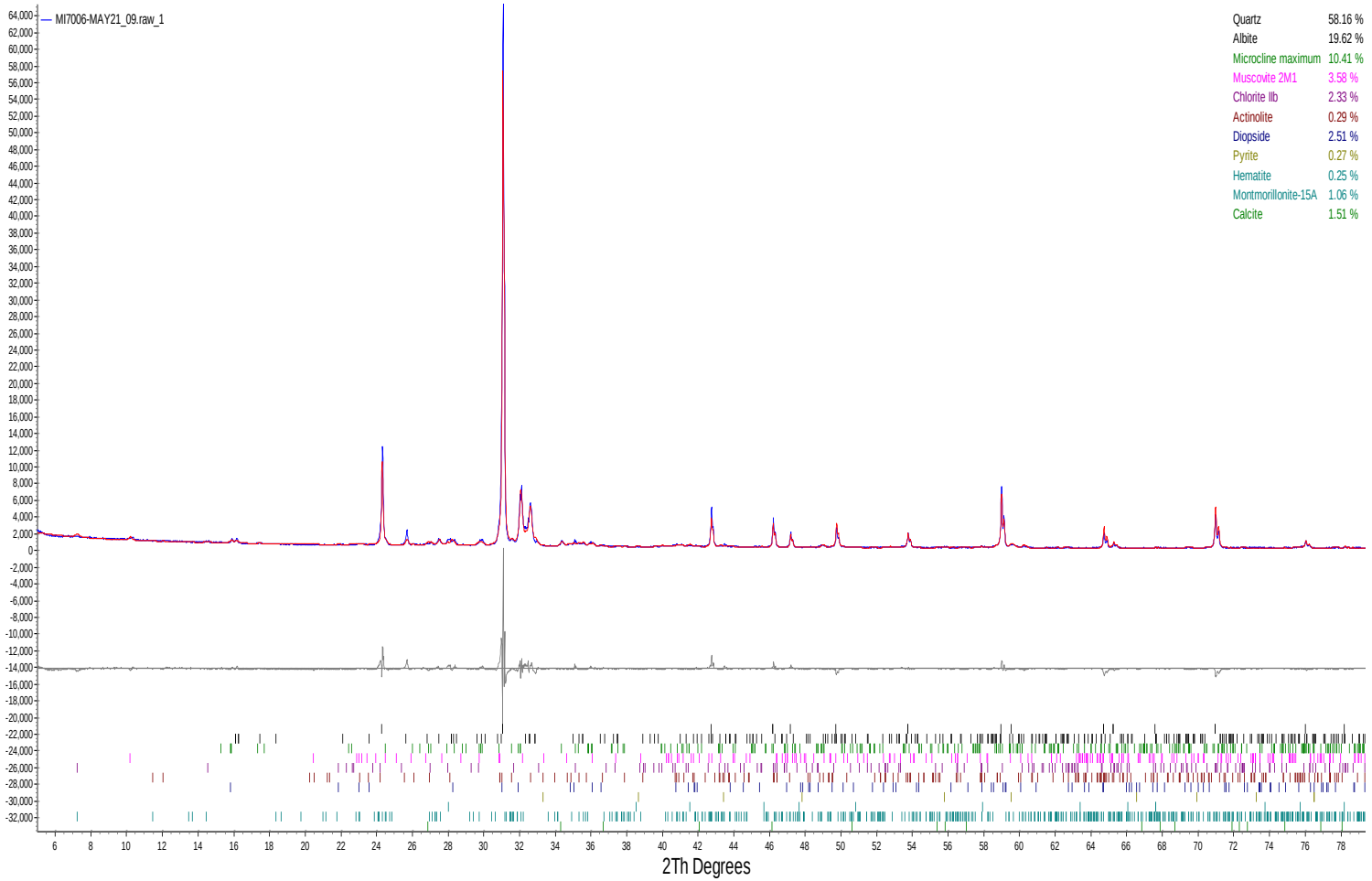


S-BH-01 S

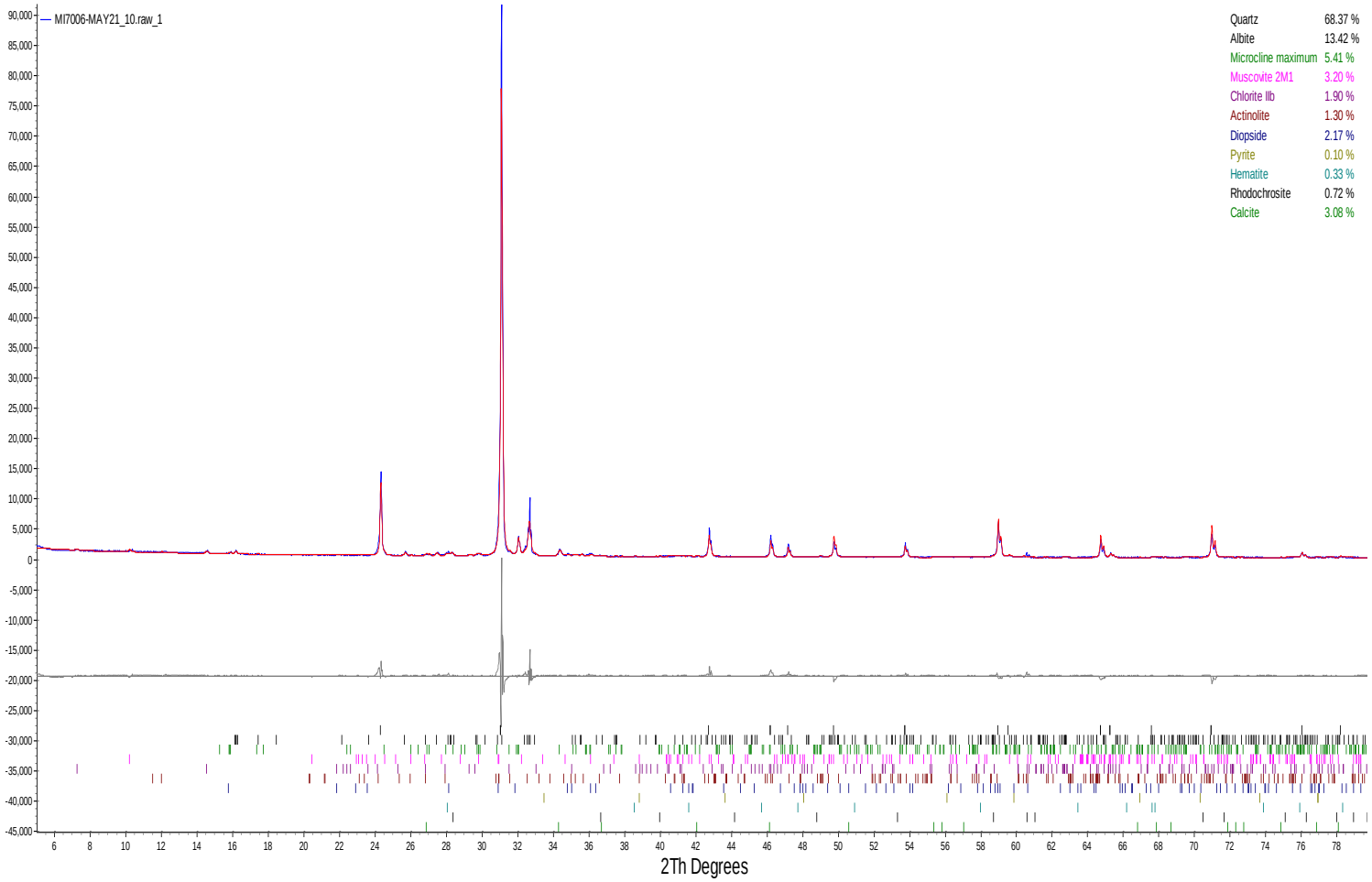

MI7006-MAY21_08.raw_1
Quartz 72.41 %
Albite 13.76 %
Microcline maximum 6.50 %
Muscovite 2M1 2.12 %
Chlorite IIb 1.89 %
Actinolite 0.80 %
Diopside 1.23 %
Pyrite 0.08 %
Hematite 0.33 %
Montmorillonite-15A 0.88 %
2Th Degrees

Golder Associates Inc.
18502-02/MI7006-MAY21
06/30/2021

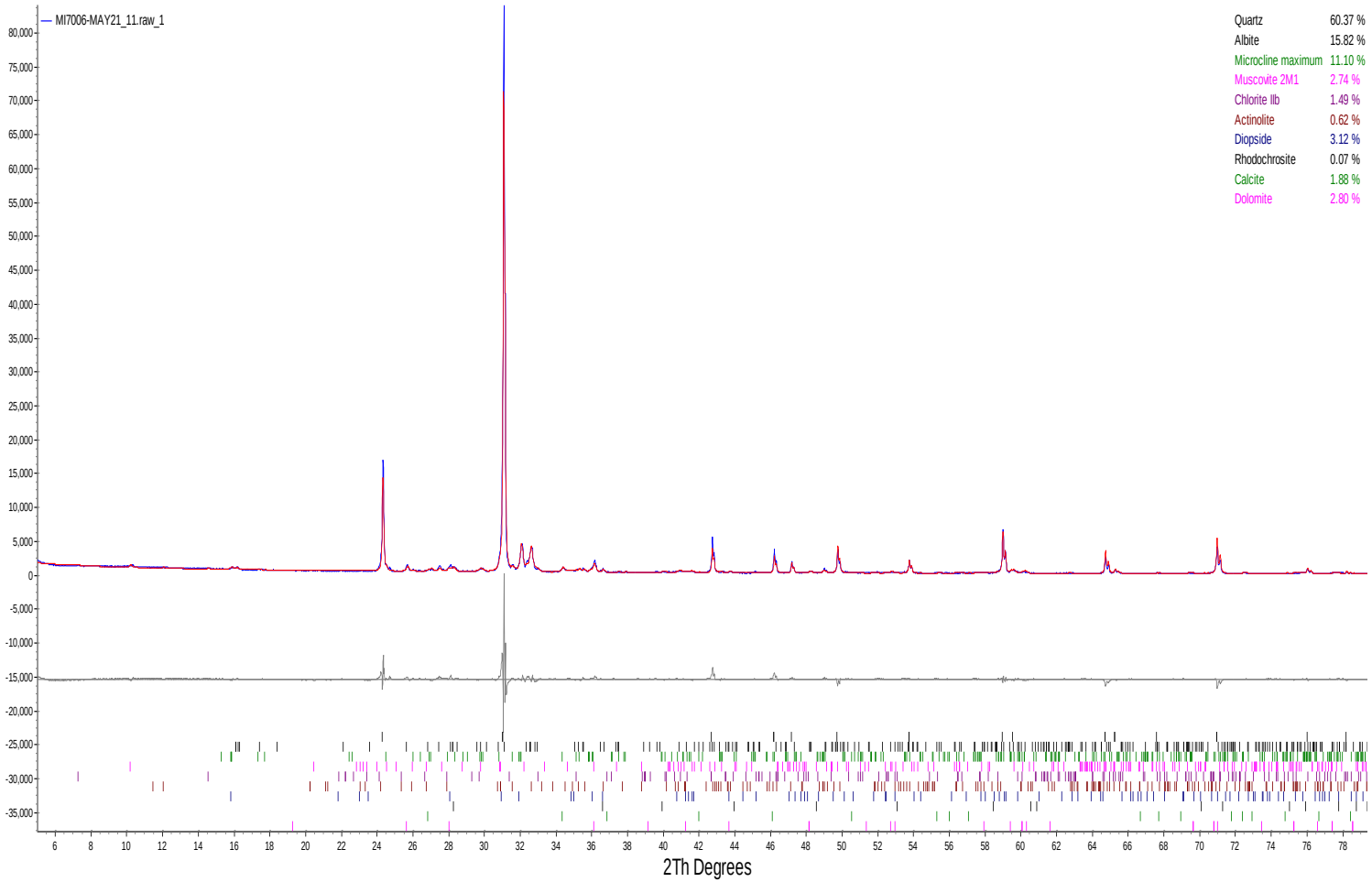
S-BH-01 M



S-BH-01 D


MI7006-MAY21_10.raw_1
Quartz 68.37 %
Albite 13.42 %
Microcline maximum 5.41 %
Muscovite 2M1 3.20 %
Chlorite IIb 1.90 %
Actinolite 1.30 %
Diopside 2.17 %
Pyrite 0.10 %
Hematite 0.33 %
Rhodochrosite 0.72 %
Calcite 3.08 %
2Th Degrees

S-BH-01 (93-96)


MI7006-MAY21_11.raw_1
Quartz 60.37 %
Albite 15.82 %
Microcline maximum 11.10 %
Muscovite 2M1 2.74 %
Chlorite IIb 1.49 %
Actinolite 0.62 %
Diopside 3.12 %
Rhodochrosite 0.07 %
Calcite 1.88 %
Dolomite 2.80 %
2Th Degrees

APPENDIX C

Sequential Extraction Laboratory Report

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-23289-1
Client Project/Site: Sioux Energy Center

For:
Golder Associates Inc.
13515 Barrett Parkway Drive
Suite 260
Ballwin, Missouri 63021

Attn: Jeffrey Ingram

Ryan Henry

Authorized for release by:
7/30/2021 10:09:48 AM

Ryan Henry, Project Manager I
(865)291-3000
williamr.henry@eurofinset.com

Table of Contents

Definitions/Glossary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
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: 140-23289-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-23289-1

Receipt
The samples were received on 5/28/2021 at 10:00am and arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.5º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

· Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO4), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO3-H2O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/mL
V = Final volume of digestate, mL
D = Instrument dilution factor
V1 = Total volume of leachate, mL
V2 = Volume of leachate digested, mL
W = Wet weight of sample, g
S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in

Job ID: 140-23289-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

A laboratory sample duplicate was prepared and analyzed with each batch of samples in order to provide information regarding the reproducibility of the procedure.

SEP Report Notes:

The final report lists the results for each step, the result for the total digestion of the sample, and a sum of the results of steps 1 through 7 by element.

Magnesium was not reported for step 1 because the extraction solution for this step (magnesium sulfate) contains high levels of magnesium. Sodium was not reported for steps 2 and 5 since the extraction solutions for these steps contain high levels of sodium. The sum of steps 1 through 7 is much higher than the total result for sodium and magnesium due to the magnesium and sodium introduced by the extraction solutions.

The digestates for steps 1, 2 and 5 were analyzed at a dilution due to instrument problems caused by the high solids content of the digestates. The reporting limits were adjusted accordingly.

Method 6010B: The following samples were diluted due to the nature of the sample matrix: S-BH-01S (140-23289-1), S-BH-01M (140-23289-2), S-BH-01D (140-23289-3) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B: The serial dilution performed for the following sample associated with batch 140-52210 was outside control limits: (140-23289-A-2-D SD ^5)

Method 6010B: The sample duplicate (DUP) precision for preparation batch 140-51614 and analytical batch 140-52210 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: S-BH-01S (140-23289-1), S-BH-01M (140-23289-2), S-BH-01D (140-23289-3) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, sodium, within the calibration range: S-BH-01M (140-23289-2) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-51666 and 140-51707 and analytical batch 140-51972 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, sodium, within the calibration range: S-BH-01S (140-23289-1), S-BH-01M (140-23289-2), S-BH-01D (140-23289-3) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The serial dilution performed for the following sample associated with batch 140-52062 was outside control limits: (140-23289-A-2-AB SD ^5)

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: S-BH-01S (140-23289-1), S-BH-01M (140-23289-2), S-BH-01D (140-23289-3) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided.

Job ID: 140-23289-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

Method 6010B SEP: The following sample was diluted due to the presence of silicon which interferes with Arsenic and Selenium: S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: S-BH-01S (140-23289-1), S-BH-01M (140-23289-2), S-BH-01D (140-23289-3) and S-BH-01 (93-96) (140-23289-4). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B SEP: The following sample was diluted to bring the concentration of target analyte, potassium, within the calibration range: S-BH-01 (93-96) (140-23289-4). 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.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-23289-1	S-BH-01S	Solid	05/22/21 12:18	05/28/21 10:00
140-23289-2	S-BH-01M	Solid	05/22/21 13:15	05/28/21 10:00
140-23289-3	S-BH-01D	Solid	05/22/21 15:05	05/28/21 10:00
140-23289-4	S-BH-01 (93-96)	Solid	05/22/21 15:05	05/28/21 10:00

Client Sample ID: S-BH-01S
Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1
Matrix: Solid
Percent Solids: 80.5

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	7.9	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Antimony	ND		15	1.4	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Calcium	**390**	**J B**	1200	9.4	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Iron	ND		25	14	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Lithium	ND		12	0.75	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Manganese	**0.16**	**J**	3.7	0.15	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Molybdenum	ND		9.9	0.41	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Potassium	ND		1200	130	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Selenium	ND		2.5	0.84	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4
Sodium	ND		1200	650	mg/Kg	☼	07/13/21 08:00	07/21/21 12:23	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		37	6.0	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Antimony	ND		11	1.0	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Arsenic	ND		1.9	0.48	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Calcium	**60**	**J**	930	8.2	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Cobalt	ND		9.3	0.23	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Iron	**13**	**J**	19	11	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Lithium	ND		9.3	0.56	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Manganese	**2.3**	**J**	2.8	1.0	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Molybdenum	ND		7.5	0.31	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Potassium	ND		930	97	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3
Selenium	ND		1.9	0.63	mg/Kg	☼	07/13/21 08:00	07/21/21 14:11	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**38**		12	2.6	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Arsenic	**0.24**	**J**	0.62	0.16	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Calcium	**6.8**	**J**	310	1.9	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Cobalt	**0.60**	**J**	3.1	0.056	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Iron	**590**		6.2	3.6	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Lithium	ND		3.1	0.19	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Manganese	**14**	**B**	0.93	0.034	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Potassium	ND		310	32	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1
Sodium	**7000**		310	160	mg/Kg	☼	07/14/21 08:00	07/21/21 16:13	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**530**		12	2.0	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Antimony	ND		3.7	0.56	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Arsenic	**0.30**	**J**	0.62	0.27	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Calcium	**260**	**J**	310	2.7	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Cobalt	**1.5**	**J**	3.1	0.066	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Iron	**2000**		6.2	3.6	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1

Client Sample ID: S-BH-01S
Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1
Matrix: Solid
Percent Solids: 80.5

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.69	J	3.1	0.19	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Manganese	17		0.93	0.16	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Potassium	ND		310	32	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Selenium	ND		0.62	0.58	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1
Sodium	400		310	160	mg/Kg	☼	07/15/21 08:00	07/22/21 13:40	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	70	J	190	29	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Antimony	ND		56	5.2	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Arsenic	ND		9.3	2.4	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Calcium	92	J B	4700	14	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Cobalt	ND		47	0.75	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Iron	ND		93	55	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Lithium	ND		47	2.7	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Manganese	ND		14	2.3	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Molybdenum	ND		37	1.6	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Potassium	3300	J B	4700	530	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5
Selenium	ND		9.3	3.2	mg/Kg	☼	07/17/21 08:14	07/22/21 15:25	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	700		12	2.0	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Arsenic	0.42	J	0.62	0.19	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Calcium	170	J	310	2.6	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Cobalt	0.82	J	3.1	0.057	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Iron	2600		6.2	3.6	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Lithium	0.65	J	3.1	0.19	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Manganese	17		0.93	0.31	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Potassium	140	J	310	32	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/16/21 12:00	07/22/21 17:15	1
Sodium	20000		1600	810	mg/Kg	☼	07/16/21 12:00	07/22/21 18:50	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		120	20	mg/Kg	☼	07/20/21 08:00	07/23/21 12:55	10
Antimony	0.31	J	3.7	0.17	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Arsenic	0.80		0.62	0.16	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Calcium	3600		3100	32	mg/Kg	☼	07/20/21 08:00	07/23/21 12:55	10
Cobalt	0.37	J	3.1	0.032	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Iron	2500		6.2	5.1	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Lithium	2.9	J	3.1	0.19	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Manganese	38		0.93	0.14	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Potassium	11000		1600	62	mg/Kg	☼	07/20/21 08:00	07/28/21 14:27	5
Selenium	ND		0.62	0.21	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1
Sodium	8400		310	53	mg/Kg	☼	07/20/21 08:00	07/23/21 14:49	1

Client Sample ID: S-BH-01S

Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1

Matrix: Solid
Percent Solids: 80.5

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			07/29/21 21:02	1
Antimony	**0.31**	**J**	3.0	0.14	mg/Kg			07/29/21 21:02	1
Arsenic	**1.8**		0.50	0.13	mg/Kg			07/29/21 21:02	1
Calcium	**4600**		250	0.74	mg/Kg			07/29/21 21:02	1
Cobalt	**3.3**		2.5	0.023	mg/Kg			07/29/21 21:02	1
Iron	**7700**		5.0	4.1	mg/Kg			07/29/21 21:02	1
Lithium	**4.2**		2.5	0.15	mg/Kg			07/29/21 21:02	1
Manganese	**87**		0.75	0.052	mg/Kg			07/29/21 21:02	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/29/21 21:02	1
Potassium	**15000**		250	26	mg/Kg			07/29/21 21:02	1
Selenium	ND		0.50	0.17	mg/Kg			07/29/21 21:02	1
Sodium	**36000**		250	130	mg/Kg			07/29/21 21:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1700**		46	5.8	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Antimony	ND		7.0	0.39	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Arsenic	**1.2**	**J**	2.3	0.34	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Calcium	**1100**		580	100	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Cobalt	**3.0**	**J**	5.8	0.056	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Iron	**5300**		23	9.2	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Lithium	**1.7**	**J**	5.8	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Manganese	**57**		1.7	0.72	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Molybdenum	ND		4.6	0.13	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Potassium	**160**	**J**	580	28	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Selenium	ND		1.7	0.51	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1
Sodium	ND		580	42	mg/Kg	☼	06/10/21 08:00	06/11/21 12:06	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**29000**		120	20	mg/Kg	☼	07/12/21 08:00	07/28/21 17:04	10
Antimony	**0.41**	**J**	3.7	0.17	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Arsenic	**2.2**	**B**	0.62	0.16	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Calcium	**7300**		3100	32	mg/Kg	☼	07/12/21 08:00	07/28/21 17:04	10
Cobalt	**3.0**	**J**	3.1	0.032	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Iron	**7500**		6.2	5.1	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Lithium	**4.2**		3.1	0.19	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Manganese	**110**		0.93	0.14	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Molybdenum	**0.12**	**J**	2.5	0.10	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Potassium	**12000**		1600	62	mg/Kg	☼	07/12/21 08:00	07/29/21 13:01	5
Selenium	**0.29**	**J**	0.62	0.21	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1
Sodium	**8600**		310	53	mg/Kg	☼	07/12/21 08:00	07/29/21 11:13	1

Client Sample ID: S-BH-01M

Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2

Matrix: Solid
Percent Solids: 85.7

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		47	7.5	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Antimony	ND		14	1.3	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Arsenic	ND		2.3	0.61	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Calcium	**540**	**J B**	1200	8.9	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Cobalt	ND		12	0.21	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Iron	ND		23	14	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Lithium	ND		12	0.70	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Manganese	**0.78**	**J**	3.5	0.14	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Molybdenum	ND		9.3	0.38	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Potassium	ND		1200	120	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Selenium	ND		2.3	0.79	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4
Sodium	ND		1200	610	mg/Kg	☼	07/13/21 08:00	07/21/21 12:28	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.8**	**J**	35	5.6	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Antimony	ND		11	0.98	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Arsenic	ND		1.8	0.46	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Calcium	**1300**		880	7.7	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Cobalt	ND		8.8	0.22	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Iron	**110**		18	10	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Lithium	ND		8.8	0.53	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Manganese	**24**		2.6	0.98	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Molybdenum	ND		7.0	0.29	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Potassium	**100**	**J**	880	91	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3
Selenium	ND		1.8	0.60	mg/Kg	☼	07/13/21 08:00	07/21/21 14:16	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**48**		12	2.5	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Antimony	ND		3.5	0.33	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Arsenic	**0.25**	**J**	0.58	0.15	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Calcium	**5.9**	**J**	290	1.8	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Cobalt	**0.42**	**J**	2.9	0.053	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Iron	**390**		5.8	3.4	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Lithium	ND		2.9	0.18	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Manganese	**11**	**B**	0.88	0.032	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Potassium	ND		290	30	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Selenium	ND		0.58	0.20	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1
Sodium	**6100**		290	150	mg/Kg	☼	07/14/21 08:00	07/21/21 16:17	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**530**		12	1.9	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Antimony	ND		3.5	0.53	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Arsenic	**0.40**	**J**	0.58	0.26	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Calcium	**950**		290	2.6	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Cobalt	**1.2**	**J**	2.9	0.062	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Iron	**1200**		5.8	3.4	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2
Matrix: Solid
Percent Solids: 85.7

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.91	J	2.9	0.18	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Manganese	16		0.88	0.15	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Potassium	67	J	290	30	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Selenium	ND		0.58	0.55	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1
Sodium	330		290	150	mg/Kg	☼	07/15/21 08:00	07/22/21 13:44	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	99	J	180	27	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Antimony	ND		53	4.9	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Arsenic	ND		8.8	2.2	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Calcium	290	J B	4400	13	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Cobalt	ND		44	0.70	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Iron	ND		88	51	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Lithium	ND		44	2.6	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Manganese	ND		13	2.2	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Molybdenum	ND		35	1.5	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Potassium	3200	J B	4400	500	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5
Selenium	ND		8.8	3.0	mg/Kg	☼	07/17/21 08:14	07/22/21 15:31	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	870		12	1.9	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Antimony	ND		3.5	0.33	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Arsenic	0.88		0.58	0.18	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Calcium	260	J	290	2.5	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Cobalt	0.99	J	2.9	0.054	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Iron	2000		5.8	3.4	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Lithium	0.99	J	2.9	0.18	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Manganese	14		0.88	0.29	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Molybdenum	ND		2.3	0.12	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Potassium	220	J	290	30	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Selenium	ND		0.58	0.20	mg/Kg	☼	07/16/21 12:00	07/22/21 17:20	1
Sodium	20000		1500	760	mg/Kg	☼	07/16/21 12:00	07/22/21 18:55	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		120	19	mg/Kg	☼	07/20/21 08:00	07/23/21 13:00	10
Antimony	0.33	J	3.5	0.16	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Arsenic	1.1		0.58	0.15	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Calcium	3900		2900	30	mg/Kg	☼	07/20/21 08:00	07/23/21 13:00	10
Cobalt	0.57	J	2.9	0.030	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Iron	2700		5.8	4.8	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Lithium	4.0		2.9	0.18	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Manganese	38		0.88	0.13	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Molybdenum	ND		2.3	0.096	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Potassium	24000		1500	58	mg/Kg	☼	07/20/21 08:00	07/28/21 14:31	5
Selenium	ND		0.58	0.20	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1
Sodium	10000		290	50	mg/Kg	☼	07/20/21 08:00	07/23/21 14:54	1

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2
Matrix: Solid
Percent Solids: 85.7

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	31000		10	1.6	mg/Kg			07/29/21 21:02	1
Antimony	0.33	J	3.0	0.14	mg/Kg			07/29/21 21:02	1
Arsenic	2.6		0.50	0.13	mg/Kg			07/29/21 21:02	1
Calcium	7200		250	0.74	mg/Kg			07/29/21 21:02	1
Cobalt	3.2		2.5	0.023	mg/Kg			07/29/21 21:02	1
Iron	6400		5.0	4.1	mg/Kg			07/29/21 21:02	1
Lithium	5.9		2.5	0.15	mg/Kg			07/29/21 21:02	1
Manganese	100		0.75	0.052	mg/Kg			07/29/21 21:02	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/29/21 21:02	1
Potassium	27000		250	26	mg/Kg			07/29/21 21:02	1
Selenium	ND		0.50	0.17	mg/Kg			07/29/21 21:02	1
Sodium	37000		250	130	mg/Kg			07/29/21 21:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2000		43	5.4	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Antimony	ND		6.5	0.37	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Arsenic	2.6		2.2	0.31	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Calcium	13000	F1	540	95	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Cobalt	3.3	J	5.4	0.052	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Iron	4400		22	8.5	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Lithium	2.8	J	5.4	0.32	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Manganese	250	F2	1.6	0.67	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Molybdenum	ND		4.3	0.12	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Potassium	360	J	540	26	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Selenium	ND		1.6	0.47	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1
Sodium	ND		540	39	mg/Kg	☼	06/10/21 08:00	06/11/21 12:11	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	45000		120	19	mg/Kg	☼	07/12/21 08:00	07/28/21 17:08	10
Antimony	0.43	J	3.5	0.16	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Arsenic	4.0	B	0.58	0.15	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Calcium	11000		2900	30	mg/Kg	☼	07/12/21 08:00	07/28/21 17:08	10
Cobalt	3.7		2.9	0.030	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Iron	7200		5.8	4.8	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Lithium	8.1		2.9	0.18	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Manganese	130		0.88	0.13	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Molybdenum	0.31	J	2.3	0.096	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Potassium	22000		1500	58	mg/Kg	☼	07/12/21 08:00	07/29/21 13:06	5
Selenium	ND		0.58	0.20	mg/Kg	☼	07/12/21 08:00	07/29/21 11:18	1
Sodium	14000		1500	250	mg/Kg	☼	07/12/21 08:00	07/29/21 13:06	5

Client Sample ID: S-BH-01D

Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-3

Matrix: Solid
Percent Solids: 89.7

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		45	7.1	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Antimony	ND		13	1.2	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Arsenic	ND		2.2	0.58	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Calcium	**300**	**J B**	1100	8.5	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Cobalt	ND		11	0.20	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Iron	ND		22	13	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Lithium	ND		11	0.67	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Manganese	**8.3**		3.3	0.14	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Molybdenum	ND		8.9	0.37	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Potassium	ND		1100	120	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Selenium	ND		2.2	0.76	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4
Sodium	ND		1100	580	mg/Kg	☼	07/13/21 08:00	07/21/21 12:37	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**8.8**	**J**	33	5.4	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Antimony	ND		10	0.94	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Arsenic	ND		1.7	0.43	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Calcium	**2500**		840	7.4	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Cobalt	**0.45**	**J**	8.4	0.21	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Iron	**370**		17	9.7	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Lithium	ND		8.4	0.50	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Manganese	**110**		2.5	0.94	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Molybdenum	ND		6.7	0.27	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Potassium	**89**	**J**	840	87	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3
Selenium	ND		1.7	0.57	mg/Kg	☼	07/13/21 08:00	07/21/21 14:26	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**51**		11	2.3	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Antimony	ND		3.3	0.31	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Arsenic	ND		0.56	0.14	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Calcium	**5.7**	**J**	280	1.7	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Cobalt	**0.53**	**J**	2.8	0.050	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Iron	**1200**		5.6	3.2	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Lithium	ND		2.8	0.17	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Manganese	**43**	**B**	0.84	0.030	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Molybdenum	ND		2.2	0.091	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Potassium	ND		280	29	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1
Sodium	**6600**		280	140	mg/Kg	☼	07/14/21 08:00	07/21/21 16:27	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**420**		11	1.8	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Antimony	ND		3.3	0.50	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Arsenic	**0.47**	**J**	0.56	0.25	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Calcium	**1400**		280	2.5	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Cobalt	**1.7**	**J**	2.8	0.059	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Iron	**1300**		5.6	3.2	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1

Client Sample ID: S-BH-01D
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-3
Matrix: Solid
Percent Solids: 89.7

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.67	J	2.8	0.17	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Manganese	30		0.84	0.14	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Molybdenum	ND		2.2	0.091	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Potassium	ND		280	29	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Selenium	ND		0.56	0.52	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1
Sodium	460		280	140	mg/Kg	☼	07/15/21 08:00	07/22/21 13:54	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	76	J	170	26	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Antimony	ND		50	4.7	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Arsenic	ND		8.4	2.1	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Calcium	860	J B	4200	12	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Cobalt	ND		42	0.67	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Iron	ND		84	49	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Lithium	2.7	J	42	2.5	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Manganese	2.4	J	13	2.1	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Molybdenum	ND		33	1.4	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Potassium	2900	J B	4200	470	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5
Selenium	ND		8.4	2.9	mg/Kg	☼	07/17/21 08:14	07/22/21 15:41	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	710		11	1.8	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Antimony	ND		3.3	0.31	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Arsenic	2.7		0.56	0.17	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Calcium	1300		280	2.3	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Cobalt	1.5	J	2.8	0.051	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Iron	2500		5.6	3.2	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Lithium	1.0	J	2.8	0.17	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Manganese	25		0.84	0.28	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Molybdenum	ND		2.2	0.11	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Potassium	130	J	280	29	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/16/21 12:00	07/22/21 17:30	1
Sodium	21000		1400	720	mg/Kg	☼	07/16/21 12:00	07/22/21 19:04	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		110	18	mg/Kg	☼	07/20/21 08:00	07/23/21 13:09	10
Antimony	0.39	J	3.3	0.16	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Arsenic	1.1		0.56	0.14	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Calcium	6800		2800	29	mg/Kg	☼	07/20/21 08:00	07/23/21 13:09	10
Cobalt	3.4		2.8	0.029	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Iron	6200		5.6	4.6	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Lithium	3.5		2.8	0.17	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Manganese	110		0.84	0.12	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Molybdenum	ND		2.2	0.091	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Potassium	18000		1400	56	mg/Kg	☼	07/20/21 08:00	07/28/21 14:41	5
Selenium	ND		0.56	0.19	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1
Sodium	9600		280	48	mg/Kg	☼	07/20/21 08:00	07/23/21 15:04	1

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01D
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-3
Matrix: Solid
Percent Solids: 89.7

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			07/29/21 21:02	1
Antimony	0.39	J	3.0	0.14	mg/Kg			07/29/21 21:02	1
Arsenic	4.3		0.50	0.13	mg/Kg			07/29/21 21:02	1
Calcium	13000		250	0.74	mg/Kg			07/29/21 21:02	1
Cobalt	7.5		2.5	0.023	mg/Kg			07/29/21 21:02	1
Iron	12000		5.0	4.1	mg/Kg			07/29/21 21:02	1
Lithium	7.9		2.5	0.15	mg/Kg			07/29/21 21:02	1
Manganese	320		0.75	0.052	mg/Kg			07/29/21 21:02	1
Molybdenum	ND		2.0	0.082	mg/Kg			07/29/21 21:02	1
Potassium	21000		250	26	mg/Kg			07/29/21 21:02	1
Selenium	ND		0.50	0.17	mg/Kg			07/29/21 21:02	1
Sodium	37000		250	130	mg/Kg			07/29/21 21:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1500		41	5.2	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Antimony	ND		6.2	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Arsenic	3.6		2.1	0.30	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Calcium	6500		520	91	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Cobalt	5.3		5.2	0.050	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Iron	6400		21	8.2	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Lithium	1.9	J	5.2	0.31	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Manganese	310		1.6	0.64	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Molybdenum	ND		4.1	0.11	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Potassium	180	J	520	25	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Selenium	0.53	J	1.6	0.46	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1
Sodium	53	J	520	37	mg/Kg	☼	06/10/21 08:00	06/11/21 12:25	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		110	18	mg/Kg	☼	07/12/21 08:00	07/28/21 17:18	10
Antimony	0.31	J	3.3	0.16	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Arsenic	3.5	B	0.56	0.14	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Calcium	10000		2800	29	mg/Kg	☼	07/12/21 08:00	07/28/21 17:18	10
Cobalt	6.1		2.8	0.029	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Iron	10000		5.6	4.6	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Lithium	7.7		2.8	0.17	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Manganese	320		0.84	0.12	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Molybdenum	0.11	J	2.2	0.091	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Potassium	13000		1400	56	mg/Kg	☼	07/12/21 08:00	07/29/21 13:16	5
Selenium	ND		0.56	0.19	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1
Sodium	9300		280	48	mg/Kg	☼	07/12/21 08:00	07/29/21 11:28	1

Client Sample ID: S-BH-01 (93-96)
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-4
Matrix: Solid
Percent Solids: 90.1

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		44	7.1	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Antimony	ND		13	1.2	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Arsenic	ND		2.2	0.58	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Calcium	**900**	**J B**	1100	8.4	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Cobalt	ND		11	0.20	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Iron	ND		22	13	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Lithium	ND		11	0.67	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Manganese	**9.8**		3.3	0.14	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Molybdenum	ND		8.9	0.36	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Potassium	ND		1100	120	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Selenium	ND		2.2	0.76	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4
Sodium	ND		1100	580	mg/Kg	☼	07/13/21 08:00	07/21/21 12:42	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**19**	**J**	33	5.3	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Antimony	ND		10	0.93	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Arsenic	ND		1.7	0.43	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Calcium	**2500**		830	7.3	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Cobalt	**0.28**	**J**	8.3	0.21	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Iron	**86**		17	9.7	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Lithium	ND		8.3	0.50	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Manganese	**57**		2.5	0.93	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Molybdenum	ND		6.7	0.27	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Potassium	**130**	**J**	830	87	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3
Selenium	ND		1.7	0.57	mg/Kg	☼	07/13/21 08:00	07/21/21 14:31	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**110**		11	2.3	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Antimony	ND		3.3	0.31	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Arsenic	**0.41**	**J**	0.56	0.14	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Calcium	**5.0**	**J**	280	1.7	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Cobalt	**0.75**	**J**	2.8	0.050	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Iron	**800**		5.6	3.2	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Lithium	ND		2.8	0.17	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Manganese	**23**	**B**	0.83	0.030	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Molybdenum	**0.25**	**J**	2.2	0.091	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Potassium	ND		280	29	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1
Sodium	**5900**		280	140	mg/Kg	☼	07/14/21 08:00	07/21/21 16:32	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**450**		11	1.8	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Antimony	ND		3.3	0.50	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Arsenic	**0.60**		0.56	0.24	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Calcium	**1300**		280	2.4	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Cobalt	**1.0**	**J**	2.8	0.059	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Iron	**1300**		5.6	3.2	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1

Client Sample ID: S-BH-01 (93-96)

Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-4

Matrix: Solid
Percent Solids: 90.1

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	0.68	J	2.8	0.17	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Manganese	21		0.83	0.14	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Molybdenum	0.12	J	2.2	0.091	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Potassium	50	J	280	29	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Selenium	ND		0.56	0.52	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1
Sodium	410		280	140	mg/Kg	☼	07/15/21 08:00	07/22/21 13:59	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	44	J	170	26	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Antimony	ND		50	4.7	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Arsenic	ND		8.3	2.1	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Calcium	660	J B	4200	12	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Cobalt	0.67	J	42	0.67	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Iron	ND		83	49	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Lithium	2.4	J	42	2.4	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Manganese	3.6	J	12	2.1	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Molybdenum	ND		33	1.4	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Potassium	2800	J B	4200	470	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5
Selenium	ND		8.3	2.9	mg/Kg	☼	07/17/21 08:14	07/22/21 15:46	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	540		11	1.8	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Antimony	ND		3.3	0.31	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Arsenic	1.0		0.56	0.17	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Calcium	300		280	2.3	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Cobalt	0.65	J	2.8	0.051	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Iron	1400		5.6	3.2	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Lithium	0.76	J	2.8	0.17	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Manganese	12		0.83	0.28	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Molybdenum	ND		2.2	0.11	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Potassium	180	J	280	29	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/16/21 12:00	07/22/21 17:34	1
Sodium	19000		1400	720	mg/Kg	☼	07/16/21 12:00	07/22/21 19:09	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000		110	18	mg/Kg	☼	07/20/21 08:00	07/23/21 13:14	10
Antimony	0.18	J	3.3	0.16	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Arsenic	ND		1.1	0.29	mg/Kg	☼	07/20/21 08:00	07/28/21 14:46	2
Calcium	3400		2800	29	mg/Kg	☼	07/20/21 08:00	07/23/21 13:14	10
Cobalt	ND		2.8	0.029	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Iron	1300		5.6	4.6	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Lithium	2.3	J	2.8	0.17	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Manganese	27		0.83	0.12	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Molybdenum	0.13	J	2.2	0.091	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1
Potassium	16000		1400	56	mg/Kg	☼	07/20/21 08:00	07/28/21 14:51	5
Selenium	ND		1.1	0.38	mg/Kg	☼	07/20/21 08:00	07/28/21 14:46	2
Sodium	8900		280	48	mg/Kg	☼	07/20/21 08:00	07/23/21 15:10	1

Client Sample ID: S-BH-01 (93-96)

Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-4

Matrix: Solid
Percent Solids: 90.1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		10	1.6	mg/Kg			07/29/21 21:02	1
Antimony	0.18	J	3.0	0.14	mg/Kg			07/29/21 21:02	1
Arsenic	2.0		0.50	0.13	mg/Kg			07/29/21 21:02	1
Calcium	9100		250	0.74	mg/Kg			07/29/21 21:02	1
Cobalt	3.4		2.5	0.023	mg/Kg			07/29/21 21:02	1
Iron	4900		5.0	4.1	mg/Kg			07/29/21 21:02	1
Lithium	6.1		2.5	0.15	mg/Kg			07/29/21 21:02	1
Manganese	150		0.75	0.052	mg/Kg			07/29/21 21:02	1
Molybdenum	0.50	J	2.0	0.082	mg/Kg			07/29/21 21:02	1
Potassium	19000		250	26	mg/Kg			07/29/21 21:02	1
Selenium	ND		0.50	0.17	mg/Kg			07/29/21 21:02	1
Sodium	34000		250	130	mg/Kg			07/29/21 21:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1600		43	5.3	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Antimony	ND		6.4	0.36	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Arsenic	2.8		2.1	0.31	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Calcium	9600		530	94	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Cobalt	4.1	J	5.3	0.051	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Iron	4000		21	8.4	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Lithium	1.7	J	5.3	0.32	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Manganese	250		1.6	0.66	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Molybdenum	0.91	J	4.3	0.12	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Potassium	370	J	530	26	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Selenium	0.50	J	1.6	0.47	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1
Sodium	140	J	530	38	mg/Kg	☼	06/10/21 08:00	06/11/21 12:30	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	41000		110	18	mg/Kg	☼	07/12/21 08:00	07/28/21 17:23	10
Antimony	0.54	J	3.3	0.16	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Arsenic	4.2	B	0.56	0.14	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Calcium	11000		2800	29	mg/Kg	☼	07/12/21 08:00	07/28/21 17:23	10
Cobalt	4.7		2.8	0.029	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Iron	6200		5.6	4.6	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Lithium	5.0		2.8	0.17	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Manganese	180		0.83	0.12	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Molybdenum	0.90	J	2.2	0.091	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Potassium	23000		1400	56	mg/Kg	☼	07/12/21 08:00	07/29/21 13:20	5
Selenium	0.27	J	0.56	0.19	mg/Kg	☼	07/12/21 08:00	07/29/21 11:34	1
Sodium	14000		1400	240	mg/Kg	☼	07/12/21 08:00	07/29/21 13:20	5

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

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
Calcium	250	1.9	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.031	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.28	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	1.5	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.027	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A

SEP: Metal Hydroxide

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

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
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.13	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.47	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Calcium	750	2.2	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Iron	15	8.8	mg/Kg
Lithium	7.5	0.44	mg/Kg
Manganese	2.3	0.37	mg/Kg
Molybdenum	6.0	0.25	mg/Kg
Potassium	750	85	mg/Kg
Selenium	1.5	0.52	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Calcium	250	2.1	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.25	mg/Kg
Molybdenum	2.0	0.099	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Prep: Residual

Analyte	RL	MDL	Units
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.11	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	0.74	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B - Metals (ICP)

Prep: 3050B

Analyte	RL	MDL	Units
Aluminum	40	5.0	mg/Kg
Antimony	6.0	0.34	mg/Kg
Arsenic	2.0	0.29	mg/Kg
Calcium	500	88	mg/Kg
Cobalt	5.0	0.048	mg/Kg
Iron	20	7.9	mg/Kg
Lithium	5.0	0.30	mg/Kg
Manganese	1.5	0.62	mg/Kg
Molybdenum	4.0	0.11	mg/Kg
Potassium	500	24	mg/Kg
Selenium	1.5	0.44	mg/Kg
Sodium	500	36	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Prep: Total

Analyte	RL	MDL	Units
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.11	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-50632/14-A
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 50632

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	5.0	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Antimony	ND		6.0	0.34	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Arsenic	ND		2.0	0.29	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Calcium	ND		500	88	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Cobalt	ND		5.0	0.048	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Iron	ND		20	7.9	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Lithium	ND		5.0	0.30	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Manganese	ND		1.5	0.62	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Molybdenum	ND		4.0	0.11	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Potassium	ND		500	24	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Selenium	ND		1.5	0.44	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Sodium	ND		500	36	mg/Kg		06/10/21 08:00	06/11/21 10:58	1

Lab Sample ID: LCS 140-50632/15-A
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	200	203		mg/Kg		102	90 - 110
Antimony	50.0	49.9		mg/Kg		100	90 - 110
Arsenic	10.0	9.86		mg/Kg		99	90 - 110
Calcium	5000	5060		mg/Kg		101	90 - 110
Cobalt	10.0	10.3		mg/Kg		103	90 - 110
Iron	100	104		mg/Kg		104	90 - 113
Lithium	10.0	9.88		mg/Kg		99	80 - 120
Manganese	10.0	10.6		mg/Kg		106	90 - 110
Molybdenum	50.0	51.7		mg/Kg		103	90 - 110
Potassium	5000	4980		mg/Kg		100	90 - 110
Selenium	15.0	14.8		mg/Kg		99	90 - 110
Sodium	5000	5060		mg/Kg		101	87 - 116

Lab Sample ID: 140-23289-2 MS
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: S-BH-01M
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	2000		232	4090	4	mg/Kg	☼	885	75 - 125
Antimony	ND		57.9	49.4		mg/Kg	☼	85	75 - 125
Arsenic	2.6		11.6	15.0		mg/Kg	☼	107	75 - 125
Calcium	13000	F1	5790	10400	F1	mg/Kg	☼	-48	75 - 125
Cobalt	3.3	J	11.6	14.6		mg/Kg	☼	97	75 - 125
Iron	4400		116	5400	4	mg/Kg	☼	830	75 - 125
Lithium	2.8	J	11.6	15.2		mg/Kg	☼	107	75 - 125
Manganese	250	F2	11.6	139	4	mg/Kg	☼	-942	75 - 125
Molybdenum	ND		57.9	56.0		mg/Kg	☼	97	75 - 125
Potassium	360	J	5790	6270		mg/Kg	☼	102	75 - 125
Selenium	ND		17.4	16.6		mg/Kg	☼	95	75 - 121
Sodium	ND		5790	5680		mg/Kg	☼	98	75 - 125

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 140-23289-2 MSD
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: S-BH-01M
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	2000		231	4050	4	mg/Kg	☼	869	75 - 125	1	20
Antimony	ND		57.8	48.5		mg/Kg	☼	84	75 - 125	2	20
Arsenic	2.6		11.6	13.2		mg/Kg	☼	92	75 - 125	13	20
Calcium	13000	F1	5780	8940	F1	mg/Kg	☼	-74	75 - 125	15	20
Cobalt	3.3	J	11.6	14.2		mg/Kg	☼	94	75 - 125	3	20
Iron	4400		116	4750	4	mg/Kg	☼	269	75 - 125	13	20
Lithium	2.8	J	11.6	14.1		mg/Kg	☼	98	75 - 125	7	20
Manganese	250	F2	11.6	93.1	4 F2	mg/Kg	☼	-1339	75 - 125	39	20
Molybdenum	ND		57.8	55.2		mg/Kg	☼	96	75 - 125	1	20
Potassium	360	J	5780	6130		mg/Kg	☼	100	75 - 125	2	20
Selenium	ND		17.3	16.3		mg/Kg	☼	94	75 - 121	2	20
Sodium	ND		5780	5590		mg/Kg	☼	97	75 - 125	1	20

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-51614/18-A
Matrix: Solid
Analysis Batch: 52192

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51614

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/12/21 08:00	07/28/21 16:44	1
Calcium	ND		250	2.6	mg/Kg		07/12/21 08:00	07/28/21 16:44	1

Lab Sample ID: MB 140-51614/18-A
Matrix: Solid
Analysis Batch: 52210

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 51614

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Antimony	ND		3.0	0.14	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Arsenic	0.134	J	0.50	0.13	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Calcium	ND		250	2.6	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Cobalt	ND		2.5	0.026	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Iron	ND		5.0	4.1	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Lithium	ND		2.5	0.15	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Manganese	ND		0.75	0.11	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Potassium	ND		250	10	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Selenium	ND		0.50	0.17	mg/Kg		07/12/21 08:00	07/29/21 10:53	1
Sodium	ND		250	43	mg/Kg		07/12/21 08:00	07/29/21 10:53	1

Lab Sample ID: LCS 140-51614/19-A
Matrix: Solid
Analysis Batch: 52192

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	100		mg/Kg		100	80 - 120
Calcium	2500	2550		mg/Kg		102	80 - 120

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: LCS 140-51614/19-A
Matrix: Solid
Analysis Batch: 52210

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	103		mg/Kg		103	80 - 120
Antimony	25.0	25.2		mg/Kg		101	80 - 125
Arsenic	5.00	5.16		mg/Kg		103	80 - 120
Calcium	2500	2610		mg/Kg		104	80 - 120
Cobalt	5.00	5.25		mg/Kg		105	80 - 125
Iron	50.0	53.6		mg/Kg		107	80 - 120
Lithium	5.00	5.15		mg/Kg		103	80 - 120
Manganese	5.00	5.42		mg/Kg		108	80 - 120
Molybdenum	25.0	26.6		mg/Kg		106	80 - 125
Potassium	2500	2630		mg/Kg		105	80 - 120
Selenium	7.50	7.51		mg/Kg		100	80 - 120
Sodium	2500	2660		mg/Kg		106	80 - 120

Lab Sample ID: LCSD 140-51614/20-A
Matrix: Solid
Analysis Batch: 52192

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	100		mg/Kg		100	80 - 120	0	30
Calcium	2500	2540		mg/Kg		101	80 - 120	1	30

Lab Sample ID: LCSD 140-51614/20-A
Matrix: Solid
Analysis Batch: 52210

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	103		mg/Kg		103	80 - 120	0	30
Antimony	25.0	25.3		mg/Kg		101	80 - 125	0	30
Arsenic	5.00	5.15		mg/Kg		103	80 - 120	0	30
Calcium	2500	2590		mg/Kg		103	80 - 120	1	30
Cobalt	5.00	5.24		mg/Kg		105	80 - 125	0	30
Iron	50.0	53.1		mg/Kg		106	80 - 120	1	30
Lithium	5.00	5.04		mg/Kg		101	80 - 120	2	30
Manganese	5.00	5.44		mg/Kg		109	80 - 120	0	30
Molybdenum	25.0	26.5		mg/Kg		106	80 - 125	0	30
Potassium	2500	2610		mg/Kg		104	80 - 120	1	30
Selenium	7.50	7.40		mg/Kg		99	80 - 120	2	30
Sodium	2500	2640		mg/Kg		105	80 - 120	1	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52192

Client Sample ID: S-BH-01M
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	45000		40200		mg/Kg	☼	12	30
Calcium	11000		10200		mg/Kg	☼	8	30

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52210

Client Sample ID: S-BH-01M
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	0.43	J	0.466	J	mg/Kg	☼	9	30
Arsenic	4.0	B	4.79		mg/Kg	☼	19	30
Cobalt	3.7		3.99		mg/Kg	☼	7	30
Iron	7200		9190		mg/Kg	☼	24	30
Lithium	8.1		7.80		mg/Kg	☼	4	30
Manganese	130		758	F3	mg/Kg	☼	143	30
Molybdenum	0.31	J	0.256	J	mg/Kg	☼	18	30
Selenium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52210

Client Sample ID: S-BH-01M
Prep Type: Total/NA
Prep Batch: 51614

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Potassium	22000		21000		mg/Kg	☼	7	30
Sodium	14000		12000		mg/Kg	☼	17	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-51615/18-B ^4
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 51654

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Antimony	ND		12	1.1	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Arsenic	ND		2.0	0.52	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Calcium	23.2	J	1000	7.6	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Cobalt	ND		10	0.18	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Iron	ND		20	12	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Lithium	ND		10	0.60	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Manganese	ND		3.0	0.12	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Molybdenum	ND		8.0	0.33	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Potassium	ND		1000	100	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Selenium	ND		2.0	0.68	mg/Kg		07/13/21 08:00	07/21/21 12:08	4
Sodium	ND		1000	520	mg/Kg		07/13/21 08:00	07/21/21 12:08	4

Lab Sample ID: LCS 140-51615/19-B ^5
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 51654

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	94.2		mg/Kg		94	80 - 120
Antimony	25.0	23.2		mg/Kg		93	80 - 120
Arsenic	5.00	4.51		mg/Kg		90	80 - 120
Calcium	2500	2330		mg/Kg		93	80 - 120
Cobalt	5.00	4.68	J	mg/Kg		94	80 - 120
Iron	50.0	48.1		mg/Kg		96	80 - 120
Lithium	5.00	4.89	J	mg/Kg		98	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-51615/19-B ^5
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 51654

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	5.00	4.95		mg/Kg		99	80 - 120
Molybdenum	25.0	23.6		mg/Kg		94	80 - 120
Potassium	2500	2500		mg/Kg		100	80 - 120
Selenium	7.50	7.36		mg/Kg		98	80 - 120
Sodium	2500	2450		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 140-51615/20-B ^5
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 51654

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	99.7		mg/Kg		100	80 - 120	6	30
Antimony	25.0	23.7		mg/Kg		95	80 - 120	2	30
Arsenic	5.00	4.52		mg/Kg		90	80 - 120	0	30
Calcium	2500	2390		mg/Kg		95	80 - 120	2	30
Cobalt	5.00	4.80	J	mg/Kg		96	80 - 120	3	30
Iron	50.0	49.4		mg/Kg		99	80 - 120	3	30
Lithium	5.00	4.94	J	mg/Kg		99	80 - 120	1	30
Manganese	5.00	5.04		mg/Kg		101	80 - 120	2	30
Molybdenum	25.0	24.1		mg/Kg		96	80 - 120	2	30
Potassium	2500	2550		mg/Kg		102	80 - 120	2	30
Selenium	7.50	7.47		mg/Kg		100	80 - 120	1	30
Sodium	2500	2510		mg/Kg		100	80 - 120	2	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: S-BH-01M
Prep Type: Step 1
Prep Batch: 51654

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	ND		ND		mg/Kg	☼	NC	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Calcium	540	J B	550	J	mg/Kg	☼	2	30
Cobalt	ND		ND		mg/Kg	☼	NC	30
Iron	ND		ND		mg/Kg	☼	NC	30
Lithium	ND		ND		mg/Kg	☼	NC	30
Manganese	0.78	J	0.826	J	mg/Kg	☼	6	30
Molybdenum	ND		ND		mg/Kg	☼	NC	30
Potassium	ND		ND		mg/Kg	☼	NC	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Sodium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-51653/15-B ^3
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 51667

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Antimony	ND		9.0	0.84	mg/Kg		07/13/21 08:00	07/21/21 13:55	3

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-51653/15-B ^3
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 51667

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.5	0.39	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Calcium	ND		750	6.6	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Cobalt	ND		7.5	0.19	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Iron	ND		15	8.7	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Lithium	ND		7.5	0.45	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Manganese	ND		2.3	0.84	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Molybdenum	ND		6.0	0.25	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Potassium	ND		750	78	mg/Kg		07/13/21 08:00	07/21/21 13:55	3
Selenium	ND		1.5	0.51	mg/Kg		07/13/21 08:00	07/21/21 13:55	3

Lab Sample ID: LCS 140-51653/16-B ^5
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 51667

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	ND		mg/Kg		0.3	
Antimony	25.0	21.2		mg/Kg		85	70 - 120
Arsenic	5.00	3.66		mg/Kg		73	60 - 120
Calcium	2500	659	J	mg/Kg		26	10 - 40
Cobalt	5.00	4.72	J	mg/Kg		94	80 - 120
Iron	50.0	ND		mg/Kg		3	
Lithium	5.00	4.68	J	mg/Kg		94	80 - 120
Manganese	5.00	4.89		mg/Kg		98	80 - 120
Molybdenum	25.0	21.2		mg/Kg		85	70 - 120
Potassium	2500	2550		mg/Kg		102	80 - 120
Selenium	7.50	6.87		mg/Kg		92	70 - 120

Lab Sample ID: LCSD 140-51653/17-B ^5
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 51667

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	ND		mg/Kg		-2		281	
Antimony	25.0	20.9		mg/Kg		83	70 - 120	2	30
Arsenic	5.00	3.54		mg/Kg		71	60 - 120	3	30
Calcium	2500	641	J	mg/Kg		26	10 - 40	3	30
Cobalt	5.00	4.54	J	mg/Kg		91	80 - 120	4	30
Iron	50.0	ND		mg/Kg		4		35	
Lithium	5.00	4.44	J	mg/Kg		89	80 - 120	5	30
Manganese	5.00	4.69		mg/Kg		94	80 - 120	4	30
Molybdenum	25.0	20.4		mg/Kg		82	70 - 120	4	30
Potassium	2500	2450		mg/Kg		98	80 - 120	4	30
Selenium	7.50	5.97		mg/Kg		80	70 - 120	14	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: S-BH-01M
Prep Type: Step 2
Prep Batch: 51667

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	7.8	J	8.01	J	mg/Kg	☼	2	
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Calcium	1300		1330		mg/Kg	☼	5	30
Cobalt	ND		0.252	J	mg/Kg	☼	NC	30
Iron	110		128		mg/Kg	☼	18	
Lithium	ND		ND		mg/Kg	☼	NC	30
Manganese	24		26.8		mg/Kg	☼	10	30
Molybdenum	ND		ND		mg/Kg	☼	NC	30
Potassium	100	J	107	J	mg/Kg	☼	2	30
Selenium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-51666/15-B
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 51707

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Antimony	ND		3.0	0.28	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Arsenic	ND		0.50	0.13	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Calcium	ND		250	1.5	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Cobalt	ND		2.5	0.045	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Iron	ND		5.0	2.9	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Lithium	ND		2.5	0.15	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Manganese	0.0895	J	0.75	0.027	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Potassium	ND		250	26	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Selenium	ND		0.50	0.17	mg/Kg		07/14/21 08:00	07/21/21 15:58	1
Sodium	ND		250	130	mg/Kg		07/14/21 08:00	07/21/21 15:58	1

Lab Sample ID: LCS 140-51666/16-B
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 51707

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	93.0		mg/Kg		93	80 - 120
Antimony	25.0	22.7		mg/Kg		91	80 - 120
Arsenic	5.00	4.51		mg/Kg		90	80 - 120
Calcium	2500	30.3	J	mg/Kg		1	
Cobalt	5.00	4.66		mg/Kg		93	80 - 120
Iron	50.0	48.2		mg/Kg		96	80 - 120
Lithium	5.00	4.55		mg/Kg		91	80 - 120
Manganese	5.00	4.76		mg/Kg		95	80 - 120
Molybdenum	25.0	23.4		mg/Kg		93	80 - 120
Potassium	2500	2350		mg/Kg		94	80 - 120
Selenium	7.50	7.10		mg/Kg		95	80 - 120
Sodium	2500	2330		mg/Kg		93	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-51666/17-B
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 51707

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	94.5		mg/Kg		94	80 - 120	2	30
Antimony			25.0	23.0		mg/Kg		92	80 - 120	1	30
Arsenic			5.00	4.55		mg/Kg		91	80 - 120	1	30
Calcium			2500	31.2	J	mg/Kg		1		3	
Cobalt			5.00	4.71		mg/Kg		94	80 - 120	1	30
Iron			50.0	49.2		mg/Kg		98	80 - 120	2	30
Lithium			5.00	4.57		mg/Kg		91	80 - 120	1	30
Manganese			5.00	4.81		mg/Kg		96	80 - 120	1	30
Molybdenum			25.0	23.6		mg/Kg		94	80 - 120	1	30
Potassium			2500	2370		mg/Kg		95	80 - 120	1	30
Selenium			7.50	7.31		mg/Kg		97	80 - 120	3	30
Sodium			2500	2350		mg/Kg		94	80 - 120	1	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 51972

Client Sample ID: S-BH-01M
Prep Type: Step 3
Prep Batch: 51707

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	48			48.3		mg/Kg	☼			0.3	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	0.25	J		0.339	J F5	mg/Kg	☼			31	30
Calcium	5.9	J		7.32	J	mg/Kg	☼			21	
Cobalt	0.42	J		0.464	J	mg/Kg	☼			11	30
Iron	390			438		mg/Kg	☼			10	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Manganese	11	B		14.5		mg/Kg	☼			24	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Sodium	6100			6340		mg/Kg	☼			5	30

Lab Sample ID: MB 140-51690/15-B
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 51767

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Antimony	ND		3.0	0.45	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Arsenic	ND		0.50	0.22	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Calcium	ND		250	2.2	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Cobalt	ND		2.5	0.053	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Iron	ND		5.0	2.9	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Lithium	ND		2.5	0.15	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Manganese	ND		0.75	0.13	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Potassium	ND		250	26	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Selenium	ND		0.50	0.47	mg/Kg		07/15/21 08:00	07/22/21 13:25	1
Sodium	ND		250	130	mg/Kg		07/15/21 08:00	07/22/21 13:25	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-51690/16-B
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 51767

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	94.8		mg/Kg		95	80 - 120		
Antimony			25.0	23.9		mg/Kg		96	80 - 130		
Arsenic			5.00	4.86		mg/Kg		97	80 - 130		
Calcium			2500	2400		mg/Kg		96	80 - 120		
Cobalt			5.00	4.91		mg/Kg		98	80 - 120		
Iron			50.0	48.6		mg/Kg		97	80 - 120		
Lithium			5.00	4.66		mg/Kg		93	80 - 120		
Manganese			5.00	4.90		mg/Kg		98	80 - 120		
Molybdenum			25.0	25.0		mg/Kg		100	80 - 120		
Potassium			2500	2380		mg/Kg		95	80 - 120		
Selenium			7.50	ND		mg/Kg		4			
Sodium			2500	2390		mg/Kg		96	80 - 120		

Lab Sample ID: LCSD 140-51690/17-B
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 51767

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	94.5		mg/Kg		95	80 - 120	0	30
Antimony			25.0	24.1		mg/Kg		96	80 - 130	1	30
Arsenic			5.00	4.83		mg/Kg		97	80 - 130	1	30
Calcium			2500	2400		mg/Kg		96	80 - 120	0	30
Cobalt			5.00	4.93		mg/Kg		99	80 - 120	0	30
Iron			50.0	49.0		mg/Kg		98	80 - 120	1	30
Lithium			5.00	4.65		mg/Kg		93	80 - 120	0	30
Manganese			5.00	4.92		mg/Kg		98	80 - 120	0	30
Molybdenum			25.0	25.1		mg/Kg		100	80 - 120	0	30
Potassium			2500	2390		mg/Kg		96	80 - 120	0	30
Selenium			7.50	ND		mg/Kg		5		27	
Sodium			2500	2400		mg/Kg		96	80 - 120	0	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: S-BH-01M
Prep Type: Step 4
Prep Batch: 51767

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	530			508		mg/Kg	☼			4	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	0.40	J		0.414	J	mg/Kg	☼			5	30
Calcium	950			914		mg/Kg	☼			3	30
Cobalt	1.2	J		1.12	J	mg/Kg	☼			6	30
Iron	1200			1290		mg/Kg	☼			4	30
Lithium	0.91	J		0.933	J	mg/Kg	☼			3	30
Manganese	16			17.8		mg/Kg	☼			11	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	67	J		65.1	J	mg/Kg	☼			3	30
Selenium	ND			ND		mg/Kg	☼			NC	
Sodium	330			396		mg/Kg	☼			18	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-51761/15-B ^5
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 51837

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Antimony	ND		45	4.2	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Arsenic	ND		7.5	1.9	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Calcium	11.0	J	3800	11	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Cobalt	ND		38	0.60	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Iron	ND		75	44	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Lithium	ND		38	2.2	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Manganese	ND		11	1.9	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Molybdenum	ND		30	1.3	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Potassium	2300	J	3800	430	mg/Kg		07/17/21 08:14	07/22/21 15:11	5
Selenium	ND		7.5	2.6	mg/Kg		07/17/21 08:14	07/22/21 15:11	5

Lab Sample ID: LCS 140-51761/16-B ^5
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 51837

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	ND		mg/Kg		4	
Antimony	75.0	69.4		mg/Kg		93	80 - 120
Arsenic	15.0	10.3		mg/Kg		69	60 - 100
Calcium	7500	1890	J	mg/Kg		25	20 - 50
Cobalt	15.0	0.623	J	mg/Kg		4	1 - 60
Iron	150	ND		mg/Kg		-0.8	
Lithium	15.0	15.5	J	mg/Kg		103	80 - 150
Manganese	15.0	ND		mg/Kg		12	1 - 60
Molybdenum	75.0	52.9		mg/Kg		70	60 - 100
Potassium	7500	9720		mg/Kg		130	80 - 180
Selenium	22.5	23.3		mg/Kg		103	80 - 140

Lab Sample ID: LCSD 140-51761/17-B ^5
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 51837

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	300	ND		mg/Kg		2		62	
Antimony	75.0	68.0		mg/Kg		91	80 - 120	2	30
Arsenic	15.0	10.1		mg/Kg		68	60 - 100	2	30
Calcium	7500	1850	J	mg/Kg		25	20 - 50	2	30
Cobalt	15.0	ND		mg/Kg		4	1 - 60	8	30
Iron	150	ND		mg/Kg		0.5		1094	
Lithium	15.0	15.3	J	mg/Kg		102	80 - 150	2	30
Manganese	15.0	2.38	J	mg/Kg		16	1 - 60	30	30
Molybdenum	75.0	52.5		mg/Kg		70	60 - 100	1	30
Potassium	7500	9510		mg/Kg		127	80 - 180	2	30
Selenium	22.5	23.0		mg/Kg		102	80 - 140	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: S-BH-01M
Prep Type: Step 5
Prep Batch: 51837

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	99	J	72.8	J	mg/Kg	☼	30	
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Calcium	290	J B	368	J	mg/Kg	☼	23	30
Cobalt	ND		ND		mg/Kg	☼	NC	30
Iron	ND		ND		mg/Kg	☼	NC	
Lithium	ND		ND		mg/Kg	☼	NC	30
Manganese	ND		ND		mg/Kg	☼	NC	30
Molybdenum	ND		ND		mg/Kg	☼	NC	30
Potassium	3200	J B	3120	J	mg/Kg	☼	3	30
Selenium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-51802/15-A
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 51802

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Antimony	ND		3.0	0.28	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Arsenic	ND		0.50	0.15	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Calcium	ND		250	2.1	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Cobalt	ND		2.5	0.046	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Iron	ND		5.0	2.9	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Lithium	ND		2.5	0.15	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Manganese	ND		0.75	0.25	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Molybdenum	ND		2.0	0.099	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Potassium	ND		250	26	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Selenium	ND		0.50	0.17	mg/Kg		07/16/21 12:00	07/22/21 17:00	1
Sodium	ND		250	130	mg/Kg		07/16/21 12:00	07/22/21 17:00	1

Lab Sample ID: LCS 140-51802/16-A
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 51802

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.6		mg/Kg		97	80 - 120
Antimony	25.0	24.7		mg/Kg		99	80 - 120
Arsenic	5.00	4.73		mg/Kg		95	80 - 120
Calcium	2500	2410		mg/Kg		96	80 - 120
Cobalt	5.00	4.94		mg/Kg		99	80 - 120
Iron	50.0	49.4		mg/Kg		99	80 - 120
Lithium	5.00	4.52		mg/Kg		90	80 - 120
Manganese	5.00	4.94		mg/Kg		99	80 - 120
Molybdenum	25.0	25.1		mg/Kg		100	80 - 120
Potassium	2500	2420		mg/Kg		97	80 - 120
Selenium	7.50	7.56		mg/Kg		101	80 - 120
Sodium	2500	2420		mg/Kg		97	80 - 120

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-51802/17-A
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 51802

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	98.0		mg/Kg		98	80 - 120	1	30
Antimony			25.0	25.0		mg/Kg		100	80 - 120	1	30
Arsenic			5.00	4.84		mg/Kg		97	80 - 120	2	30
Calcium			2500	2450		mg/Kg		98	80 - 120	2	30
Cobalt			5.00	5.02		mg/Kg		100	80 - 120	2	30
Iron			50.0	50.3		mg/Kg		101	80 - 120	2	30
Lithium			5.00	4.64		mg/Kg		93	80 - 120	2	30
Manganese			5.00	5.02		mg/Kg		100	80 - 120	2	30
Molybdenum			25.0	25.5		mg/Kg		102	80 - 120	2	30
Potassium			2500	2470		mg/Kg		99	80 - 120	2	30
Selenium			7.50	7.61		mg/Kg		102	80 - 120	1	30
Sodium			2500	2460		mg/Kg		99	80 - 120	2	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: S-BH-01M
Prep Type: Step 6
Prep Batch: 51802

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	870			959		mg/Kg	☼			9	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	0.88			1.11		mg/Kg	☼			23	30
Calcium	260	J		197	J	mg/Kg	☼			29	30
Cobalt	0.99	J		1.21	J	mg/Kg	☼			20	30
Iron	2000			2280		mg/Kg	☼			15	30
Lithium	0.99	J		1.20	J	mg/Kg	☼			19	30
Manganese	14			17.1		mg/Kg	☼			21	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	220	J		229	J	mg/Kg	☼			2	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52038

Client Sample ID: S-BH-01M
Prep Type: Step 6
Prep Batch: 51802

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Sodium	20000			18600		mg/Kg	☼			9	30

Lab Sample ID: MB 140-51862/15-A
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 51862

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Antimony	ND		3.0	0.14	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Arsenic	ND		0.50	0.13	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Calcium	ND		250	2.6	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Cobalt	ND		2.5	0.026	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Iron	ND		5.0	4.1	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Lithium	ND		2.5	0.15	mg/Kg		07/20/21 08:00	07/23/21 12:35	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-51862/15-A
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 51862

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.75	0.11	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Potassium	ND		250	10	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Selenium	ND		0.50	0.17	mg/Kg		07/20/21 08:00	07/23/21 12:35	1
Sodium	ND		250	43	mg/Kg		07/20/21 08:00	07/23/21 12:35	1

Lab Sample ID: LCS 140-51862/16-A
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 51862

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	98.3		mg/Kg		98	80 - 120		
Antimony			25.0	24.5		mg/Kg		98	80 - 125		
Arsenic			5.00	4.94		mg/Kg		99	80 - 120		
Calcium			2500	2480		mg/Kg		99	80 - 120		
Cobalt			5.00	5.02		mg/Kg		100	80 - 125		
Iron			50.0	51.6		mg/Kg		103	80 - 120		
Lithium			5.00	4.90		mg/Kg		98	80 - 120		
Manganese			5.00	5.18		mg/Kg		104	80 - 120		
Molybdenum			25.0	25.7		mg/Kg		103	80 - 125		
Potassium			2500	2500		mg/Kg		100	80 - 120		
Selenium			7.50	7.19		mg/Kg		96	80 - 120		
Sodium			2500	2520		mg/Kg		101	80 - 120		

Lab Sample ID: LCSD 140-51862/17-A
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 51862

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	97.4		mg/Kg		97	80 - 120	1	30
Antimony			25.0	24.6		mg/Kg		98	80 - 125	0	30
Arsenic			5.00	4.95		mg/Kg		99	80 - 120	0	30
Calcium			2500	2500		mg/Kg		100	80 - 120	1	30
Cobalt			5.00	5.05		mg/Kg		101	80 - 125	1	30
Iron			50.0	51.8		mg/Kg		104	80 - 120	1	30
Lithium			5.00	4.95		mg/Kg		99	80 - 120	1	30
Manganese			5.00	5.21		mg/Kg		104	80 - 120	1	30
Molybdenum			25.0	25.8		mg/Kg		103	80 - 125	0	30
Potassium			2500	2520		mg/Kg		101	80 - 120	1	30
Selenium			7.50	7.17		mg/Kg		96	80 - 120	0	30
Sodium			2500	2540		mg/Kg		101	80 - 120	0	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: S-BH-01M
Prep Type: Step 7
Prep Batch: 51862

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	30000			31700		mg/Kg	☼			7	30
Calcium	3900			4210		mg/Kg	☼			8	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52062

Client Sample ID: S-BH-01M
Prep Type: Step 7
Prep Batch: 51862

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Antimony	0.33	J		0.309	J	mg/Kg	☼			7	30
Arsenic	1.1			1.37		mg/Kg	☼			26	30
Cobalt	0.57	J		0.570	J	mg/Kg	☼			0.3	30
Iron	2700			2490		mg/Kg	☼			8	30
Lithium	4.0			3.82		mg/Kg	☼			5	30
Manganese	38			35.6		mg/Kg	☼			6	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Sodium	10000			7620		mg/Kg	☼			28	30

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Analysis Batch: 52192

Client Sample ID: S-BH-01M
Prep Type: Step 7
Prep Batch: 51862

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Potassium	24000			26100		mg/Kg	☼			10	30

Metals

Prep Batch: 50632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Total/NA	Solid	3050B	
140-23289-2	S-BH-01M	Total/NA	Solid	3050B	
140-23289-3	S-BH-01D	Total/NA	Solid	3050B	
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	3050B	
MB 140-50632/14-A	Method Blank	Total/NA	Solid	3050B	
LCS 140-50632/15-A	Lab Control Sample	Total/NA	Solid	3050B	
140-23289-2 MS	S-BH-01M	Total/NA	Solid	3050B	
140-23289-2 MSD	S-BH-01M	Total/NA	Solid	3050B	

Analysis Batch: 50744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Total/NA	Solid	6010B	50632
140-23289-2	S-BH-01M	Total/NA	Solid	6010B	50632
140-23289-3	S-BH-01D	Total/NA	Solid	6010B	50632
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	6010B	50632
MB 140-50632/14-A	Method Blank	Total/NA	Solid	6010B	50632
LCS 140-50632/15-A	Lab Control Sample	Total/NA	Solid	6010B	50632
140-23289-2 MS	S-BH-01M	Total/NA	Solid	6010B	50632
140-23289-2 MSD	S-BH-01M	Total/NA	Solid	6010B	50632

Prep Batch: 51614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Total/NA	Solid	Total	
140-23289-2	S-BH-01M	Total/NA	Solid	Total	
140-23289-3	S-BH-01D	Total/NA	Solid	Total	
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	Total	
MB 140-51614/18-A	Method Blank	Total/NA	Solid	Total	
LCS 140-51614/19-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-51614/20-A	Lab Control Sample Dup	Total/NA	Solid	Total	
140-23289-2 DU	S-BH-01M	Total/NA	Solid	Total	

SEP Batch: 51615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 1	Solid	Exchangeable	
140-23289-2	S-BH-01M	Step 1	Solid	Exchangeable	
140-23289-3	S-BH-01D	Step 1	Solid	Exchangeable	
140-23289-4	S-BH-01 (93-96)	Step 1	Solid	Exchangeable	
MB 140-51615/18-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-51615/19-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-51615/20-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-23289-2 DU	S-BH-01M	Step 1	Solid	Exchangeable	

SEP Batch: 51653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 2	Solid	Carbonate	
140-23289-2	S-BH-01M	Step 2	Solid	Carbonate	
140-23289-3	S-BH-01D	Step 2	Solid	Carbonate	
140-23289-4	S-BH-01 (93-96)	Step 2	Solid	Carbonate	
MB 140-51653/15-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-51653/16-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-51653/17-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Metals (Continued)

SEP Batch: 51653 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-2 DU	S-BH-01M	Step 2	Solid	Carbonate	

Prep Batch: 51654

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 1	Solid	3010A	51615
140-23289-2	S-BH-01M	Step 1	Solid	3010A	51615
140-23289-3	S-BH-01D	Step 1	Solid	3010A	51615
140-23289-4	S-BH-01 (93-96)	Step 1	Solid	3010A	51615
MB 140-51615/18-B ^4	Method Blank	Step 1	Solid	3010A	51615
LCS 140-51615/19-B ^5	Lab Control Sample	Step 1	Solid	3010A	51615
LCSD 140-51615/20-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	51615
140-23289-2 DU	S-BH-01M	Step 1	Solid	3010A	51615

SEP Batch: 51666

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 3	Solid	Non-Crystalline	
140-23289-2	S-BH-01M	Step 3	Solid	Non-Crystalline	
140-23289-3	S-BH-01D	Step 3	Solid	Non-Crystalline	
140-23289-4	S-BH-01 (93-96)	Step 3	Solid	Non-Crystalline	
MB 140-51666/15-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-51666/16-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-51666/17-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-23289-2 DU	S-BH-01M	Step 3	Solid	Non-Crystalline	

Prep Batch: 51667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 2	Solid	3010A	51653
140-23289-2	S-BH-01M	Step 2	Solid	3010A	51653
140-23289-3	S-BH-01D	Step 2	Solid	3010A	51653
140-23289-4	S-BH-01 (93-96)	Step 2	Solid	3010A	51653
MB 140-51653/15-B ^3	Method Blank	Step 2	Solid	3010A	51653
LCS 140-51653/16-B ^5	Lab Control Sample	Step 2	Solid	3010A	51653
LCSD 140-51653/17-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	51653
140-23289-2 DU	S-BH-01M	Step 2	Solid	3010A	51653

SEP Batch: 51690

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 4	Solid	Metal Hydroxide	
140-23289-2	S-BH-01M	Step 4	Solid	Metal Hydroxide	
140-23289-3	S-BH-01D	Step 4	Solid	Metal Hydroxide	
140-23289-4	S-BH-01 (93-96)	Step 4	Solid	Metal Hydroxide	
MB 140-51690/15-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-51690/16-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-51690/17-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-23289-2 DU	S-BH-01M	Step 4	Solid	Metal Hydroxide	

Prep Batch: 51707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 3	Solid	3010A	51666
140-23289-2	S-BH-01M	Step 3	Solid	3010A	51666
140-23289-3	S-BH-01D	Step 3	Solid	3010A	51666

Metals (Continued)

Prep Batch: 51707 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-4	S-BH-01 (93-96)	Step 3	Solid	3010A	51666
MB 140-51666/15-B	Method Blank	Step 3	Solid	3010A	51666
LCS 140-51666/16-B	Lab Control Sample	Step 3	Solid	3010A	51666
LCSD 140-51666/17-B	Lab Control Sample Dup	Step 3	Solid	3010A	51666
140-23289-2 DU	S-BH-01M	Step 3	Solid	3010A	51666

SEP Batch: 51761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 5	Solid	Organic-Bound	
140-23289-2	S-BH-01M	Step 5	Solid	Organic-Bound	
140-23289-3	S-BH-01D	Step 5	Solid	Organic-Bound	
140-23289-4	S-BH-01 (93-96)	Step 5	Solid	Organic-Bound	
MB 140-51761/15-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-51761/16-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-51761/17-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-23289-2 DU	S-BH-01M	Step 5	Solid	Organic-Bound	

Prep Batch: 51767

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 4	Solid	3010A	51690
140-23289-2	S-BH-01M	Step 4	Solid	3010A	51690
140-23289-3	S-BH-01D	Step 4	Solid	3010A	51690
140-23289-4	S-BH-01 (93-96)	Step 4	Solid	3010A	51690
MB 140-51690/15-B	Method Blank	Step 4	Solid	3010A	51690
LCS 140-51690/16-B	Lab Control Sample	Step 4	Solid	3010A	51690
LCSD 140-51690/17-B	Lab Control Sample Dup	Step 4	Solid	3010A	51690
140-23289-2 DU	S-BH-01M	Step 4	Solid	3010A	51690

SEP Batch: 51802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 6	Solid	Acid/Sulfide	
140-23289-2	S-BH-01M	Step 6	Solid	Acid/Sulfide	
140-23289-3	S-BH-01D	Step 6	Solid	Acid/Sulfide	
140-23289-4	S-BH-01 (93-96)	Step 6	Solid	Acid/Sulfide	
MB 140-51802/15-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-51802/16-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-51802/17-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-23289-2 DU	S-BH-01M	Step 6	Solid	Acid/Sulfide	

Prep Batch: 51837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 5	Solid	3010A	51761
140-23289-2	S-BH-01M	Step 5	Solid	3010A	51761
140-23289-3	S-BH-01D	Step 5	Solid	3010A	51761
140-23289-4	S-BH-01 (93-96)	Step 5	Solid	3010A	51761
MB 140-51761/15-B ^5	Method Blank	Step 5	Solid	3010A	51761
LCS 140-51761/16-B ^5	Lab Control Sample	Step 5	Solid	3010A	51761
LCSD 140-51761/17-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	51761
140-23289-2 DU	S-BH-01M	Step 5	Solid	3010A	51761

Metals

Prep Batch: 51862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 7	Solid	Residual	
140-23289-2	S-BH-01M	Step 7	Solid	Residual	
140-23289-3	S-BH-01D	Step 7	Solid	Residual	
140-23289-4	S-BH-01 (93-96)	Step 7	Solid	Residual	
MB 140-51862/15-A	Method Blank	Step 7	Solid	Residual	
LCS 140-51862/16-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-51862/17-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-23289-2 DU	S-BH-01M	Step 7	Solid	Residual	

Analysis Batch: 51972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 1	Solid	6010B SEP	51654
140-23289-1	S-BH-01S	Step 2	Solid	6010B SEP	51667
140-23289-1	S-BH-01S	Step 3	Solid	6010B SEP	51707
140-23289-2	S-BH-01M	Step 1	Solid	6010B SEP	51654
140-23289-2	S-BH-01M	Step 2	Solid	6010B SEP	51667
140-23289-2	S-BH-01M	Step 3	Solid	6010B SEP	51707
140-23289-3	S-BH-01D	Step 1	Solid	6010B SEP	51654
140-23289-3	S-BH-01D	Step 2	Solid	6010B SEP	51667
140-23289-3	S-BH-01D	Step 3	Solid	6010B SEP	51707
140-23289-4	S-BH-01 (93-96)	Step 1	Solid	6010B SEP	51654
140-23289-4	S-BH-01 (93-96)	Step 2	Solid	6010B SEP	51667
140-23289-4	S-BH-01 (93-96)	Step 3	Solid	6010B SEP	51707
MB 140-51615/18-B ^4	Method Blank	Step 1	Solid	6010B SEP	51654
MB 140-51653/15-B ^3	Method Blank	Step 2	Solid	6010B SEP	51667
MB 140-51666/15-B	Method Blank	Step 3	Solid	6010B SEP	51707
LCS 140-51615/19-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	51654
LCS 140-51653/16-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	51667
LCS 140-51666/16-B	Lab Control Sample	Step 3	Solid	6010B SEP	51707
LCSD 140-51615/20-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	51654
LCSD 140-51653/17-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	51667
LCSD 140-51666/17-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	51707
140-23289-2 DU	S-BH-01M	Step 1	Solid	6010B SEP	51654
140-23289-2 DU	S-BH-01M	Step 2	Solid	6010B SEP	51667
140-23289-2 DU	S-BH-01M	Step 3	Solid	6010B SEP	51707

Analysis Batch: 52038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 4	Solid	6010B SEP	51767
140-23289-1	S-BH-01S	Step 5	Solid	6010B SEP	51837
140-23289-1	S-BH-01S	Step 6	Solid	6010B SEP	51802
140-23289-1	S-BH-01S	Step 6	Solid	6010B SEP	51802
140-23289-2	S-BH-01M	Step 4	Solid	6010B SEP	51767
140-23289-2	S-BH-01M	Step 5	Solid	6010B SEP	51837
140-23289-2	S-BH-01M	Step 6	Solid	6010B SEP	51802
140-23289-2	S-BH-01M	Step 6	Solid	6010B SEP	51802
140-23289-3	S-BH-01D	Step 4	Solid	6010B SEP	51767
140-23289-3	S-BH-01D	Step 5	Solid	6010B SEP	51837
140-23289-3	S-BH-01D	Step 6	Solid	6010B SEP	51802
140-23289-3	S-BH-01D	Step 6	Solid	6010B SEP	51802
140-23289-4	S-BH-01 (93-96)	Step 4	Solid	6010B SEP	51767

Metals (Continued)

Analysis Batch: 52038 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-4	S-BH-01 (93-96)	Step 5	Solid	6010B SEP	51837
140-23289-4	S-BH-01 (93-96)	Step 6	Solid	6010B SEP	51802
140-23289-4	S-BH-01 (93-96)	Step 6	Solid	6010B SEP	51802
MB 140-51690/15-B	Method Blank	Step 4	Solid	6010B SEP	51767
MB 140-51761/15-B ^5	Method Blank	Step 5	Solid	6010B SEP	51837
MB 140-51802/15-A	Method Blank	Step 6	Solid	6010B SEP	51802
LCS 140-51690/16-B	Lab Control Sample	Step 4	Solid	6010B SEP	51767
LCS 140-51761/16-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	51837
LCS 140-51802/16-A	Lab Control Sample	Step 6	Solid	6010B SEP	51802
LCSD 140-51690/17-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	51767
LCSD 140-51761/17-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	51837
LCSD 140-51802/17-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	51802
140-23289-2 DU	S-BH-01M	Step 4	Solid	6010B SEP	51767
140-23289-2 DU	S-BH-01M	Step 5	Solid	6010B SEP	51837
140-23289-2 DU	S-BH-01M	Step 6	Solid	6010B SEP	51802
140-23289-2 DU	S-BH-01M	Step 6	Solid	6010B SEP	51802

Analysis Batch: 52062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 7	Solid	6010B SEP	51862
140-23289-1	S-BH-01S	Step 7	Solid	6010B SEP	51862
140-23289-2	S-BH-01M	Step 7	Solid	6010B SEP	51862
140-23289-2	S-BH-01M	Step 7	Solid	6010B SEP	51862
140-23289-3	S-BH-01D	Step 7	Solid	6010B SEP	51862
140-23289-3	S-BH-01D	Step 7	Solid	6010B SEP	51862
140-23289-4	S-BH-01 (93-96)	Step 7	Solid	6010B SEP	51862
140-23289-4	S-BH-01 (93-96)	Step 7	Solid	6010B SEP	51862
MB 140-51862/15-A	Method Blank	Step 7	Solid	6010B SEP	51862
LCS 140-51862/16-A	Lab Control Sample	Step 7	Solid	6010B SEP	51862
LCSD 140-51862/17-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	51862
140-23289-2 DU	S-BH-01M	Step 7	Solid	6010B SEP	51862
140-23289-2 DU	S-BH-01M	Step 7	Solid	6010B SEP	51862

Analysis Batch: 52192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Step 7	Solid	6010B SEP	51862
140-23289-1	S-BH-01S	Total/NA	Solid	6010B	51614
140-23289-2	S-BH-01M	Step 7	Solid	6010B SEP	51862
140-23289-2	S-BH-01M	Total/NA	Solid	6010B	51614
140-23289-3	S-BH-01D	Step 7	Solid	6010B SEP	51862
140-23289-3	S-BH-01D	Total/NA	Solid	6010B	51614
140-23289-4	S-BH-01 (93-96)	Step 7	Solid	6010B SEP	51862
140-23289-4	S-BH-01 (93-96)	Step 7	Solid	6010B SEP	51862
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	6010B	51614
MB 140-51614/18-A	Method Blank	Total/NA	Solid	6010B	51614
LCS 140-51614/19-A	Lab Control Sample	Total/NA	Solid	6010B	51614
LCSD 140-51614/20-A	Lab Control Sample Dup	Total/NA	Solid	6010B	51614
140-23289-2 DU	S-BH-01M	Step 7	Solid	6010B SEP	51862
140-23289-2 DU	S-BH-01M	Total/NA	Solid	6010B	51614

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Metals

Analysis Batch: 52210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Total/NA	Solid	6010B	51614
140-23289-1	S-BH-01S	Total/NA	Solid	6010B	51614
140-23289-2	S-BH-01M	Total/NA	Solid	6010B	51614
140-23289-2	S-BH-01M	Total/NA	Solid	6010B	51614
140-23289-3	S-BH-01D	Total/NA	Solid	6010B	51614
140-23289-3	S-BH-01D	Total/NA	Solid	6010B	51614
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	6010B	51614
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	6010B	51614
MB 140-51614/18-A	Method Blank	Total/NA	Solid	6010B	51614
LCS 140-51614/19-A	Lab Control Sample	Total/NA	Solid	6010B	51614
LCSD 140-51614/20-A	Lab Control Sample Dup	Total/NA	Solid	6010B	51614
140-23289-2 DU	S-BH-01M	Total/NA	Solid	6010B	51614
140-23289-2 DU	S-BH-01M	Total/NA	Solid	6010B	51614

Analysis Batch: 52215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Sum of Steps 1-7	Solid	6010B SEP	
140-23289-2	S-BH-01M	Sum of Steps 1-7	Solid	6010B SEP	
140-23289-3	S-BH-01D	Sum of Steps 1-7	Solid	6010B SEP	
140-23289-4	S-BH-01 (93-96)	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 50469

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23289-1	S-BH-01S	Total/NA	Solid	Moisture	
140-23289-2	S-BH-01M	Total/NA	Solid	Moisture	
140-23289-3	S-BH-01D	Total/NA	Solid	Moisture	
140-23289-4	S-BH-01 (93-96)	Total/NA	Solid	Moisture	
140-23289-2 DU	S-BH-01M	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01S
Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1
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			52215	07/29/21 21:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-BH-01S
Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1
Matrix: Solid
Percent Solids: 80.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.535 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			52192	07/28/21 17:04	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:13	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			52210	07/29/21 13:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 14:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:15	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01S
Date Collected: 05/22/21 12:18
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-1
Matrix: Solid
Percent Solids: 80.5

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			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			52038	07/22/21 18:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			52062	07/23/21 12:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 14:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			52192	07/28/21 14:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2
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			52215	07/29/21 21:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2
Matrix: Solid
Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.541 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:11	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			52192	07/28/21 17:08	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:18	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			52210	07/29/21 13:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:28	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01M

Lab Sample ID: 140-23289-2

Date Collected: 05/22/21 13:15

Matrix: Solid

Date Received: 05/28/21 10:00

Percent Solids: 85.7

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 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 14:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:44	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:20	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			52038	07/22/21 18:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			52062	07/23/21 13:00	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 14:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			52192	07/28/21 14:31	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01D

Lab Sample ID: 140-23289-3

Date Collected: 05/22/21 15:05

Matrix: Solid

Date Received: 05/28/21 10:00

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			52215	07/29/21 21:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01D

Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-3

Matrix: Solid
Percent Solids: 89.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.539 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:25	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			52192	07/28/21 17:18	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:28	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			52210	07/29/21 13:16	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:37	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 14:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:27	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			52038	07/22/21 19:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			52062	07/23/21 13:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 15:04	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01D
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-3
Matrix: Solid
Percent Solids: 89.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			52192	07/28/21 14:41	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01 (93-96)
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-4
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			52215	07/29/21 21:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-BH-01 (93-96)
Date Collected: 05/22/21 15:05
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-4
Matrix: Solid
Percent Solids: 90.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.521 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:30	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			52192	07/28/21 17:23	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:34	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			52210	07/29/21 13:20	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:42	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 14:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:32	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01 (93-96)

Lab Sample ID: 140-23289-4
Date Collected: 05/22/21 15:05
Matrix: Solid
Date Received: 05/28/21 10:00
Percent Solids: 90.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:34	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			52038	07/22/21 19:09	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			52062	07/23/21 13:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 15:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			52192	07/28/21 14:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			52192	07/28/21 14:51	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-50632/14-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	3050B			0.500 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 10:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-51614/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52192	07/28/21 16:44	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51614/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 10:53	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51615/18-B ^4
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:08	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51653/15-B ^3
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 13:55	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51666/15-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 15:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51690/15-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:25	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51761/15-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:11	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51802/15-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
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:00	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-51862/15-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
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 12:35	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50632/15-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	3050B			0.500 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:03	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51614/19-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52192	07/28/21 16:49	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 10:58	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51615/19-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		5			51972	07/21/21 12:13	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51653/16-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		5			51972	07/21/21 14:00	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51666/16-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:03	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51690/16-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:30	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51761/16-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:16	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51802/16-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			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:05	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-51862/16-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			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 12:40	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51614/20-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
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52192	07/28/21 16:54	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:03	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51615/20-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 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		5			51972	07/21/21 12:18	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51653/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		5			51972	07/21/21 14:05	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51666/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:08	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51690/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:35	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51761/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:21	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51802/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:10	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-51862/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 12:45	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2 MS
Matrix: Solid
Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.504 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:16	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2 MSD
Matrix: Solid
Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.505 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:20	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2 DU
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	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: S-BH-01M
Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2 DU
Matrix: Solid
Percent Solids: 85.7

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 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			52192	07/28/21 17:13	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			52210	07/29/21 11:23	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1 g	50 mL	51614	07/12/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			52210	07/29/21 13:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5 g	25 mL	51615	07/12/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	51654	07/13/21 08:00	JTB	TAL KNX
Step 1	Analysis	6010B SEP		4			51972	07/21/21 12:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	51653	07/12/21 12:10	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	51667	07/13/21 08:00	JTB	TAL KNX
Step 2	Analysis	6010B SEP		3			51972	07/21/21 14:21	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Client Sample ID: S-BH-01M

Date Collected: 05/22/21 13:15
Date Received: 05/28/21 10:00

Lab Sample ID: 140-23289-2 DU

Matrix: Solid
Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	51666	07/13/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	51707	07/14/21 08:00	JTB	TAL KNX
Step 3	Analysis	6010B SEP		1			51972	07/21/21 16:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5 g	25 mL	51690	07/14/21 08:00	JTB	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	51767	07/15/21 08:00	JTB	TAL KNX
Step 4	Analysis	6010B SEP		1			52038	07/22/21 13:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5 g	75 mL	51761	07/15/21 08:00	JTB	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	51837	07/17/21 08:14	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			52038	07/22/21 15:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			52038	07/22/21 17:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.00 g	250 mL	51802	07/16/21 12:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			52038	07/22/21 19:00	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			52062	07/23/21 13:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			52062	07/23/21 14:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.00 g	50 mL	51862	07/20/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			52192	07/28/21 14:36	KNC	TAL KNX
	Instrument ID: DUO									

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
Arkansas DEQ	State	88-0688	06-17-21 *
California	State	2423	06-30-22
Colorado	State	TN00009	02-28-22
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	06-30-22
Georgia (DW)	State	906	12-11-22
Hawaii	State	NA	12-11-21
Kansas	NELAP	E-10349	10-31-21
Kentucky (DW)	State	90101	12-31-21
Louisiana	NELAP	83979	06-30-22
Louisiana (DW)	State	LA019	12-31-21
Maryland	State	277	03-31-22
Michigan	State	9933	12-11-22
Nevada	State	TN00009	08-01-21
New Hampshire	NELAP	299919	01-17-22
New Jersey	NELAP	TN001	06-30-22
New York	NELAP	10781	03-31-22
North Carolina (DW)	State	21705	07-31-21
North Carolina (WW/SW)	State	64	12-31-21
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-21
Oregon	NELAP	TNI0189	01-01-22
Pennsylvania	NELAP	68-00576	12-31-21
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-21
Virginia	NELAP	460176	09-14-21
Washington	State	C593	01-19-22
West Virginia (DW)	State	9955C	01-02-22
West Virginia DEP	State	345	04-30-22
Wisconsin	State	998044300	08-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23289-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

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: 140-9346-2811.3
Client Contact: Jeffrey Ingram	Phone:	E-Mail: williamr.henry@eurofinset.com	State of Origin:	Page: 1 / 1 Page 8 of 8
Company: Golder Associates Inc.	PWSID:			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: Sioux Energy Center	Project #: 14006318			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - SEP Metals	6010B - Total Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
S-BH-01S	5-22-21	1218	G	S	N	N	/	/		
S-BH-01M		1315					/	/		
S-BH-01D		1505					/	/		
S-BH-01 (93-96)		1505					/	/		

140-23289 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Brendan Talbert	5-27-21 1700	Golder		5-28-21 1000	BTA Fox
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	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 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: S(7) 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
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 AT RT 0.4/CTDS'C
GD 5-28-21
COOLER BOX# 787675067039 PO

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 #: _____ PM Instructions: _____

Sample Receiving Associate: Nancy Johnson Date: 5-28-21

QA026R32.doc, 062719

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

Laboratory Job ID: 140-23062-1
Client Project/Site: Sioux Energy Center

For:
Golder Associates Inc.
13515 Barrett Parkway Drive
Suite 260
Ballwin, Missouri 63021

Attn: Jeffrey Ingram

Ryan Henry

Authorized for release by:
6/21/2021 10:39:03 AM

Ryan Henry, Project Manager I
(865)291-3000
williamr.henry@eurofinset.com

Table of Contents

Definitions/Glossary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Qualifiers

Metals

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
*1	LCS/LCSD RPD exceeds control limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
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: 140-23062-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-23062-1

Receipt
The samples were received on 5/13/2021 at 9:30am and arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.5º C.

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

· Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO4), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO3-H2O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/mL
V = Final volume of digestate, mL
D = Instrument dilution factor
V1 = Total volume of leachate, mL
V2 = Volume of leachate digested, mL
W = Wet weight of sample, g
S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in

Job ID: 140-23062-1 (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 sample duplicate (DUP) precision for preparation batch 140-50176 and analytical batch 140-50709 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B: The serial dilution performed for the following sample associated with batch 140-50709 was outside control limits: (140-23062-A-5-A SD ^5)

Method 6010B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: EW-3-FA (10-17) (140-23062-7).

Method 6010B: The following sample was diluted due to the presence of titanium which interferes with Cobalt: EW-3-FA (10-17) (140-23062-7). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of silicon which interferes with Arsenic and Selenium: IW-2S (140-23062-1), IW-2D (140-23062-3), EW-3M (140-23062-5) and (140-23062-A-5-B DU). Elevated reporting limits (RLs) are provided.

Method 6010B: The following sample was diluted due to the presence of Iron which interferes with Arsenic and Selenium: EW-3-FA (10-17) (140-23062-7). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: IW-2S (140-23062-1), IW-2M (140-23062-2), IW-2D (140-23062-3), EW-3S (140-23062-4), EW-3M (140-23062-5), EW-3D (140-23062-6), EW-3-FA (10-17) (140-23062-7) and (140-23062-A-5-B DU). Elevated reporting limits (RLs) are provided.

Method 6010B: The following sample was diluted to bring the concentration of target analyte, sodium, within the calibration range: IW-2M (140-23062-2). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the nature of the sample matrix: IW-2S (140-23062-1), IW-2M (140-23062-2), IW-2D (140-23062-3), EW-3S (140-23062-4), EW-3M (140-23062-5), EW-3D (140-23062-6), EW-3-FA (10-17) (140-23062-7) and (140-23062-A-5-B DU). Elevated reporting limits (RLs) are provided for aluminum and calcium.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, sodium, within the calibration range: IW-2S (140-23062-1), IW-2M (140-23062-2), IW-2D (140-23062-3), EW-3S (140-23062-4), EW-3M (140-23062-5), EW-3D (140-23062-6), EW-3-FA (10-17) (140-23062-7) and (140-23062-A-5-X DU). Elevated reporting limits (RLs) are provided.

Job ID: 140-23062-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

Method 6010B SEP: The following sample was diluted due to the presence of titanium which interferes with Cobalt: EW-3-FA (10-17) (140-23062-7). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The method blank for preparation batch 140-50371 and 140-50451 contained Iron above the reporting limit (RL). None of the samples associated with this method blank contained the target compound; therefore, re-extraction and/or re-analysis of samples were not performed. Results for the samples were either non-detect or an estimated value for iron.

Method 6010B SEP: The serial dilution performed for the following sample associated with batch 140-50529 was outside control limits: (140-23062-A-5-W SD ^5)

Method 6010B SEP: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 140-50371 and 140-50451 and analytical batch 140-50529 recovered outside control limits for the following analyte: Lithium. This analyte was biased high in the LCS and LCSD and was not detected in the associated samples; therefore, the data have been reported. Lithium results for the samples were either non-detect or estimated values.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-50497 and analytical batch 140-50662 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B SEP: The following samples were diluted due to the presence of silicon which interferes with Arsenic and Selenium: IW-2S (140-23062-1), EW-3S (140-23062-4), EW-3M (140-23062-5) and (140-23062-A-5-Z DU). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted to bring the concentration of target analyte, potassium, within the calibration range: IW-2S (140-23062-1), IW-2M (140-23062-2), IW-2D (140-23062-3), EW-3S (140-23062-4), EW-3M (140-23062-5), EW-3D (140-23062-6), EW-3-FA (10-17) (140-23062-7) and (140-23062-A-5-Z DU). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following sample was diluted to bring the concentration of target analyte, sodium, within the calibration range: IW-2D (140-23062-3). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: IW-2S (140-23062-1), IW-2M (140-23062-2), IW-2D (140-23062-3), EW-3S (140-23062-4), EW-3M (140-23062-5), EW-3D (140-23062-6), EW-3-FA (10-17) (140-23062-7) and (140-23062-A-5-Z DU). Elevated reporting limits (RLs) are provided for aluminum and calcium.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-23062-1	IW-2S	Solid	05/05/21 09:00	05/13/21 09:30	
140-23062-2	IW-2M	Solid	05/05/21 10:25	05/13/21 09:30	
140-23062-3	IW-2D	Solid	05/05/21 15:30	05/13/21 09:30	
140-23062-4	EW-3S	Solid	05/11/21 10:20	05/13/21 09:30	
140-23062-5	EW-3M	Solid	05/11/21 11:10	05/13/21 09:30	
140-23062-6	EW-3D	Solid	05/11/21 12:25	05/13/21 09:30	
140-23062-7	EW-3-FA (10-17)	Solid	05/11/21 12:00	05/13/21 09:30	

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: IW-2S
Date Collected: 05/05/21 09:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-1
Matrix: Solid
Percent Solids: 81.5

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		49	7.9	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Antimony	ND		15	1.4	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Arsenic	ND		2.5	0.64	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Calcium	**550**	**J B**	1200	9.3	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Cobalt	ND		12	0.22	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Iron	ND		25	14	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Lithium	ND		12	0.74	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Molybdenum	ND		9.8	0.40	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Potassium	ND		1200	130	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Selenium	ND		2.5	0.83	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4
Sodium	ND		1200	640	mg/Kg	☼	05/27/21 08:00	06/02/21 12:01	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**6.1**	**J**	37	5.9	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Antimony	ND		11	1.0	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Arsenic	ND		1.8	0.48	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Calcium	**69**	**J**	920	8.1	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Cobalt	ND		9.2	0.23	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Iron	**14**	**J**	18	11	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Lithium	ND		9.2	0.55	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Molybdenum	ND		7.4	0.30	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Potassium	ND		920	96	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3
Selenium	ND		1.8	0.63	mg/Kg	☼	05/28/21 08:00	06/02/21 13:53	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**55**		12	2.6	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Antimony	ND		3.7	0.34	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Arsenic	**0.56**	**J**	0.61	0.16	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Calcium	**8.5**	**J**	310	1.8	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Cobalt	**0.57**	**J**	3.1	0.055	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Iron	**1400**		6.1	3.6	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Lithium	ND		3.1	0.18	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Molybdenum	**0.35**	**J**	2.5	0.10	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Potassium	ND		310	32	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Selenium	ND		0.61	0.21	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1
Sodium	**6900**		310	160	mg/Kg	☼	06/01/21 08:00	06/02/21 15:46	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**690**		12	2.0	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Antimony	ND		3.7	0.55	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Arsenic	**0.60**	**J B**	0.61	0.27	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Calcium	**230**	**J**	310	2.7	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Cobalt	**2.0**	**J**	3.1	0.065	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Iron	**3200**		6.1	3.6	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Lithium	**1.2**	**J**	3.1	0.18	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Potassium	**36**	**J**	310	32	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1

Client Sample ID: IW-2S
Date Collected: 05/05/21 09:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-1
Matrix: Solid
Percent Solids: 81.5

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.61	0.58	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1
Sodium	**430**		310	160	mg/Kg	☼	06/02/21 08:00	06/05/21 11:26	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**88**	**J**	180	29	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Antimony	ND		55	5.2	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Arsenic	ND		9.2	2.3	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Calcium	**62**	**J**	4600	14	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Cobalt	ND	*1	46	0.74	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Iron	ND		92	54	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Lithium	**11**	**J B *+**	46	2.7	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Molybdenum	ND		37	1.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Potassium	**2900**	**J B**	4600	520	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5
Selenium	ND		9.2	3.2	mg/Kg	☼	06/04/21 08:00	06/05/21 13:19	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1100**		12	2.0	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Antimony	ND		3.7	0.34	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Arsenic	**0.60**	**J**	0.61	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Calcium	**180**	**J**	310	2.6	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Cobalt	**0.96**	**J**	3.1	0.056	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Iron	**3800**		6.1	3.6	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Lithium	**1.4**	**J B**	3.1	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Potassium	**210**	**J**	310	32	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Selenium	**0.28**	**J**	0.61	0.21	mg/Kg	☼	06/04/21 08:00	06/05/21 15:12	1
Sodium	**25000**		1500	800	mg/Kg	☼	06/04/21 08:00	06/05/21 16:32	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**27000**		120	20	mg/Kg	☼	06/07/21 08:00	06/09/21 12:06	10
Antimony	**0.19**	**J**	3.7	0.17	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1
Arsenic	**2.1**	**B**	1.2	0.32	mg/Kg	☼	06/07/21 08:00	06/09/21 14:54	2
Calcium	**4600**		3100	32	mg/Kg	☼	06/07/21 08:00	06/09/21 12:06	10
Cobalt	**0.16**	**J**	3.1	0.032	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1
Iron	**3100**		6.1	5.0	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1
Lithium	**2.7**	**J**	3.1	0.18	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1
Molybdenum	ND		2.5	0.10	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1
Potassium	**13000**		1500	61	mg/Kg	☼	06/07/21 08:00	06/09/21 14:59	5
Selenium	ND		1.2	0.42	mg/Kg	☼	06/07/21 08:00	06/09/21 14:54	2
Sodium	**11000**		310	53	mg/Kg	☼	06/07/21 08:00	06/09/21 13:43	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**29000**		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	**0.19**	**J**	3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**3.9**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**5700**		250	0.74	mg/Kg			06/13/21 13:02	1

Client Sample ID: IW-2S
Date Collected: 05/05/21 09:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-1
Matrix: Solid
Percent Solids: 81.5

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	3.7		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	12000		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	16		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	0.35	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	16000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	0.28	J	0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	43000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100		47	5.8	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Antimony	ND		7.0	0.40	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Arsenic	1.5	J	2.3	0.34	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Calcium	1100		580	100	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Cobalt	3.5	J	5.8	0.056	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Iron	8100		23	9.2	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Lithium	2.3	J	5.8	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Manganese	52		1.7	0.72	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Molybdenum	0.46	J	4.7	0.13	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Potassium	240	J	580	28	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Selenium	0.70	J	1.7	0.51	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1
Sodium	45	J	580	42	mg/Kg	☼	06/10/21 08:00	06/11/21 11:08	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	31000	B	120	20	mg/Kg	☼	05/27/21 08:00	06/10/21 11:54	10
Antimony	0.56	J	3.7	0.17	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1
Arsenic	3.3	B	1.2	0.32	mg/Kg	☼	05/27/21 08:00	06/10/21 14:57	2
Calcium	5800		3100	32	mg/Kg	☼	05/27/21 08:00	06/10/21 11:54	10
Cobalt	3.7		3.1	0.032	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1
Iron	11000		6.1	5.0	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1
Lithium	5.2		3.1	0.18	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1
Molybdenum	0.54	J	2.5	0.10	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1
Potassium	13000		1500	61	mg/Kg	☼	05/27/21 08:00	06/10/21 15:02	5
Selenium	ND		1.2	0.42	mg/Kg	☼	05/27/21 08:00	06/10/21 14:57	2
Sodium	8600	B	310	53	mg/Kg	☼	05/27/21 08:00	06/10/21 13:34	1

Client Sample ID: IW-2M
Date Collected: 05/05/21 10:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-2
Matrix: Solid
Percent Solids: 77.0

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.3	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Antimony	ND		16	1.5	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Arsenic	ND		2.6	0.68	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Calcium	**560**	**J B**	1300	9.9	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Cobalt	ND		13	0.23	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Iron	ND		26	15	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Lithium	ND		13	0.78	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Molybdenum	**0.99**	**J**	10	0.43	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Potassium	ND		1300	140	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Selenium	ND		2.6	0.88	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4
Sodium	ND		1300	680	mg/Kg	☼	05/27/21 08:00	06/02/21 12:06	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**10**	**J**	39	6.2	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Antimony	ND		12	1.1	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Arsenic	ND		1.9	0.51	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Calcium	**1300**		970	8.6	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Cobalt	ND		9.7	0.25	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Iron	**170**		19	11	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Lithium	ND		9.7	0.58	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Molybdenum	ND		7.8	0.32	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Potassium	ND		970	100	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3
Selenium	ND		1.9	0.66	mg/Kg	☼	05/28/21 08:00	06/02/21 13:58	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**49**		13	2.7	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Antimony	ND		3.9	0.36	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Arsenic	**0.29**	**J**	0.65	0.17	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Calcium	**5.1**	**J**	320	1.9	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Cobalt	**0.44**	**J**	3.2	0.058	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Iron	**680**		6.5	3.8	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Lithium	ND		3.2	0.19	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Molybdenum	**0.32**	**J**	2.6	0.11	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Potassium	ND		320	34	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1
Sodium	**6700**		320	170	mg/Kg	☼	06/01/21 08:00	06/02/21 15:50	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**470**		13	2.1	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Antimony	ND		3.9	0.58	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Arsenic	**0.79**	**B**	0.65	0.29	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Calcium	**1400**		320	2.9	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Cobalt	**1.2**	**J**	3.2	0.069	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Iron	**1500**		6.5	3.8	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Lithium	**1.0**	**J**	3.2	0.19	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Molybdenum	**0.22**	**J**	2.6	0.11	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Potassium	**38**	**J**	320	34	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1

Client Sample ID: IW-2M
Date Collected: 05/05/21 10:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-2
Matrix: Solid
Percent Solids: 77.0

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.65	0.61	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1
Sodium	**490**		320	170	mg/Kg	☼	06/02/21 08:00	06/05/21 11:31	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**31**	**J**	190	31	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Antimony	ND		58	5.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Arsenic	ND		9.7	2.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Calcium	**520**	**J**	4900	14	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Cobalt	ND	*1	49	0.78	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Iron	ND		97	57	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Lithium	**9.9**	**J B *+**	49	2.9	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Molybdenum	ND		39	1.6	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Potassium	**3000**	**J B**	4900	550	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5
Selenium	ND		9.7	3.4	mg/Kg	☼	06/04/21 08:00	06/05/21 13:24	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**690**		13	2.1	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Antimony	ND		3.9	0.36	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Arsenic	**1.4**		0.65	0.19	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Calcium	**680**		320	2.7	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Cobalt	**1.0**	**J**	3.2	0.060	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Iron	**2000**		6.5	3.8	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Lithium	**1.3**	**J B**	3.2	0.19	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Molybdenum	ND		2.6	0.13	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Potassium	**180**	**J**	320	34	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/04/21 08:00	06/05/21 15:17	1
Sodium	**21000**		1600	840	mg/Kg	☼	06/04/21 08:00	06/05/21 16:36	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**19000**		130	21	mg/Kg	☼	06/07/21 08:00	06/09/21 12:11	10
Antimony	ND		3.9	0.18	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Arsenic	**1.6**	**B**	0.65	0.17	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Calcium	**2900**		320	3.4	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Cobalt	**0.35**	**J**	3.2	0.034	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Iron	**3000**		6.5	5.3	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Lithium	**2.9**	**J**	3.2	0.19	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Molybdenum	**0.12**	**J**	2.6	0.11	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Potassium	**15000**		1600	65	mg/Kg	☼	06/07/21 08:00	06/09/21 15:04	5
Selenium	ND		0.65	0.22	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	1
Sodium	**12000**		320	56	mg/Kg	☼	06/07/21 08:00	06/09/21 13:48	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			06/13/21 13:02	1
Antimony	ND		3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**4.1**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**7300**		250	0.74	mg/Kg			06/13/21 13:02	1

Client Sample ID: IW-2M
Date Collected: 05/05/21 10:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-2
Matrix: Solid
Percent Solids: 77.0

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	3.0		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	7400		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	15		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	1.7	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	18000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	ND		0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	40000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1800		48	6.0	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Antimony	ND		7.2	0.41	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Arsenic	5.1		2.4	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Calcium	3900		600	110	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Cobalt	4.8	J	6.0	0.057	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Iron	5300		24	9.5	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Lithium	2.7	J	6.0	0.36	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Manganese	98		1.8	0.74	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Molybdenum	2.1	J	4.8	0.13	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Potassium	280	J	600	29	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Selenium	ND		1.8	0.53	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1
Sodium	47	J	600	43	mg/Kg	☼	06/10/21 08:00	06/11/21 11:13	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000	B	130	21	mg/Kg	☼	05/27/21 08:00	06/10/21 11:59	10
Antimony	0.64	J	3.9	0.18	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Arsenic	5.3	B	0.65	0.17	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Calcium	11000		3200	34	mg/Kg	☼	05/27/21 08:00	06/10/21 11:59	10
Cobalt	3.8		3.2	0.034	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Iron	7900		6.5	5.3	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Lithium	6.8		3.2	0.19	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Molybdenum	2.0	J	2.6	0.11	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Potassium	16000		1600	65	mg/Kg	☼	05/27/21 08:00	06/10/21 15:06	5
Selenium	0.27	J	0.65	0.22	mg/Kg	☼	05/27/21 08:00	06/10/21 13:39	1
Sodium	15000	B	1600	280	mg/Kg	☼	05/27/21 08:00	06/10/21 15:06	5

Client Sample ID: IW-2D
Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3
Matrix: Solid
Percent Solids: 95.5

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		42	6.7	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Antimony	ND		13	1.2	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Arsenic	ND		2.1	0.54	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Calcium	**290**	**J B**	1000	8.0	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Cobalt	ND		10	0.19	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Iron	ND		21	12	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Lithium	ND		10	0.63	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Molybdenum	ND		8.4	0.34	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Potassium	ND		1000	110	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Selenium	ND		2.1	0.71	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4
Sodium	ND		1000	540	mg/Kg	☼	05/27/21 08:00	06/02/21 12:10	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.4**	**J**	31	5.0	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Antimony	ND		9.4	0.88	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Arsenic	ND		1.6	0.41	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Calcium	**4600**		790	6.9	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Cobalt	ND		7.9	0.20	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Iron	**300**		16	9.1	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Lithium	ND		7.9	0.47	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Molybdenum	ND		6.3	0.26	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Potassium	ND		790	82	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3
Selenium	ND		1.6	0.53	mg/Kg	☼	05/28/21 08:00	06/02/21 14:03	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**25**		10	2.2	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Antimony	ND		3.1	0.29	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Arsenic	ND		0.52	0.14	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Calcium	**4.9**	**J**	260	1.6	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Cobalt	**0.20**	**J**	2.6	0.047	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Iron	**890**		5.2	3.0	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Lithium	ND		2.6	0.16	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Molybdenum	**0.16**	**J**	2.1	0.086	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Potassium	ND		260	27	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Selenium	ND		0.52	0.18	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1
Sodium	**6500**		260	140	mg/Kg	☼	06/01/21 08:00	06/02/21 15:55	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**270**		10	1.7	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Antimony	ND		3.1	0.47	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Arsenic	**0.51**	**J B**	0.52	0.23	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Calcium	**8300**		260	2.3	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Cobalt	**2.4**	**J**	2.6	0.056	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Iron	**1600**		5.2	3.0	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Lithium	**0.84**	**J**	2.6	0.16	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Molybdenum	ND		2.1	0.086	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Potassium	ND		260	27	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1

Client Sample ID: IW-2D
Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3
Matrix: Solid
Percent Solids: 95.5

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.52	0.49	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1
Sodium	**500**		260	140	mg/Kg	☼	06/02/21 08:00	06/05/21 11:46	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**38**	**J**	160	25	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Antimony	ND		47	4.4	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Arsenic	ND		7.9	2.0	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Calcium	**3600**	**J**	3900	12	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Cobalt	ND	*1	39	0.63	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Iron	ND		79	46	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Lithium	**9.3**	**J B *+**	39	2.3	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Molybdenum	ND		31	1.3	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Potassium	**2400**	**J B**	3900	450	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5
Selenium	ND		7.9	2.7	mg/Kg	☼	06/04/21 08:00	06/05/21 13:29	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1500**		10	1.7	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Antimony	ND		3.1	0.29	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Arsenic	**2.0**		0.52	0.16	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Calcium	**2700**		260	2.2	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Cobalt	**2.5**	**J**	2.6	0.048	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Iron	**5000**		5.2	3.0	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Lithium	**3.4**	**B**	2.6	0.16	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Molybdenum	**0.13**	**J**	2.1	0.10	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Potassium	**170**	**J**	260	27	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Selenium	**0.34**	**J**	0.52	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:22	1
Sodium	**18000**		1300	680	mg/Kg	☼	06/04/21 08:00	06/05/21 16:41	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**29000**		100	17	mg/Kg	☼	06/07/21 08:00	06/09/21 12:15	10
Antimony	ND		3.1	0.15	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Arsenic	**1.9**	**B**	0.52	0.14	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Calcium	**4800**		2600	27	mg/Kg	☼	06/07/21 08:00	06/09/21 12:15	10
Cobalt	**1.1**	**J**	2.6	0.027	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Iron	**3600**		5.2	4.3	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Lithium	**3.2**		2.6	0.16	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Molybdenum	ND		2.1	0.086	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Potassium	**14000**		1300	52	mg/Kg	☼	06/07/21 08:00	06/09/21 15:08	5
Selenium	ND		0.52	0.18	mg/Kg	☼	06/07/21 08:00	06/09/21 13:53	1
Sodium	**13000**		1300	230	mg/Kg	☼	06/07/21 08:00	06/09/21 15:08	5

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30000**		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	ND		3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**4.4**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**24000**		250	0.74	mg/Kg			06/13/21 13:02	1

Client Sample ID: IW-2D
Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3
Matrix: Solid
Percent Solids: 95.5

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	6.2		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	11000		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	17		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	0.30	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	16000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	0.34	J	0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	38000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		39	4.8	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Antimony	ND		5.8	0.33	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Arsenic	2.9		1.9	0.28	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Calcium	29000		480	85	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Cobalt	3.9	J	4.8	0.046	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Iron	5500		19	7.6	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Lithium	1.9	J	4.8	0.29	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Manganese	380		1.5	0.60	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Molybdenum	0.47	J	3.9	0.11	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Potassium	130	J	480	23	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Selenium	ND		1.5	0.43	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1
Sodium	44	J	480	35	mg/Kg	☼	06/10/21 08:00	06/11/21 11:17	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	14000	B	100	17	mg/Kg	☼	05/27/21 08:00	06/10/21 12:04	10
Antimony	0.87	J	3.1	0.15	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1
Arsenic	7.0	B	1.0	0.27	mg/Kg	☼	05/27/21 08:00	06/10/21 15:11	2
Calcium	70000		2600	27	mg/Kg	☼	05/27/21 08:00	06/10/21 12:04	10
Cobalt	5.2		2.6	0.027	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1
Iron	11000		5.2	4.3	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1
Lithium	6.5		2.6	0.16	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1
Molybdenum	0.37	J	2.1	0.086	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1
Potassium	10000		520	21	mg/Kg	☼	05/27/21 08:00	06/10/21 15:11	2
Selenium	ND		1.0	0.36	mg/Kg	☼	05/27/21 08:00	06/10/21 15:11	2
Sodium	7200	B	260	45	mg/Kg	☼	05/27/21 08:00	06/10/21 13:44	1

Client Sample ID: EW-3S
Date Collected: 05/11/21 10:20
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-4
Matrix: Solid
Percent Solids: 80.8

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	7.9	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Antimony	ND		15	1.4	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Arsenic	ND		2.5	0.64	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Calcium	**470**	**J B**	1200	9.4	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Cobalt	ND		12	0.22	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Iron	ND		25	14	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Lithium	ND		12	0.74	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Molybdenum	**0.92**	**J**	9.9	0.41	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Potassium	ND		1200	130	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Selenium	ND		2.5	0.84	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4
Sodium	ND		1200	640	mg/Kg	☼	05/27/21 08:00	06/02/21 12:25	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		37	5.9	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Antimony	ND		11	1.0	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Arsenic	ND		1.9	0.48	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Calcium	**1200**		930	8.2	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Cobalt	**0.55**	**J**	9.3	0.23	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Iron	**100**		19	11	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Lithium	ND		9.3	0.56	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Molybdenum	ND		7.4	0.30	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Potassium	ND		930	97	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3
Selenium	ND		1.9	0.63	mg/Kg	☼	05/28/21 08:00	06/02/21 14:18	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**42**		12	2.6	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Antimony	ND		3.7	0.35	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Arsenic	**0.87**		0.62	0.16	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Calcium	**4.7**	**J**	310	1.9	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Cobalt	**1.4**	**J**	3.1	0.056	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Iron	**450**		6.2	3.6	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Lithium	ND		3.1	0.19	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Molybdenum	**0.32**	**J**	2.5	0.10	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Potassium	ND		310	32	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Selenium	ND		0.62	0.21	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1
Sodium	**6100**		310	160	mg/Kg	☼	06/01/21 08:00	06/02/21 16:10	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**520**		12	2.0	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Antimony	ND		3.7	0.56	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Arsenic	**1.0**	**B**	0.62	0.27	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Calcium	**1200**		310	2.7	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Cobalt	**1.9**	**J**	3.1	0.066	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Iron	**1600**		6.2	3.6	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Lithium	**1.2**	**J**	3.1	0.19	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Molybdenum	**0.23**	**J**	2.5	0.10	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Potassium	**54**	**J**	310	32	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1

Client Sample ID: EW-3S
Date Collected: 05/11/21 10:20
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-4
Matrix: Solid
Percent Solids: 80.8

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.62	0.58	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1
Sodium	**380**		310	160	mg/Kg	☼	06/02/21 08:00	06/05/21 11:51	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40**	**J**	190	29	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Antimony	ND		56	5.2	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Arsenic	ND		9.3	2.4	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Calcium	**290**	**J**	4600	14	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Cobalt	ND	*1	46	0.74	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Iron	ND		93	54	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Lithium	**11**	**J B *+**	46	2.7	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Molybdenum	ND		37	1.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Potassium	**2800**	**J B**	4600	530	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5
Selenium	ND		9.3	3.2	mg/Kg	☼	06/04/21 08:00	06/05/21 13:44	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**780**		12	2.0	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Antimony	ND		3.7	0.35	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Arsenic	**1.1**		0.62	0.19	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Calcium	**300**	**J**	310	2.6	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Cobalt	**1.1**	**J**	3.1	0.057	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Iron	**1900**		6.2	3.6	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Lithium	**1.3**	**J B**	3.1	0.19	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Molybdenum	ND		2.5	0.12	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Potassium	**210**	**J**	310	32	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Selenium	ND		0.62	0.21	mg/Kg	☼	06/04/21 08:00	06/05/21 15:38	1
Sodium	**19000**		1500	800	mg/Kg	☼	06/04/21 08:00	06/05/21 16:46	5

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	☼	06/07/21 08:00	06/09/21 12:20	10
Antimony	**0.18**	**J**	3.7	0.17	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1
Arsenic	**1.8**	**B**	1.2	0.32	mg/Kg	☼	06/07/21 08:00	06/09/21 15:13	2
Calcium	**4700**		3100	32	mg/Kg	☼	06/07/21 08:00	06/09/21 12:20	10
Cobalt	**0.85**	**J**	3.1	0.032	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1
Iron	**3500**		6.2	5.1	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1
Lithium	**2.6**	**J**	3.1	0.19	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1
Molybdenum	**0.17**	**J**	2.5	0.10	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1
Potassium	**19000**		1500	62	mg/Kg	☼	06/07/21 08:00	06/09/21 15:18	5
Selenium	ND		1.2	0.42	mg/Kg	☼	06/07/21 08:00	06/09/21 15:13	2
Sodium	**10000**		310	53	mg/Kg	☼	06/07/21 08:00	06/09/21 13:58	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**32000**		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	**0.18**	**J**	3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**4.8**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**8100**		250	0.74	mg/Kg			06/13/21 13:02	1

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: EW-3S
Date Collected: 05/11/21 10:20
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-4
Matrix: Solid
Percent Solids: 80.8

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	5.8		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	7500		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	16		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	1.6	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	22000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	ND		0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	36000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1400		49	6.1	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Antimony	ND		7.3	0.41	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Arsenic	4.4		2.4	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Calcium	4200		610	110	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Cobalt	5.5	J	6.1	0.058	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Iron	3700		24	9.6	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Lithium	1.9	J	6.1	0.37	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Manganese	53		1.8	0.76	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Molybdenum	1.3	J	4.9	0.13	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Potassium	370	J	610	29	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Selenium	ND		1.8	0.54	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1
Sodium	54	J	610	44	mg/Kg	☼	06/10/21 08:00	06/11/21 11:22	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000	B	120	20	mg/Kg	☼	05/27/21 08:00	06/10/21 12:09	10
Antimony	0.59	J	3.7	0.17	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Arsenic	4.3	B	0.62	0.16	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Calcium	7200		3100	32	mg/Kg	☼	05/27/21 08:00	06/10/21 12:09	10
Cobalt	4.6		3.1	0.032	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Iron	5700		6.2	5.1	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Lithium	5.6		3.1	0.19	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Molybdenum	1.5	J	2.5	0.10	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Potassium	17000		1500	62	mg/Kg	☼	05/27/21 08:00	06/10/21 15:21	5
Selenium	0.39	J	0.62	0.21	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1
Sodium	10000	B	310	53	mg/Kg	☼	05/27/21 08:00	06/10/21 13:50	1

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5
Matrix: Solid
Percent Solids: 83.1

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.7	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Antimony	ND		14	1.3	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Arsenic	ND		2.4	0.63	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Calcium	**350**	**J B**	1200	9.1	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Cobalt	ND		12	0.22	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Iron	ND		24	14	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Lithium	ND		12	0.72	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Molybdenum	**0.86**	**J**	9.6	0.39	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Potassium	ND		1200	130	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Selenium	ND		2.4	0.82	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4
Sodium	ND		1200	630	mg/Kg	☼	05/27/21 08:00	06/02/21 12:30	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11**	**J**	36	5.8	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Antimony	ND		11	1.0	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Arsenic	ND		1.8	0.47	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Calcium	**670**	**J**	900	7.9	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Cobalt	ND		9.0	0.23	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Iron	**99**		18	10	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Lithium	ND		9.0	0.54	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Molybdenum	ND		7.2	0.30	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Potassium	ND		900	94	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3
Selenium	ND		1.8	0.61	mg/Kg	☼	05/28/21 08:00	06/02/21 14:23	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30**		12	2.5	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Antimony	ND		3.6	0.34	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Arsenic	**0.31**	**J**	0.60	0.16	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Calcium	**4.6**	**J**	300	1.8	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Cobalt	**0.28**	**J**	3.0	0.054	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Iron	**170**		6.0	3.5	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Lithium	ND		3.0	0.18	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Molybdenum	**0.21**	**J**	2.4	0.099	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Potassium	ND		300	31	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Selenium	ND		0.60	0.20	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1
Sodium	**6900**		300	160	mg/Kg	☼	06/01/21 08:00	06/02/21 16:14	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**330**		12	1.9	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Antimony	ND		3.6	0.54	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Arsenic	**0.91**	**B**	0.60	0.26	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Calcium	**730**		300	2.6	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Cobalt	**0.71**	**J**	3.0	0.064	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Iron	**1000**		6.0	3.5	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Lithium	**0.70**	**J**	3.0	0.18	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Molybdenum	**0.18**	**J**	2.4	0.099	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Potassium	**38**	**J**	300	31	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5
Matrix: Solid
Percent Solids: 83.1

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.60	0.57	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1
Sodium	**470**		300	160	mg/Kg	☼	06/02/21 08:00	06/05/21 11:55	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**73**	**J**	180	28	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Antimony	ND		54	5.1	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Calcium	**110**	**J**	4500	13	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Cobalt	ND	*1	45	0.72	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Iron	**84**	**J B**	90	53	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Lithium	**9.3**	**J B *+**	45	2.6	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Molybdenum	ND		36	1.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Potassium	**2800**	**J B**	4500	510	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5
Selenium	ND		9.0	3.1	mg/Kg	☼	06/04/21 08:00	06/05/21 13:49	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**300**		12	1.9	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Antimony	ND		3.6	0.34	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Arsenic	**0.72**		0.60	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Calcium	**100**	**J**	300	2.5	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Cobalt	**0.34**	**J**	3.0	0.055	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Iron	**800**		6.0	3.5	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Lithium	**0.74**	**J B**	3.0	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Molybdenum	ND		2.4	0.12	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Potassium	**150**	**J**	300	31	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Selenium	ND		0.60	0.20	mg/Kg	☼	06/04/21 08:00	06/05/21 15:42	1
Sodium	**22000**		1500	780	mg/Kg	☼	06/04/21 08:00	06/05/21 16:51	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**24000**		120	19	mg/Kg	☼	06/07/21 08:00	06/09/21 12:25	10
Antimony	ND		3.6	0.17	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1
Arsenic	**1.7**	**B**	1.2	0.31	mg/Kg	☼	06/07/21 08:00	06/09/21 15:33	2
Calcium	**3100**		3000	31	mg/Kg	☼	06/07/21 08:00	06/09/21 12:25	10
Cobalt	ND		3.0	0.031	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1
Iron	**1000**		6.0	4.9	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1
Lithium	**2.2**	**J**	3.0	0.18	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1
Molybdenum	ND		2.4	0.099	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1
Potassium	**16000**		1500	60	mg/Kg	☼	06/07/21 08:00	06/09/21 15:38	5
Selenium	ND		1.2	0.41	mg/Kg	☼	06/07/21 08:00	06/09/21 15:33	2
Sodium	**9700**		300	52	mg/Kg	☼	06/07/21 08:00	06/09/21 14:03	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**24000**		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	ND		3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**3.7**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**5100**		250	0.74	mg/Kg			06/13/21 13:02	1

Client Sample ID: EW-3M

Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5

Matrix: Solid
Percent Solids: 83.1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.3	J	2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	3200		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	13		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	1.2	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	19000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	ND		0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	39000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	900	F1	46	5.7	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Antimony	ND		6.8	0.39	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Arsenic	1.6	J	2.3	0.33	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Calcium	1800		570	100	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Cobalt	1.5	J	5.7	0.055	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Iron	2100		23	9.0	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Lithium	1.1	J	5.7	0.34	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Manganese	32	F1	1.7	0.71	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Molybdenum	1.1	J	4.6	0.13	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Potassium	220	J	570	27	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Selenium	ND		1.7	0.50	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1
Sodium	43	J	570	41	mg/Kg	☼	06/10/21 08:00	06/11/21 11:27	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000	B	120	19	mg/Kg	☼	05/27/21 08:00	06/10/21 12:13	10
Antimony	0.82	J	3.6	0.17	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1
Arsenic	11	B	1.2	0.31	mg/Kg	☼	05/27/21 08:00	06/10/21 15:26	2
Calcium	6600		3000	31	mg/Kg	☼	05/27/21 08:00	06/10/21 12:13	10
Cobalt	3.6		3.0	0.031	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1
Iron	4700		6.0	4.9	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1
Lithium	3.7		3.0	0.18	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1
Molybdenum	3.1		2.4	0.099	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1
Potassium	16000		1500	60	mg/Kg	☼	05/27/21 08:00	06/10/21 15:31	5
Selenium	0.80	J	1.2	0.41	mg/Kg	☼	05/27/21 08:00	06/10/21 15:26	2
Sodium	9300	B	300	52	mg/Kg	☼	05/27/21 08:00	06/10/21 13:55	1

Client Sample ID: EW-3D
Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-6
Matrix: Solid
Percent Solids: 93.0

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		43	6.9	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Antimony	ND		13	1.2	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Arsenic	ND		2.1	0.56	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Calcium	**820**	**J B**	1100	8.2	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Cobalt	ND		11	0.19	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Iron	**13**	**J**	21	12	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Lithium	ND		11	0.64	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Molybdenum	ND		8.6	0.35	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Potassium	ND		1100	110	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Selenium	ND		2.1	0.73	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4
Sodium	ND		1100	560	mg/Kg	☼	05/27/21 08:00	06/02/21 12:40	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**19**	**J**	32	5.2	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Antimony	ND		9.7	0.90	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Calcium	**20000**		810	7.1	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Cobalt	**0.32**	**J**	8.1	0.20	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Iron	**290**		16	9.4	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Lithium	ND		8.1	0.48	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Molybdenum	ND		6.4	0.26	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Potassium	ND		810	84	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3
Selenium	ND		1.6	0.55	mg/Kg	☼	05/28/21 08:00	06/02/21 14:33	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**83**		11	2.3	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Antimony	ND		3.2	0.30	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Arsenic	**0.19**	**J**	0.54	0.14	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Calcium	**5.7**	**J**	270	1.6	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Cobalt	**0.47**	**J**	2.7	0.048	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Iron	**1100**		5.4	3.1	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Lithium	ND		2.7	0.16	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Molybdenum	ND		2.1	0.088	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Potassium	ND		270	28	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Selenium	ND		0.54	0.18	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1
Sodium	**5300**		270	140	mg/Kg	☼	06/01/21 08:00	06/02/21 16:24	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**270**		11	1.7	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Antimony	ND		3.2	0.48	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Arsenic	**0.51**	**J B**	0.54	0.24	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Calcium	**18000**		270	2.4	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Cobalt	**1.7**	**J**	2.7	0.057	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Iron	**1700**		5.4	3.1	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Lithium	**1.0**	**J**	2.7	0.16	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Molybdenum	ND		2.1	0.088	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Potassium	ND		270	28	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1

Client Sample ID: EW-3D
Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-6
Matrix: Solid
Percent Solids: 93.0

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.54	0.51	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1
Sodium	**460**		270	140	mg/Kg	☼	06/02/21 08:00	06/05/21 12:05	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**100**	**J**	160	25	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Antimony	ND		48	4.5	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Arsenic	ND		8.1	2.0	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Calcium	**6600**		4000	12	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Cobalt	ND	*1	40	0.64	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Iron	ND		81	47	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Lithium	**8.5**	**J B *+**	40	2.4	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Molybdenum	ND		32	1.3	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Potassium	**2500**	**J B**	4000	460	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5
Selenium	ND		8.1	2.8	mg/Kg	☼	06/04/21 08:00	06/05/21 13:59	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1400**		11	1.7	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Antimony	ND		3.2	0.30	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Arsenic	**2.7**		0.54	0.16	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Calcium	**4200**		270	2.3	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Cobalt	**2.2**	**J**	2.7	0.049	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Iron	**5900**		5.4	3.1	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Lithium	**2.6**	**J B**	2.7	0.16	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Molybdenum	**0.17**	**J**	2.1	0.11	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Potassium	**230**	**J**	270	28	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Selenium	**0.40**	**J**	0.54	0.18	mg/Kg	☼	06/04/21 08:00	06/05/21 15:52	1
Sodium	**16000**		1300	700	mg/Kg	☼	06/04/21 08:00	06/05/21 17:01	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**12000**		110	17	mg/Kg	☼	06/07/21 08:00	06/09/21 12:49	10
Antimony	ND		3.2	0.15	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Arsenic	**1.5**	**B**	0.54	0.14	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Calcium	**2400**		270	2.8	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Cobalt	**1.0**	**J**	2.7	0.028	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Iron	**3900**		5.4	4.4	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Lithium	**3.9**		2.7	0.16	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Molybdenum	ND		2.1	0.088	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Potassium	**11000**		1300	54	mg/Kg	☼	06/07/21 08:00	06/09/21 15:52	5
Selenium	ND		0.54	0.18	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1
Sodium	**6700**		270	46	mg/Kg	☼	06/07/21 08:00	06/09/21 14:13	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14000**		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	ND		3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	**4.8**		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	**52000**		250	0.74	mg/Kg			06/13/21 13:02	1

Client Sample ID: EW-3D
Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-6
Matrix: Solid
Percent Solids: 93.0

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	5.7		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	13000		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	16		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	0.17	J	2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	14000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	0.40	J	0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	29000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	3200		41	5.1	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Antimony	ND		6.1	0.35	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Arsenic	4.8		2.0	0.30	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Calcium	44000		510	90	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Cobalt	8.0		5.1	0.049	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Iron	9400		20	8.0	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Lithium	5.8		5.1	0.31	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Manganese	680		1.5	0.63	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Molybdenum	0.15	J	4.1	0.11	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Potassium	400	J	510	24	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Selenium	ND		1.5	0.45	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1
Sodium	61	J	510	37	mg/Kg	☼	06/10/21 08:00	06/11/21 11:56	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000	B	110	17	mg/Kg	☼	05/27/21 08:00	06/10/21 12:33	10
Antimony	0.70	J	3.2	0.15	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Arsenic	3.7	B	0.54	0.14	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Calcium	48000		2700	28	mg/Kg	☼	05/27/21 08:00	06/10/21 12:33	10
Cobalt	5.6		2.7	0.028	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Iron	10000		5.4	4.4	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Lithium	8.0		2.7	0.16	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Molybdenum	0.38	J	2.1	0.088	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Potassium	17000		1300	54	mg/Kg	☼	05/27/21 08:00	06/10/21 15:55	5
Selenium	ND		0.54	0.18	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1
Sodium	7600	B	270	46	mg/Kg	☼	05/27/21 08:00	06/10/21 14:06	1

Client Sample ID: EW-3-FA (10-17)

Date Collected: 05/11/21 12:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-7

Matrix: Solid
Percent Solids: 61.6

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		65	10	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Antimony	ND		19	1.8	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Arsenic	ND		3.2	0.84	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Calcium	**3500**	**B**	1600	12	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Cobalt	ND		16	0.29	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Iron	ND		32	19	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Lithium	ND		16	0.97	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Molybdenum	**2.0**	**J**	13	0.53	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Potassium	ND		1600	170	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Selenium	ND		3.2	1.1	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4
Sodium	ND		1600	840	mg/Kg	☼	05/27/21 08:00	06/02/21 12:44	4

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3800**		49	7.8	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Antimony	ND		15	1.4	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Arsenic	**7.7**		2.4	0.63	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Calcium	**16000**		1200	11	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Cobalt	**0.66**	**J**	12	0.31	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Iron	**840**		24	14	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Lithium	**1.3**	**J**	12	0.73	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Molybdenum	**7.3**	**J**	9.7	0.40	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Potassium	**220**	**J**	1200	130	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3
Selenium	**1.0**	**J**	2.4	0.83	mg/Kg	☼	05/28/21 08:00	06/02/21 14:38	3

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5300**		16	3.4	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Antimony	**0.68**	**J**	4.9	0.45	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Arsenic	**23**		0.81	0.21	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Calcium	**35**	**J**	410	2.4	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Cobalt	**1.5**	**J**	4.1	0.073	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Iron	**4500**		8.1	4.7	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Lithium	**1.4**	**J**	4.1	0.24	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Molybdenum	**18**		3.2	0.13	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Potassium	**86**	**J**	410	42	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Selenium	**3.5**		0.81	0.28	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1
Sodium	**15000**		410	210	mg/Kg	☼	06/01/21 08:00	06/02/21 16:29	1

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7300**		16	2.6	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Antimony	ND		4.9	0.73	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Arsenic	**8.4**	**B**	0.81	0.36	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Calcium	**13000**		410	3.6	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Cobalt	**4.0**	**J**	4.1	0.086	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Iron	**10000**		8.1	4.7	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Lithium	**3.9**	**J**	4.1	0.24	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Molybdenum	**12**		3.2	0.13	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Potassium	**510**		410	42	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1

Client Sample ID: EW-3-FA (10-17)
Date Collected: 05/11/21 12:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-7
Matrix: Solid
Percent Solids: 61.6

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	1.4		0.81	0.76	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1
Sodium	2200		410	210	mg/Kg	☼	06/02/21 08:00	06/05/21 12:10	1

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	77	J	240	38	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Antimony	ND		73	6.8	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Arsenic	8.2	J	12	3.1	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Calcium	3200	J	6100	18	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Cobalt	ND	*1	61	0.97	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Iron	85	J B	120	71	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Lithium	13	J B *+	61	3.6	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Molybdenum	2.5	J	49	2.0	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Potassium	3700	J B	6100	690	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5
Selenium	8.3	J	12	4.2	mg/Kg	☼	06/04/21 08:00	06/05/21 14:04	5

Method: 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		16	2.6	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Antimony	1.9	J	4.9	0.45	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Arsenic	14		0.81	0.24	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Calcium	6000		410	3.4	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Cobalt	10	J	20	0.37	mg/Kg	☼	06/04/21 08:00	06/05/21 17:05	5
Iron	28000		8.1	4.7	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Lithium	11	B	4.1	0.24	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Molybdenum	2.7	J	3.2	0.16	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Potassium	3100		410	42	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Selenium	2.5		0.81	0.28	mg/Kg	☼	06/04/21 08:00	06/05/21 15:57	1
Sodium	39000		2000	1100	mg/Kg	☼	06/04/21 08:00	06/05/21 17:05	5

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	34000		160	26	mg/Kg	☼	06/07/21 08:00	06/09/21 12:54	10
Antimony	3.1	J	4.9	0.23	mg/Kg	☼	06/07/21 08:00	06/09/21 14:18	1
Arsenic	6.9	B	1.6	0.42	mg/Kg	☼	06/07/21 08:00	06/09/21 15:57	2
Calcium	11000		4100	42	mg/Kg	☼	06/07/21 08:00	06/09/21 12:54	10
Cobalt	23		20	0.21	mg/Kg	☼	06/07/21 08:00	06/09/21 16:02	5
Iron	52000		16	13	mg/Kg	☼	06/07/21 08:00	06/09/21 15:57	2
Lithium	42		4.1	0.24	mg/Kg	☼	06/07/21 08:00	06/09/21 14:18	1
Molybdenum	2.3	J	3.2	0.13	mg/Kg	☼	06/07/21 08:00	06/09/21 14:18	1
Potassium	15000		810	32	mg/Kg	☼	06/07/21 08:00	06/09/21 15:57	2
Selenium	ND		1.6	0.55	mg/Kg	☼	06/07/21 08:00	06/09/21 15:57	2
Sodium	9000		410	70	mg/Kg	☼	06/07/21 08:00	06/09/21 14:18	1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	66000		10	1.6	mg/Kg			06/13/21 13:02	1
Antimony	5.7		3.0	0.14	mg/Kg			06/13/21 13:02	1
Arsenic	69		0.50	0.13	mg/Kg			06/13/21 13:02	1
Calcium	52000		250	0.74	mg/Kg			06/13/21 13:02	1

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: EW-3-FA (10-17)
Date Collected: 05/11/21 12:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-7
Matrix: Solid
Percent Solids: 61.6

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	40		2.5	0.023	mg/Kg			06/13/21 13:02	1
Iron	96000		5.0	4.1	mg/Kg			06/13/21 13:02	1
Lithium	72		2.5	0.15	mg/Kg			06/13/21 13:02	1
Molybdenum	46		2.0	0.082	mg/Kg			06/13/21 13:02	1
Potassium	22000		250	26	mg/Kg			06/13/21 13:02	1
Selenium	17		0.50	0.17	mg/Kg			06/13/21 13:02	1
Sodium	65000		250	130	mg/Kg			06/13/21 13:02	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38000		63	7.9	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Antimony	ND		9.5	0.54	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Arsenic	60		3.2	0.46	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Calcium	41000		790	140	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Cobalt	18		7.9	0.076	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Iron	51000		32	12	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Lithium	19		7.9	0.47	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Manganese	170		2.4	0.98	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Molybdenum	36		6.3	0.17	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Potassium	4800		790	38	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Selenium	17		2.4	0.70	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1
Sodium	3800		790	57	mg/Kg	☼	06/10/21 08:00	06/11/21 12:01	1

Method: 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	67000	B	160	26	mg/Kg	☼	05/27/21 08:00	06/10/21 12:37	10
Antimony	5.0	J	9.7	0.45	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Arsenic	52	B	1.6	0.42	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Calcium	60000		4100	42	mg/Kg	☼	05/27/21 08:00	06/10/21 12:37	10
Cobalt	33		20	0.21	mg/Kg	☼	05/27/21 08:00	06/10/21 16:05	5
Iron	67000		16	13	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Lithium	36		8.1	0.49	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Molybdenum	41		6.5	0.27	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Potassium	12000		810	32	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Selenium	9.8		1.6	0.55	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2
Sodium	8300	B	810	140	mg/Kg	☼	05/27/21 08:00	06/10/21 16:00	2

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

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
Calcium	250	1.9	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	1.5	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Calcium	250	2.2	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.47	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Calcium	750	2.2	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Iron	15	8.8	mg/Kg
Lithium	7.5	0.44	mg/Kg
Molybdenum	6.0	0.25	mg/Kg
Potassium	750	85	mg/Kg
Selenium	1.5	0.52	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Calcium	250	2.1	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Iron	5.0	2.9	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.099	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7 (Continued)

Prep: Residual

Analyte	RL	MDL	Units
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	0.74	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	26	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	130	mg/Kg

Method: 6010B - Metals (ICP)

Prep: 3050B

Analyte	RL	MDL	Units
Aluminum	40	5.0	mg/Kg
Antimony	6.0	0.34	mg/Kg
Arsenic	2.0	0.29	mg/Kg
Calcium	500	88	mg/Kg
Cobalt	5.0	0.048	mg/Kg
Iron	20	7.9	mg/Kg
Lithium	5.0	0.30	mg/Kg
Manganese	1.5	0.62	mg/Kg
Molybdenum	4.0	0.11	mg/Kg
Potassium	500	24	mg/Kg
Selenium	1.5	0.44	mg/Kg
Sodium	500	36	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Calcium	250	2.6	mg/Kg
Cobalt	2.5	0.026	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Potassium	250	10	mg/Kg
Selenium	0.50	0.17	mg/Kg
Sodium	250	43	mg/Kg

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-50632/14-A
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 50632

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	5.0	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Antimony	ND		6.0	0.34	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Arsenic	ND		2.0	0.29	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Calcium	ND		500	88	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Cobalt	ND		5.0	0.048	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Iron	ND		20	7.9	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Lithium	ND		5.0	0.30	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Manganese	ND		1.5	0.62	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Molybdenum	ND		4.0	0.11	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Potassium	ND		500	24	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Selenium	ND		1.5	0.44	mg/Kg		06/10/21 08:00	06/11/21 10:58	1
Sodium	ND		500	36	mg/Kg		06/10/21 08:00	06/11/21 10:58	1

Lab Sample ID: LCS 140-50632/15-A
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	200	203		mg/Kg		102	90 - 110
Antimony	50.0	49.9		mg/Kg		100	90 - 110
Arsenic	10.0	9.86		mg/Kg		99	90 - 110
Calcium	5000	5060		mg/Kg		101	90 - 110
Cobalt	10.0	10.3		mg/Kg		103	90 - 110
Iron	100	104		mg/Kg		104	90 - 113
Lithium	10.0	9.88		mg/Kg		99	80 - 120
Manganese	10.0	10.6		mg/Kg		106	90 - 110
Molybdenum	50.0	51.7		mg/Kg		103	90 - 110
Potassium	5000	4980		mg/Kg		100	90 - 110
Selenium	15.0	14.8		mg/Kg		99	90 - 110
Sodium	5000	5060		mg/Kg		101	87 - 116

Lab Sample ID: 140-23062-5 MS
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	900	F1	225	1880	F1	mg/Kg	☼	435	75 - 125
Antimony	ND		56.2	50.7		mg/Kg	☼	90	75 - 125
Arsenic	1.6	J	11.2	13.3		mg/Kg	☼	104	75 - 125
Calcium	1800		5620	7640		mg/Kg	☼	103	75 - 125
Cobalt	1.5	J	11.2	12.6		mg/Kg	☼	99	75 - 125
Iron	2100		112	2460	4	mg/Kg	☼	337	75 - 125
Lithium	1.1	J	11.2	12.1		mg/Kg	☼	98	75 - 125
Manganese	32	F1	11.2	48.5	F1	mg/Kg	☼	148	75 - 125
Molybdenum	1.1	J	56.2	55.6		mg/Kg	☼	97	75 - 125
Potassium	220	J	5620	5770		mg/Kg	☼	99	75 - 125
Selenium	ND		16.9	16.0		mg/Kg	☼	95	75 - 121
Sodium	43	J	5620	5550		mg/Kg	☼	98	75 - 125

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 140-23062-5 MSD
Matrix: Solid
Analysis Batch: 50744

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50632

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	900	F1	237	2050	F1	mg/Kg	☼	488	75 - 125	9	20
Antimony	ND		59.3	53.3		mg/Kg	☼	90	75 - 125	5	20
Arsenic	1.6	J	11.9	13.3		mg/Kg	☼	98	75 - 125	0	20
Calcium	1800		5930	7660		mg/Kg	☼	98	75 - 125	0	20
Cobalt	1.5	J	11.9	13.1		mg/Kg	☼	97	75 - 125	4	20
Iron	2100		119	2590	4	mg/Kg	☼	433	75 - 125	5	20
Lithium	1.1	J	11.9	12.9		mg/Kg	☼	100	75 - 125	6	20
Manganese	32	F1	11.9	50.2	F1	mg/Kg	☼	155	75 - 125	3	20
Molybdenum	1.1	J	59.3	58.6		mg/Kg	☼	97	75 - 125	5	20
Potassium	220	J	5930	6130		mg/Kg	☼	100	75 - 125	6	20
Selenium	ND		17.8	17.1		mg/Kg	☼	96	75 - 121	6	20
Sodium	43	J	5930	5890		mg/Kg	☼	99	75 - 125	6	20

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-50176/17-A
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 50176

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1.76	J	10	1.6	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Antimony	ND		3.0	0.14	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Arsenic	0.240	J	0.50	0.13	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Calcium	ND		250	2.6	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Cobalt	ND		2.5	0.026	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Iron	ND		5.0	4.1	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Lithium	ND		2.5	0.15	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Molybdenum	ND		2.0	0.082	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Potassium	ND		250	10	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Selenium	ND		0.50	0.17	mg/Kg		05/27/21 08:00	06/10/21 11:30	1
Sodium	50.5	J	250	43	mg/Kg		05/27/21 08:00	06/10/21 11:30	1

Lab Sample ID: LCS 140-50176/18-A
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 50176

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	101		mg/Kg		101	80 - 120
Antimony	25.0	24.9		mg/Kg		99	80 - 125
Arsenic	5.00	5.11		mg/Kg		102	80 - 120
Calcium	2500	2590		mg/Kg		104	80 - 120
Cobalt	5.00	5.11		mg/Kg		102	80 - 125
Iron	50.0	53.9		mg/Kg		108	80 - 120
Lithium	5.00	4.95		mg/Kg		99	80 - 120
Molybdenum	25.0	25.7		mg/Kg		103	80 - 125
Potassium	2500	2540		mg/Kg		102	80 - 120
Selenium	7.50	7.21		mg/Kg		96	80 - 120
Sodium	2500	2580		mg/Kg		103	80 - 120

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: LCSD 140-50176/19-A
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 50176

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	99.4		mg/Kg		99	80 - 120	1	30
Antimony			25.0	24.3		mg/Kg		97	80 - 125	2	30
Arsenic			5.00	5.02		mg/Kg		100	80 - 120	2	30
Calcium			2500	2540		mg/Kg		102	80 - 120	2	30
Cobalt			5.00	5.01		mg/Kg		100	80 - 125	2	30
Iron			50.0	56.3		mg/Kg		113	80 - 120	4	30
Lithium			5.00	4.86		mg/Kg		97	80 - 120	2	30
Molybdenum			25.0	25.2		mg/Kg		101	80 - 125	2	30
Potassium			2500	2490		mg/Kg		100	80 - 120	2	30
Selenium			7.50	7.17		mg/Kg		96	80 - 120	1	30
Sodium			2500	2520		mg/Kg		101	80 - 120	2	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50176

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	28000	B		30300		mg/Kg	☼			6	30
Calcium	6600			6720		mg/Kg	☼			2	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50176

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Antimony	0.82	J		0.448	J F5	mg/Kg	☼			59	30
Cobalt	3.6			1.12	J F5	mg/Kg	☼			106	30
Iron	4700			3370	F3	mg/Kg	☼			33	30
Lithium	3.7			4.01		mg/Kg	☼			9	30
Molybdenum	3.1			1.31	J F5	mg/Kg	☼			80	30
Sodium	9300	B		8440		mg/Kg	☼			9	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50176

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Arsenic	11	B		3.59	F3	mg/Kg	☼			103	30
Selenium	0.80	J		ND		mg/Kg	☼			NC	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50709

Client Sample ID: EW-3M
Prep Type: Total/NA
Prep Batch: 50176

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Potassium	16000			16000		mg/Kg	☼			3	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-50177/16-B ^4
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 50219

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Antimony	ND		12	1.1	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Arsenic	ND		2.0	0.52	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Calcium	20.9	J	1000	7.6	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Cobalt	ND		10	0.18	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Iron	ND		20	12	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Lithium	ND		10	0.60	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Molybdenum	ND		8.0	0.33	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Potassium	ND		1000	100	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Selenium	ND		2.0	0.68	mg/Kg		05/27/21 08:00	06/02/21 11:27	4
Sodium	ND		1000	520	mg/Kg		05/27/21 08:00	06/02/21 11:27	4

Lab Sample ID: LCS 140-50177/17-B ^5
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 50219

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	92.9		mg/Kg		93	80 - 120
Antimony	25.0	24.3		mg/Kg		97	80 - 120
Arsenic	5.00	4.85		mg/Kg		97	80 - 120
Calcium	2500	2380		mg/Kg		95	80 - 120
Cobalt	5.00	4.80	J	mg/Kg		96	80 - 120
Iron	50.0	51.1		mg/Kg		102	80 - 120
Lithium	5.00	4.95	J	mg/Kg		99	80 - 120
Molybdenum	25.0	24.3		mg/Kg		97	80 - 120
Potassium	2500	2410		mg/Kg		96	80 - 120
Selenium	7.50	7.44		mg/Kg		99	80 - 120
Sodium	2500	2400		mg/Kg		96	80 - 120

Lab Sample ID: LCSD 140-50177/18-B ^5
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 50219

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	95.7		mg/Kg		96	80 - 120	3	30
Antimony	25.0	24.3		mg/Kg		97	80 - 120	0	30
Arsenic	5.00	4.83		mg/Kg		97	80 - 120	0	30
Calcium	2500	2470		mg/Kg		99	80 - 120	4	30
Cobalt	5.00	4.94	J	mg/Kg		99	80 - 120	3	30
Iron	50.0	49.6		mg/Kg		99	80 - 120	3	30
Lithium	5.00	4.67	J	mg/Kg		93	80 - 120	6	30
Molybdenum	25.0	24.6		mg/Kg		99	80 - 120	1	30
Potassium	2500	2540		mg/Kg		102	80 - 120	5	30
Selenium	7.50	7.31		mg/Kg		97	80 - 120	2	30
Sodium	2500	2510		mg/Kg		100	80 - 120	4	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: EW-3M
Prep Type: Step 1
Prep Batch: 50219

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	ND			ND		mg/Kg	☼			NC	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Calcium	350	J B		337	J	mg/Kg	☼			3	30
Cobalt	ND			ND		mg/Kg	☼			NC	30
Iron	ND			ND		mg/Kg	☼			NC	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Molybdenum	0.86	J		0.761	J	mg/Kg	☼			12	30
Potassium	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Sodium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-50220/16-B ^3
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 50254

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Antimony	ND		9.0	0.84	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Arsenic	ND		1.5	0.39	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Calcium	ND		750	6.6	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Cobalt	ND		7.5	0.19	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Iron	ND		15	8.7	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Lithium	ND		7.5	0.45	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Molybdenum	ND		6.0	0.25	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Potassium	ND		750	78	mg/Kg		05/28/21 08:00	06/02/21 13:18	3
Selenium	ND		1.5	0.51	mg/Kg		05/28/21 08:00	06/02/21 13:18	3

Lab Sample ID: LCS 140-50220/17-B ^5
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 50254

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	ND		mg/Kg		5			
Antimony			25.0	20.7		mg/Kg		83	70 - 120		
Arsenic			5.00	4.29		mg/Kg		86	60 - 120		
Calcium			2500	679	J	mg/Kg		27	10 - 40		
Cobalt			5.00	4.72	J	mg/Kg		94	80 - 120		
Iron			50.0	ND		mg/Kg		7			
Lithium			5.00	4.91	J	mg/Kg		98	80 - 120		
Molybdenum			25.0	20.8		mg/Kg		83	70 - 120		
Potassium			2500	2440		mg/Kg		97	80 - 120		
Selenium			7.50	5.95		mg/Kg		79	70 - 120		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-50220/18-B ^5
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 50254

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	ND		mg/Kg		-1		326	
Antimony			25.0	21.1		mg/Kg		85	70 - 120	2	30
Arsenic			5.00	3.95		mg/Kg		79	60 - 120	8	30
Calcium			2500	687	J	mg/Kg		27	10 - 40	1	30
Cobalt			5.00	4.71	J	mg/Kg		94	80 - 120	0	30
Iron			50.0	ND		mg/Kg		21		97	
Lithium			5.00	4.53	J	mg/Kg		91	80 - 120	8	30
Molybdenum			25.0	21.1		mg/Kg		84	70 - 120	2	30
Potassium			2500	2500		mg/Kg		100	80 - 120	3	30
Selenium			7.50	6.15		mg/Kg		82	70 - 120	3	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: EW-3M
Prep Type: Step 2
Prep Batch: 50254

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	11	J		13.7	J	mg/Kg	☼			22	
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Calcium	670	J		704	J	mg/Kg	☼			5	30
Cobalt	ND			ND		mg/Kg	☼			NC	30
Iron	99			69.2		mg/Kg	☼			36	
Lithium	ND			ND		mg/Kg	☼			NC	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-50257/16-B
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 50291

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Antimony	ND		3.0	0.28	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Arsenic	ND		0.50	0.13	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Calcium	ND		250	1.5	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Cobalt	ND		2.5	0.045	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Iron	ND		5.0	2.9	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Lithium	ND		2.5	0.15	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Molybdenum	ND		2.0	0.082	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Potassium	ND		250	26	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Selenium	ND		0.50	0.17	mg/Kg		06/01/21 08:00	06/02/21 15:12	1
Sodium	ND		250	130	mg/Kg		06/01/21 08:00	06/02/21 15:12	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-50257/17-B
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 50291

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	101		mg/Kg		101	80 - 120		
Antimony			25.0	24.4		mg/Kg		98	80 - 120		
Arsenic			5.00	4.85		mg/Kg		97	80 - 120		
Calcium			2500	38.0	J	mg/Kg		2			
Cobalt			5.00	5.10		mg/Kg		102	80 - 120		
Iron			50.0	51.9		mg/Kg		104	80 - 120		
Lithium			5.00	4.89		mg/Kg		98	80 - 120		
Molybdenum			25.0	25.3		mg/Kg		101	80 - 120		
Potassium			2500	2460		mg/Kg		98	80 - 120		
Selenium			7.50	7.50		mg/Kg		100	80 - 120		
Sodium			2500	2430		mg/Kg		97	80 - 120		

Lab Sample ID: LCSD 140-50257/18-B
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 50291

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	102		mg/Kg		102	80 - 120	1	30
Antimony			25.0	24.7		mg/Kg		99	80 - 120	1	30
Arsenic			5.00	4.91		mg/Kg		98	80 - 120	1	30
Calcium			2500	38.1	J	mg/Kg		2		0	
Cobalt			5.00	5.18		mg/Kg		104	80 - 120	2	30
Iron			50.0	52.3		mg/Kg		105	80 - 120	1	30
Lithium			5.00	4.93		mg/Kg		99	80 - 120	1	30
Molybdenum			25.0	25.5		mg/Kg		102	80 - 120	1	30
Potassium			2500	2480		mg/Kg		99	80 - 120	1	30
Selenium			7.50	7.60		mg/Kg		101	80 - 120	1	30
Sodium			2500	2460		mg/Kg		98	80 - 120	1	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50418

Client Sample ID: EW-3M
Prep Type: Step 3
Prep Batch: 50291

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	30			28.2		mg/Kg	☼			5	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	0.31	J		0.322	J	mg/Kg	☼			4	30
Calcium	4.6	J		4.54	J	mg/Kg	☼			0.6	
Cobalt	0.28	J		0.268	J	mg/Kg	☼			3	30
Iron	170			167		mg/Kg	☼			2	30
Lithium	ND			ND		mg/Kg	☼			NC	30
Molybdenum	0.21	J		0.200	J	mg/Kg	☼			3	30
Potassium	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Sodium	6900			7320		mg/Kg	☼			5	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-50292/16-B
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 50364

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Antimony	ND		3.0	0.45	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Arsenic	0.259	J	0.50	0.22	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Calcium	ND		250	2.2	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Cobalt	ND		2.5	0.053	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Iron	ND		5.0	2.9	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Lithium	ND		2.5	0.15	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Molybdenum	ND		2.0	0.082	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Potassium	ND		250	26	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Selenium	ND		0.50	0.47	mg/Kg		06/02/21 08:00	06/05/21 10:52	1
Sodium	ND		250	130	mg/Kg		06/02/21 08:00	06/05/21 10:52	1

Lab Sample ID: LCS 140-50292/17-B
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 50364

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	103		mg/Kg		103	80 - 120
Antimony	25.0	25.3		mg/Kg		101	80 - 130
Arsenic	5.00	5.39		mg/Kg		108	80 - 130
Calcium	2500	2570		mg/Kg		103	80 - 120
Cobalt	5.00	5.15		mg/Kg		103	80 - 120
Iron	50.0	52.6		mg/Kg		105	80 - 120
Lithium	5.00	5.22		mg/Kg		104	80 - 120
Molybdenum	25.0	26.3		mg/Kg		105	80 - 120
Potassium	2500	2550		mg/Kg		102	80 - 120
Selenium	7.50	0.499	J	mg/Kg		7	
Sodium	2500	2580		mg/Kg		103	80 - 120

Lab Sample ID: LCSD 140-50292/18-B
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 50364

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	99.9		mg/Kg		100	80 - 120	3	30
Antimony	25.0	24.7		mg/Kg		99	80 - 130	2	30
Arsenic	5.00	5.27		mg/Kg		105	80 - 130	2	30
Calcium	2500	2500		mg/Kg		100	80 - 120	3	30
Cobalt	5.00	5.02		mg/Kg		100	80 - 120	3	30
Iron	50.0	51.3		mg/Kg		103	80 - 120	2	30
Lithium	5.00	5.08		mg/Kg		102	80 - 120	3	30
Molybdenum	25.0	25.7		mg/Kg		103	80 - 120	2	30
Potassium	2500	2480		mg/Kg		99	80 - 120	2	30
Selenium	7.50	ND		mg/Kg		6		16	
Sodium	2500	2520		mg/Kg		101	80 - 120	2	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: EW-3M
Prep Type: Step 4
Prep Batch: 50364

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	330		320		mg/Kg	☼	3	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	0.91	B	0.979		mg/Kg	☼	7	30
Calcium	730		671		mg/Kg	☼	8	30
Cobalt	0.71	J	0.724	J	mg/Kg	☼	2	30
Iron	1000		1010		mg/Kg	☼	3	30
Lithium	0.70	J	0.672	J	mg/Kg	☼	4	30
Molybdenum	0.18	J	0.182	J	mg/Kg	☼	1	30
Potassium	38	J	38.2	J	mg/Kg	☼	1	30
Selenium	ND		ND		mg/Kg	☼	NC	
Sodium	470		565		mg/Kg	☼	19	30

Lab Sample ID: MB 140-50371/16-B ^5
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 50451

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Antimony	ND		45	4.2	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Arsenic	ND		7.5	1.9	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Calcium	ND		3800	11	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Cobalt	ND		38	0.60	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Iron	333		75	44	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Lithium	8.12	J	38	2.2	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Molybdenum	ND		30	1.3	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Potassium	2100	J	3800	430	mg/Kg		06/04/21 08:00	06/05/21 12:44	5
Selenium	ND		7.5	2.6	mg/Kg		06/04/21 08:00	06/05/21 12:44	5

Lab Sample ID: LCS 140-50371/17-B ^5
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 50451

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	ND		mg/Kg		4	
Antimony	75.0	73.2		mg/Kg		98	80 - 120
Arsenic	15.0	11.3		mg/Kg		76	60 - 100
Calcium	7500	1970	J	mg/Kg		26	20 - 50
Cobalt	15.0	0.720	J	mg/Kg		5	1 - 60
Iron	150	87.9		mg/Kg		59	
Lithium	15.0	23.9	J *+	mg/Kg		159	80 - 150
Molybdenum	75.0	54.0		mg/Kg		72	60 - 100
Potassium	7500	9550		mg/Kg		127	80 - 180
Selenium	22.5	24.2		mg/Kg		108	80 - 140

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-50371/18-B ^5
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 50451

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			300	ND		mg/Kg		5		14	
Antimony			75.0	73.8		mg/Kg		98	80 - 120	1	30
Arsenic			15.0	12.3		mg/Kg		82	60 - 100	8	30
Calcium			7500	2040	J	mg/Kg		27	20 - 50	4	30
Cobalt			15.0	1.05	J *1	mg/Kg		7	1 - 60	37	30
Iron			150	ND		mg/Kg		4		174	
Lithium			15.0	25.3	J *+	mg/Kg		169	80 - 150	6	30
Molybdenum			75.0	54.3		mg/Kg		72	60 - 100	1	30
Potassium			7500	9710		mg/Kg		129	80 - 180	2	30
Selenium			22.5	24.8		mg/Kg		110	80 - 140	2	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: EW-3M
Prep Type: Step 5
Prep Batch: 50451

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	73	J		57.6	J	mg/Kg	☼			24	
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Calcium	110	J		126	J	mg/Kg	☼			10	30
Cobalt	ND	*1		ND	*1	mg/Kg	☼			NC	30
Iron	84	J B		ND		mg/Kg	☼			NC	
Lithium	9.3	J B *+		9.85	J *+	mg/Kg	☼			5	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	2800	J B		2750	J	mg/Kg	☼			0.6	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-50452/16-A
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 50452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Antimony	ND		3.0	0.28	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Arsenic	ND		0.50	0.15	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Calcium	ND		250	2.1	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Cobalt	ND		2.5	0.046	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Iron	ND		5.0	2.9	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Lithium	0.159	J	2.5	0.15	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Molybdenum	ND		2.0	0.099	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Potassium	ND		250	26	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Selenium	ND		0.50	0.17	mg/Kg		06/04/21 08:00	06/05/21 14:39	1
Sodium	ND		250	130	mg/Kg		06/04/21 08:00	06/05/21 14:39	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-50452/17-A
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 50452

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	98.3		mg/Kg		98	80 - 120		
Antimony			25.0	24.4		mg/Kg		98	80 - 120		
Arsenic			5.00	4.92		mg/Kg		98	80 - 120		
Calcium			2500	2450		mg/Kg		98	80 - 120		
Cobalt			5.00	4.94		mg/Kg		99	80 - 120		
Iron			50.0	48.8		mg/Kg		98	80 - 120		
Lithium			5.00	4.88		mg/Kg		98	80 - 120		
Molybdenum			25.0	24.8		mg/Kg		99	80 - 120		
Potassium			2500	2430		mg/Kg		97	80 - 120		
Selenium			7.50	7.46		mg/Kg		99	80 - 120		
Sodium			2500	2450		mg/Kg		98	80 - 120		

Lab Sample ID: LCSD 140-50452/18-A
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 50452

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	95.6		mg/Kg		96	80 - 120	3	30
Antimony			25.0	24.1		mg/Kg		96	80 - 120	1	30
Arsenic			5.00	4.85		mg/Kg		97	80 - 120	2	30
Calcium			2500	2410		mg/Kg		96	80 - 120	2	30
Cobalt			5.00	4.88		mg/Kg		98	80 - 120	1	30
Iron			50.0	48.0		mg/Kg		96	80 - 120	2	30
Lithium			5.00	4.92		mg/Kg		98	80 - 120	1	30
Molybdenum			25.0	24.5		mg/Kg		98	80 - 120	1	30
Potassium			2500	2390		mg/Kg		96	80 - 120	2	30
Selenium			7.50	7.36		mg/Kg		98	80 - 120	1	30
Sodium			2500	2400		mg/Kg		96	80 - 120	2	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: EW-3M
Prep Type: Step 6
Prep Batch: 50452

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	300			320		mg/Kg	☼			8	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	0.72			0.825		mg/Kg	☼			13	30
Calcium	100	J		115	J	mg/Kg	☼			13	30
Cobalt	0.34	J		0.390	J	mg/Kg	☼			14	30
Iron	800			936		mg/Kg	☼			16	30
Lithium	0.74	J B		0.822	J	mg/Kg	☼			11	30
Molybdenum	ND			ND		mg/Kg	☼			NC	30
Potassium	150	J		159	J	mg/Kg	☼			8	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50529

Client Sample ID: EW-3M
Prep Type: Step 6
Prep Batch: 50452

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Sodium	22000		21900		mg/Kg	☼	2	30

Lab Sample ID: MB 140-50497/16-A
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 50497

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Antimony	ND		3.0	0.14	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Arsenic	0.213	J	0.50	0.13	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Calcium	ND		250	2.6	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Cobalt	ND		2.5	0.026	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Iron	ND		5.0	4.1	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Lithium	ND		2.5	0.15	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Molybdenum	ND		2.0	0.082	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Potassium	ND		250	10	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Selenium	ND		0.50	0.17	mg/Kg		06/07/21 08:00	06/09/21 11:46	1
Sodium	ND		250	43	mg/Kg		06/07/21 08:00	06/09/21 11:46	1

Lab Sample ID: LCS 140-50497/17-A
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 50497

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	99.9		mg/Kg		100	80 - 120
Antimony	25.0	25.0		mg/Kg		100	80 - 125
Arsenic	5.00	5.16		mg/Kg		103	80 - 120
Calcium	2500	2570		mg/Kg		103	80 - 120
Cobalt	5.00	5.17		mg/Kg		103	80 - 125
Iron	50.0	53.1		mg/Kg		106	80 - 120
Lithium	5.00	4.98		mg/Kg		100	80 - 120
Molybdenum	25.0	26.1		mg/Kg		104	80 - 125
Potassium	2500	2570		mg/Kg		103	80 - 120
Selenium	7.50	7.37		mg/Kg		98	80 - 120
Sodium	2500	2600		mg/Kg		104	80 - 120

Lab Sample ID: LCSD 140-50497/18-A
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 50497

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	99.4		mg/Kg		99	80 - 120	1	30
Antimony	25.0	24.9		mg/Kg		100	80 - 125	1	30
Arsenic	5.00	5.12		mg/Kg		102	80 - 120	1	30
Calcium	2500	2550		mg/Kg		102	80 - 120	1	30
Cobalt	5.00	5.13		mg/Kg		103	80 - 125	1	30
Iron	50.0	52.5		mg/Kg		105	80 - 120	1	30
Lithium	5.00	4.89		mg/Kg		98	80 - 120	2	30
Molybdenum	25.0	25.8		mg/Kg		103	80 - 125	1	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-50497/18-A
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 50497

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Potassium	2500	2530		mg/Kg		101	80 - 120	1	30
Selenium	7.50	7.38		mg/Kg		98	80 - 120	0	30
Sodium	2500	2570		mg/Kg		103	80 - 120	1	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: EW-3M
Prep Type: Step 7
Prep Batch: 50497

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	24000		17300	F3	mg/Kg	☼	31	30
Calcium	3100		2860	J	mg/Kg	☼	8	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: EW-3M
Prep Type: Step 7
Prep Batch: 50497

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		ND		mg/Kg	☼	NC	30
Cobalt	ND		ND		mg/Kg	☼	NC	30
Iron	1000		1440	F3	mg/Kg	☼	32	30
Lithium	2.2	J	2.38	J	mg/Kg	☼	6	30
Molybdenum	ND		0.104	J	mg/Kg	☼	NC	30
Sodium	9700		9110		mg/Kg	☼	6	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: EW-3M
Prep Type: Step 7
Prep Batch: 50497

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	1.7	B	1.72		mg/Kg	☼	0.4	30
Selenium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Analysis Batch: 50662

Client Sample ID: EW-3M
Prep Type: Step 7
Prep Batch: 50497

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Potassium	16000		13300		mg/Kg	☼	21	30

Metals

Prep Batch: 50176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Total/NA	Solid	Total	
140-23062-2	IW-2M	Total/NA	Solid	Total	
140-23062-3	IW-2D	Total/NA	Solid	Total	
140-23062-4	EW-3S	Total/NA	Solid	Total	
140-23062-5	EW-3M	Total/NA	Solid	Total	
140-23062-6	EW-3D	Total/NA	Solid	Total	
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	Total	
MB 140-50176/17-A	Method Blank	Total/NA	Solid	Total	
LCS 140-50176/18-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-50176/19-A	Lab Control Sample Dup	Total/NA	Solid	Total	
140-23062-5 DU	EW-3M	Total/NA	Solid	Total	

SEP Batch: 50177

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 1	Solid	Exchangeable	
140-23062-2	IW-2M	Step 1	Solid	Exchangeable	
140-23062-3	IW-2D	Step 1	Solid	Exchangeable	
140-23062-4	EW-3S	Step 1	Solid	Exchangeable	
140-23062-5	EW-3M	Step 1	Solid	Exchangeable	
140-23062-6	EW-3D	Step 1	Solid	Exchangeable	
140-23062-7	EW-3-FA (10-17)	Step 1	Solid	Exchangeable	
MB 140-50177/16-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-50177/17-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-50177/18-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-23062-5 DU	EW-3M	Step 1	Solid	Exchangeable	

Prep Batch: 50219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 1	Solid	3010A	50177
140-23062-2	IW-2M	Step 1	Solid	3010A	50177
140-23062-3	IW-2D	Step 1	Solid	3010A	50177
140-23062-4	EW-3S	Step 1	Solid	3010A	50177
140-23062-5	EW-3M	Step 1	Solid	3010A	50177
140-23062-6	EW-3D	Step 1	Solid	3010A	50177
140-23062-7	EW-3-FA (10-17)	Step 1	Solid	3010A	50177
MB 140-50177/16-B ^4	Method Blank	Step 1	Solid	3010A	50177
LCS 140-50177/17-B ^5	Lab Control Sample	Step 1	Solid	3010A	50177
LCSD 140-50177/18-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	50177
140-23062-5 DU	EW-3M	Step 1	Solid	3010A	50177

SEP Batch: 50220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 2	Solid	Carbonate	
140-23062-2	IW-2M	Step 2	Solid	Carbonate	
140-23062-3	IW-2D	Step 2	Solid	Carbonate	
140-23062-4	EW-3S	Step 2	Solid	Carbonate	
140-23062-5	EW-3M	Step 2	Solid	Carbonate	
140-23062-6	EW-3D	Step 2	Solid	Carbonate	
140-23062-7	EW-3-FA (10-17)	Step 2	Solid	Carbonate	
MB 140-50220/16-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-50220/17-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	

Metals (Continued)

SEP Batch: 50220 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 140-50220/18-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-23062-5 DU	EW-3M	Step 2	Solid	Carbonate	

Prep Batch: 50254

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 2	Solid	3010A	50220
140-23062-2	IW-2M	Step 2	Solid	3010A	50220
140-23062-3	IW-2D	Step 2	Solid	3010A	50220
140-23062-4	EW-3S	Step 2	Solid	3010A	50220
140-23062-5	EW-3M	Step 2	Solid	3010A	50220
140-23062-6	EW-3D	Step 2	Solid	3010A	50220
140-23062-7	EW-3-FA (10-17)	Step 2	Solid	3010A	50220
MB 140-50220/16-B ^3	Method Blank	Step 2	Solid	3010A	50220
LCS 140-50220/17-B ^5	Lab Control Sample	Step 2	Solid	3010A	50220
LCSD 140-50220/18-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	50220
140-23062-5 DU	EW-3M	Step 2	Solid	3010A	50220

SEP Batch: 50257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 3	Solid	Non-Crystalline	
140-23062-2	IW-2M	Step 3	Solid	Non-Crystalline	
140-23062-3	IW-2D	Step 3	Solid	Non-Crystalline	
140-23062-4	EW-3S	Step 3	Solid	Non-Crystalline	
140-23062-5	EW-3M	Step 3	Solid	Non-Crystalline	
140-23062-6	EW-3D	Step 3	Solid	Non-Crystalline	
140-23062-7	EW-3-FA (10-17)	Step 3	Solid	Non-Crystalline	
MB 140-50257/16-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-50257/17-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-50257/18-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-23062-5 DU	EW-3M	Step 3	Solid	Non-Crystalline	

Prep Batch: 50291

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 3	Solid	3010A	50257
140-23062-2	IW-2M	Step 3	Solid	3010A	50257
140-23062-3	IW-2D	Step 3	Solid	3010A	50257
140-23062-4	EW-3S	Step 3	Solid	3010A	50257
140-23062-5	EW-3M	Step 3	Solid	3010A	50257
140-23062-6	EW-3D	Step 3	Solid	3010A	50257
140-23062-7	EW-3-FA (10-17)	Step 3	Solid	3010A	50257
MB 140-50257/16-B	Method Blank	Step 3	Solid	3010A	50257
LCS 140-50257/17-B	Lab Control Sample	Step 3	Solid	3010A	50257
LCSD 140-50257/18-B	Lab Control Sample Dup	Step 3	Solid	3010A	50257
140-23062-5 DU	EW-3M	Step 3	Solid	3010A	50257

SEP Batch: 50292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 4	Solid	Metal Hydroxide	
140-23062-2	IW-2M	Step 4	Solid	Metal Hydroxide	
140-23062-3	IW-2D	Step 4	Solid	Metal Hydroxide	
140-23062-4	EW-3S	Step 4	Solid	Metal Hydroxide	

Metals (Continued)

SEP Batch: 50292 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-5	EW-3M	Step 4	Solid	Metal Hydroxide	
140-23062-6	EW-3D	Step 4	Solid	Metal Hydroxide	
140-23062-7	EW-3-FA (10-17)	Step 4	Solid	Metal Hydroxide	
MB 140-50292/16-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-50292/17-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-50292/18-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-23062-5 DU	EW-3M	Step 4	Solid	Metal Hydroxide	

Prep Batch: 50364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 4	Solid	3010A	50292
140-23062-2	IW-2M	Step 4	Solid	3010A	50292
140-23062-3	IW-2D	Step 4	Solid	3010A	50292
140-23062-4	EW-3S	Step 4	Solid	3010A	50292
140-23062-5	EW-3M	Step 4	Solid	3010A	50292
140-23062-6	EW-3D	Step 4	Solid	3010A	50292
140-23062-7	EW-3-FA (10-17)	Step 4	Solid	3010A	50292
MB 140-50292/16-B	Method Blank	Step 4	Solid	3010A	50292
LCS 140-50292/17-B	Lab Control Sample	Step 4	Solid	3010A	50292
LCSD 140-50292/18-B	Lab Control Sample Dup	Step 4	Solid	3010A	50292
140-23062-5 DU	EW-3M	Step 4	Solid	3010A	50292

SEP Batch: 50371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 5	Solid	Organic-Bound	
140-23062-2	IW-2M	Step 5	Solid	Organic-Bound	
140-23062-3	IW-2D	Step 5	Solid	Organic-Bound	
140-23062-4	EW-3S	Step 5	Solid	Organic-Bound	
140-23062-5	EW-3M	Step 5	Solid	Organic-Bound	
140-23062-6	EW-3D	Step 5	Solid	Organic-Bound	
140-23062-7	EW-3-FA (10-17)	Step 5	Solid	Organic-Bound	
MB 140-50371/16-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-50371/17-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-50371/18-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-23062-5 DU	EW-3M	Step 5	Solid	Organic-Bound	

Analysis Batch: 50418

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 1	Solid	6010B SEP	50219
140-23062-1	IW-2S	Step 2	Solid	6010B SEP	50254
140-23062-1	IW-2S	Step 3	Solid	6010B SEP	50291
140-23062-2	IW-2M	Step 1	Solid	6010B SEP	50219
140-23062-2	IW-2M	Step 2	Solid	6010B SEP	50254
140-23062-2	IW-2M	Step 3	Solid	6010B SEP	50291
140-23062-3	IW-2D	Step 1	Solid	6010B SEP	50219
140-23062-3	IW-2D	Step 2	Solid	6010B SEP	50254
140-23062-3	IW-2D	Step 3	Solid	6010B SEP	50291
140-23062-4	EW-3S	Step 1	Solid	6010B SEP	50219
140-23062-4	EW-3S	Step 2	Solid	6010B SEP	50254
140-23062-4	EW-3S	Step 3	Solid	6010B SEP	50291
140-23062-5	EW-3M	Step 1	Solid	6010B SEP	50219

Metals (Continued)

Analysis Batch: 50418 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-5	EW-3M	Step 2	Solid	6010B SEP	50254
140-23062-5	EW-3M	Step 3	Solid	6010B SEP	50291
140-23062-6	EW-3D	Step 1	Solid	6010B SEP	50219
140-23062-6	EW-3D	Step 2	Solid	6010B SEP	50254
140-23062-6	EW-3D	Step 3	Solid	6010B SEP	50291
140-23062-7	EW-3-FA (10-17)	Step 1	Solid	6010B SEP	50219
140-23062-7	EW-3-FA (10-17)	Step 2	Solid	6010B SEP	50254
140-23062-7	EW-3-FA (10-17)	Step 3	Solid	6010B SEP	50291
MB 140-50177/16-B ^4	Method Blank	Step 1	Solid	6010B SEP	50219
MB 140-50220/16-B ^3	Method Blank	Step 2	Solid	6010B SEP	50254
MB 140-50257/16-B	Method Blank	Step 3	Solid	6010B SEP	50291
LCS 140-50177/17-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	50219
LCS 140-50220/17-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	50254
LCS 140-50257/17-B	Lab Control Sample	Step 3	Solid	6010B SEP	50291
LCSD 140-50177/18-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	50219
LCSD 140-50220/18-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	50254
LCSD 140-50257/18-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	50291
140-23062-5 DU	EW-3M	Step 1	Solid	6010B SEP	50219
140-23062-5 DU	EW-3M	Step 2	Solid	6010B SEP	50254
140-23062-5 DU	EW-3M	Step 3	Solid	6010B SEP	50291

Prep Batch: 50451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 5	Solid	3010A	50371
140-23062-2	IW-2M	Step 5	Solid	3010A	50371
140-23062-3	IW-2D	Step 5	Solid	3010A	50371
140-23062-4	EW-3S	Step 5	Solid	3010A	50371
140-23062-5	EW-3M	Step 5	Solid	3010A	50371
140-23062-6	EW-3D	Step 5	Solid	3010A	50371
140-23062-7	EW-3-FA (10-17)	Step 5	Solid	3010A	50371
MB 140-50371/16-B ^5	Method Blank	Step 5	Solid	3010A	50371
LCS 140-50371/17-B ^5	Lab Control Sample	Step 5	Solid	3010A	50371
LCSD 140-50371/18-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	50371
140-23062-5 DU	EW-3M	Step 5	Solid	3010A	50371

SEP Batch: 50452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 6	Solid	Acid/Sulfide	
140-23062-2	IW-2M	Step 6	Solid	Acid/Sulfide	
140-23062-3	IW-2D	Step 6	Solid	Acid/Sulfide	
140-23062-4	EW-3S	Step 6	Solid	Acid/Sulfide	
140-23062-5	EW-3M	Step 6	Solid	Acid/Sulfide	
140-23062-6	EW-3D	Step 6	Solid	Acid/Sulfide	
140-23062-7	EW-3-FA (10-17)	Step 6	Solid	Acid/Sulfide	
MB 140-50452/16-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-50452/17-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-50452/18-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-23062-5 DU	EW-3M	Step 6	Solid	Acid/Sulfide	

Metals

Prep Batch: 50497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 7	Solid	Residual	
140-23062-2	IW-2M	Step 7	Solid	Residual	
140-23062-3	IW-2D	Step 7	Solid	Residual	
140-23062-4	EW-3S	Step 7	Solid	Residual	
140-23062-5	EW-3M	Step 7	Solid	Residual	
140-23062-6	EW-3D	Step 7	Solid	Residual	
140-23062-7	EW-3-FA (10-17)	Step 7	Solid	Residual	
MB 140-50497/16-A	Method Blank	Step 7	Solid	Residual	
LCS 140-50497/17-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-50497/18-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-23062-5 DU	EW-3M	Step 7	Solid	Residual	

Analysis Batch: 50529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 4	Solid	6010B SEP	50364
140-23062-1	IW-2S	Step 5	Solid	6010B SEP	50451
140-23062-1	IW-2S	Step 6	Solid	6010B SEP	50452
140-23062-1	IW-2S	Step 6	Solid	6010B SEP	50452
140-23062-2	IW-2M	Step 4	Solid	6010B SEP	50364
140-23062-2	IW-2M	Step 5	Solid	6010B SEP	50451
140-23062-2	IW-2M	Step 6	Solid	6010B SEP	50452
140-23062-2	IW-2M	Step 6	Solid	6010B SEP	50452
140-23062-3	IW-2D	Step 4	Solid	6010B SEP	50364
140-23062-3	IW-2D	Step 5	Solid	6010B SEP	50451
140-23062-3	IW-2D	Step 6	Solid	6010B SEP	50452
140-23062-3	IW-2D	Step 6	Solid	6010B SEP	50452
140-23062-4	EW-3S	Step 4	Solid	6010B SEP	50364
140-23062-4	EW-3S	Step 5	Solid	6010B SEP	50451
140-23062-4	EW-3S	Step 6	Solid	6010B SEP	50452
140-23062-4	EW-3S	Step 6	Solid	6010B SEP	50452
140-23062-5	EW-3M	Step 4	Solid	6010B SEP	50364
140-23062-5	EW-3M	Step 5	Solid	6010B SEP	50451
140-23062-5	EW-3M	Step 6	Solid	6010B SEP	50452
140-23062-5	EW-3M	Step 6	Solid	6010B SEP	50452
140-23062-6	EW-3D	Step 4	Solid	6010B SEP	50364
140-23062-6	EW-3D	Step 5	Solid	6010B SEP	50451
140-23062-6	EW-3D	Step 6	Solid	6010B SEP	50452
140-23062-6	EW-3D	Step 6	Solid	6010B SEP	50452
140-23062-7	EW-3-FA (10-17)	Step 4	Solid	6010B SEP	50364
140-23062-7	EW-3-FA (10-17)	Step 5	Solid	6010B SEP	50451
140-23062-7	EW-3-FA (10-17)	Step 6	Solid	6010B SEP	50452
140-23062-7	EW-3-FA (10-17)	Step 6	Solid	6010B SEP	50452
MB 140-50292/16-B	Method Blank	Step 4	Solid	6010B SEP	50364
MB 140-50371/16-B ^5	Method Blank	Step 5	Solid	6010B SEP	50451
MB 140-50452/16-A	Method Blank	Step 6	Solid	6010B SEP	50452
LCS 140-50292/17-B	Lab Control Sample	Step 4	Solid	6010B SEP	50364
LCS 140-50371/17-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	50451
LCS 140-50452/17-A	Lab Control Sample	Step 6	Solid	6010B SEP	50452
LCSD 140-50292/18-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	50364
LCSD 140-50371/18-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	50451
LCSD 140-50452/18-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	50452

Metals (Continued)

Analysis Batch: 50529 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-5 DU	EW-3M	Step 4	Solid	6010B SEP	50364
140-23062-5 DU	EW-3M	Step 5	Solid	6010B SEP	50451
140-23062-5 DU	EW-3M	Step 6	Solid	6010B SEP	50452
140-23062-5 DU	EW-3M	Step 6	Solid	6010B SEP	50452

Prep Batch: 50632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Total/NA	Solid	3050B	
140-23062-2	IW-2M	Total/NA	Solid	3050B	
140-23062-3	IW-2D	Total/NA	Solid	3050B	
140-23062-4	EW-3S	Total/NA	Solid	3050B	
140-23062-5	EW-3M	Total/NA	Solid	3050B	
140-23062-6	EW-3D	Total/NA	Solid	3050B	
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	3050B	
MB 140-50632/14-A	Method Blank	Total/NA	Solid	3050B	
LCS 140-50632/15-A	Lab Control Sample	Total/NA	Solid	3050B	
140-23062-5 MS	EW-3M	Total/NA	Solid	3050B	
140-23062-5 MSD	EW-3M	Total/NA	Solid	3050B	

Analysis Batch: 50662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Step 7	Solid	6010B SEP	50497
140-23062-1	IW-2S	Step 7	Solid	6010B SEP	50497
140-23062-1	IW-2S	Step 7	Solid	6010B SEP	50497
140-23062-1	IW-2S	Step 7	Solid	6010B SEP	50497
140-23062-2	IW-2M	Step 7	Solid	6010B SEP	50497
140-23062-2	IW-2M	Step 7	Solid	6010B SEP	50497
140-23062-2	IW-2M	Step 7	Solid	6010B SEP	50497
140-23062-3	IW-2D	Step 7	Solid	6010B SEP	50497
140-23062-3	IW-2D	Step 7	Solid	6010B SEP	50497
140-23062-3	IW-2D	Step 7	Solid	6010B SEP	50497
140-23062-4	EW-3S	Step 7	Solid	6010B SEP	50497
140-23062-4	EW-3S	Step 7	Solid	6010B SEP	50497
140-23062-4	EW-3S	Step 7	Solid	6010B SEP	50497
140-23062-4	EW-3S	Step 7	Solid	6010B SEP	50497
140-23062-5	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-5	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-5	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-5	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-6	EW-3D	Step 7	Solid	6010B SEP	50497
140-23062-6	EW-3D	Step 7	Solid	6010B SEP	50497
140-23062-6	EW-3D	Step 7	Solid	6010B SEP	50497
140-23062-7	EW-3-FA (10-17)	Step 7	Solid	6010B SEP	50497
140-23062-7	EW-3-FA (10-17)	Step 7	Solid	6010B SEP	50497
140-23062-7	EW-3-FA (10-17)	Step 7	Solid	6010B SEP	50497
140-23062-7	EW-3-FA (10-17)	Step 7	Solid	6010B SEP	50497
MB 140-50497/16-A	Method Blank	Step 7	Solid	6010B SEP	50497
LCS 140-50497/17-A	Lab Control Sample	Step 7	Solid	6010B SEP	50497
LCSD 140-50497/18-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	50497
140-23062-5 DU	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-5 DU	EW-3M	Step 7	Solid	6010B SEP	50497

Metals (Continued)

Analysis Batch: 50662 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-5 DU	EW-3M	Step 7	Solid	6010B SEP	50497
140-23062-5 DU	EW-3M	Step 7	Solid	6010B SEP	50497

Analysis Batch: 50709

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Total/NA	Solid	6010B	50176
140-23062-1	IW-2S	Total/NA	Solid	6010B	50176
140-23062-1	IW-2S	Total/NA	Solid	6010B	50176
140-23062-1	IW-2S	Total/NA	Solid	6010B	50176
140-23062-2	IW-2M	Total/NA	Solid	6010B	50176
140-23062-2	IW-2M	Total/NA	Solid	6010B	50176
140-23062-2	IW-2M	Total/NA	Solid	6010B	50176
140-23062-3	IW-2D	Total/NA	Solid	6010B	50176
140-23062-3	IW-2D	Total/NA	Solid	6010B	50176
140-23062-3	IW-2D	Total/NA	Solid	6010B	50176
140-23062-4	EW-3S	Total/NA	Solid	6010B	50176
140-23062-4	EW-3S	Total/NA	Solid	6010B	50176
140-23062-4	EW-3S	Total/NA	Solid	6010B	50176
140-23062-5	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5	EW-3M	Total/NA	Solid	6010B	50176
140-23062-6	EW-3D	Total/NA	Solid	6010B	50176
140-23062-6	EW-3D	Total/NA	Solid	6010B	50176
140-23062-6	EW-3D	Total/NA	Solid	6010B	50176
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	6010B	50176
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	6010B	50176
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	6010B	50176
MB 140-50176/17-A	Method Blank	Total/NA	Solid	6010B	50176
LCS 140-50176/18-A	Lab Control Sample	Total/NA	Solid	6010B	50176
LCSD 140-50176/19-A	Lab Control Sample Dup	Total/NA	Solid	6010B	50176
140-23062-5 DU	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5 DU	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5 DU	EW-3M	Total/NA	Solid	6010B	50176
140-23062-5 DU	EW-3M	Total/NA	Solid	6010B	50176

Analysis Batch: 50744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Total/NA	Solid	6010B	50632
140-23062-2	IW-2M	Total/NA	Solid	6010B	50632
140-23062-3	IW-2D	Total/NA	Solid	6010B	50632
140-23062-4	EW-3S	Total/NA	Solid	6010B	50632
140-23062-5	EW-3M	Total/NA	Solid	6010B	50632
140-23062-6	EW-3D	Total/NA	Solid	6010B	50632
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	6010B	50632
MB 140-50632/14-A	Method Blank	Total/NA	Solid	6010B	50632
LCS 140-50632/15-A	Lab Control Sample	Total/NA	Solid	6010B	50632
140-23062-5 MS	EW-3M	Total/NA	Solid	6010B	50632
140-23062-5 MSD	EW-3M	Total/NA	Solid	6010B	50632

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Metals

Analysis Batch: 50771

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-2	IW-2M	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-3	IW-2D	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-4	EW-3S	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-5	EW-3M	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-6	EW-3D	Sum of Steps 1-7	Solid	6010B SEP	
140-23062-7	EW-3-FA (10-17)	Sum of Steps 1-7	Solid	6010B SEP	

General Chemistry

Analysis Batch: 50469

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-23062-1	IW-2S	Total/NA	Solid	Moisture	
140-23062-2	IW-2M	Total/NA	Solid	Moisture	
140-23062-3	IW-2D	Total/NA	Solid	Moisture	
140-23062-4	EW-3S	Total/NA	Solid	Moisture	
140-23062-5	EW-3M	Total/NA	Solid	Moisture	
140-23062-6	EW-3D	Total/NA	Solid	Moisture	
140-23062-7	EW-3-FA (10-17)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: IW-2S
Date Collected: 05/05/21 09:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-1
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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: IW-2S
Date Collected: 05/05/21 09:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-1
Matrix: Solid
Percent Solids: 81.5

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 11:54	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 13:34	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			50709	06/10/21 14:57	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:02	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.528 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 13:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:26	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:19	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: IW-2S

Lab Sample ID: 140-23062-1

Date Collected: 05/05/21 09:00
Matrix: Solid
Date Received: 05/13/21 09:30
Percent Solids: 81.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:12	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 13:43	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			50662	06/09/21 14:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 14:59	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: IW-2M

Lab Sample ID: 140-23062-2

Date Collected: 05/05/21 10:25
Matrix: Solid
Date Received: 05/13/21 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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: IW-2M

Lab Sample ID: 140-23062-2

Date Collected: 05/05/21 10:25
Matrix: Solid
Date Received: 05/13/21 09:30
Percent Solids: 77.0

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 11:59	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 13:39	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:06	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.542 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:13	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: IW-2M

Date Collected: 05/05/21 10:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-2

Matrix: Solid
Percent Solids: 77.0

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	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:06	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 13:58	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:31	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:36	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:11	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 13:48	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:04	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: IW-2D

Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3

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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: IW-2D

Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3

Matrix: Solid
Percent Solids: 95.5

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:04	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 13:44	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			50709	06/10/21 15:11	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.541 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:46	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:15	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 13:53	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: IW-2D
Date Collected: 05/05/21 15:30
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-3
Matrix: Solid
Percent Solids: 95.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:08	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3S
Date Collected: 05/11/21 10:20
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-4
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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: EW-3S
Date Collected: 05/11/21 10:20
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-4
Matrix: Solid
Percent Solids: 80.8

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:09	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 13:50	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:21	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.508 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 16:10	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3S

Lab Sample ID: 140-23062-4

Date Collected: 05/11/21 10:20

Matrix: Solid

Date Received: 05/13/21 09:30

Percent Solids: 80.8

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	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:51	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:44	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:38	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:46	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:20	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 13:58	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			50662	06/09/21 15:13	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:18	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: EW-3M

Lab Sample ID: 140-23062-5

Date Collected: 05/11/21 11:10

Matrix: Solid

Date Received: 05/13/21 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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID:	NOEQUIP								
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID:	NOEQUIP								

Client Sample ID: EW-3M

Lab Sample ID: 140-23062-5

Date Collected: 05/11/21 11:10

Matrix: Solid

Date Received: 05/13/21 09:30

Percent Solids: 83.1

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:13	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5
Matrix: Solid
Percent Solids: 83.1

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 13:55	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			50709	06/10/21 15:26	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:31	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.528 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:27	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:23	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 16:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:55	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:42	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:51	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 14:03	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5
Matrix: Solid
Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			50662	06/09/21 15:33	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:38	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3D
Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-6
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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: EW-3D
Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-6
Matrix: Solid
Percent Solids: 93.0

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:33	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 14:06	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:55	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.528 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:33	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 16:24	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3D

Lab Sample ID: 140-23062-6

Date Collected: 05/11/21 12:25
Date Received: 05/13/21 09:30

Matrix: Solid
Percent Solids: 93.0

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	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 12:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:59	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:52	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 17:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:49	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 14:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:52	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3-FA (10-17)

Lab Sample ID: 140-23062-7

Date Collected: 05/11/21 12:00
Date Received: 05/13/21 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			50771	06/13/21 13:02	DKW	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			50469	06/04/21 07:47	BKD	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: EW-3-FA (10-17)

Lab Sample ID: 140-23062-7

Date Collected: 05/11/21 12:00
Date Received: 05/13/21 09:30

Matrix: Solid
Percent Solids: 61.6

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:37	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			50709	06/10/21 16:00	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3-FA (10-17)

Date Collected: 05/11/21 12:00
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-7

Matrix: Solid
Percent Solids: 61.6

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 16:05	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	3050B			0.513 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 12:01	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:44	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:38	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 16:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 12:10	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 14:04	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:57	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 17:05	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 14:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			50662	06/09/21 15:57	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 16:02	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50176/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 11:30	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50177/16-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	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 11:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50220/16-B ^3
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 13:18	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50257/16-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50292/16-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	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 10:52	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50371/16-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	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 12:44	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50452/16-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 14:39	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50497/16-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 11:46	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-50632/14-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	3050B			0.500 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 10:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50176/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 11:35	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50177/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			50418	06/02/21 17:24	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50220/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			50418	06/02/21 13:23	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50257/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:17	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50292/17-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 10:57	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50371/17-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 12:49	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50452/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 14:43	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50497/17-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 11:51	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-50632/15-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	3050B			0.500 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:03	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50176/19-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 11:40	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50177/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			50418	06/02/21 11:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50220/18-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			50418	06/02/21 13:28	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50257/18-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 15:21	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50292/18-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 11:02	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50371/18-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	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 12:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-50452/18-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 14:48	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-50497/18-A
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 11:56	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5 MS
Matrix: Solid
Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.535 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5 MSD
Matrix: Solid
Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.507 g	50 mL	50632	06/10/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50744	06/11/21 11:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Percent Solids: 83.1

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	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		10			50709	06/10/21 12:28	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		1			50709	06/10/21 14:00	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		2			50709	06/10/21 15:45	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	50176	05/27/21 08:00	JTB	TAL KNX
Total/NA	Analysis	6010B		5			50709	06/10/21 15:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	50177	05/26/21 08:00	JTB	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	50219	05/27/21 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			50418	06/02/21 12:35	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Client Sample ID: EW-3M
Date Collected: 05/11/21 11:10
Date Received: 05/13/21 09:30

Lab Sample ID: 140-23062-5 DU
Matrix: Solid
Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5 g	25 mL	50220	05/27/21 08:00	JTB	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	50254	05/28/21 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			50418	06/02/21 14:28	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5 g	25 mL	50257	05/28/21 08:00	JTB	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	50291	06/01/21 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			50418	06/02/21 16:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	50292	06/01/21 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	50364	06/02/21 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			50529	06/05/21 12:00	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	50371	06/02/21 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	50451	06/04/21 08:00	JTB	TAL KNX
Step 5	Analysis	6010B SEP		5			50529	06/05/21 13:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		1			50529	06/05/21 15:47	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5 g	250 mL	50452	06/04/21 08:00	JTB	TAL KNX
Step 6	Analysis	6010B SEP		5			50529	06/05/21 16:56	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		10			50662	06/09/21 12:44	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		1			50662	06/09/21 14:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		2			50662	06/09/21 15:42	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1 g	50 mL	50497	06/07/21 08:00	JTB	TAL KNX
Step 7	Analysis	6010B SEP		5			50662	06/09/21 15:47	KNC	TAL KNX
	Instrument ID: DUO									

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Laboratory: Eurofins TestAmerica, Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-22
ANAB	Dept. of Energy	L2311.01	02-13-22
ANAB	ISO/IEC 17025	L2311	02-13-22
Arkansas DEQ	State	88-0688	06-17-21
California	State	2423	06-30-22
Colorado	State	TN00009	02-28-22
Connecticut	State	PH-0223	09-30-21
Florida	NELAP	E87177	07-01-21
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	06-30-21
Louisiana (DW)	State	LA019	12-31-21
Maryland	State	277	03-31-22
Michigan	State	9933	12-11-22
Nevada	State	TN00009	07-31-21
New Hampshire	NELAP	299919	01-17-22
New Jersey	NELAP	TN001	07-01-21
New York	NELAP	10781	03-31-22
North Carolina (DW)	State	21705	07-31-21
North Carolina (WW/SW)	State	64	12-31-21
Ohio VAP	State	CL0059	06-02-23
Oklahoma	State	9415	08-31-21
Oregon	NELAP	TNI0189	01-01-22
Pennsylvania	NELAP	68-00576	12-31-21
Tennessee	State	02014	12-11-22
Texas	NELAP	T104704380-18-12	08-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-19-00236	08-20-22
Utah	NELAP	TN00009	07-31-21
Virginia	NELAP	460176	09-14-21
Washington	State	C593	01-19-22
West Virginia (DW)	State	9955C	01-02-22
West Virginia DEP	State	345	04-30-22
Wisconsin	State	998044300	08-31-21

Method Summary

Client: Golder Associates Inc.
Project/Site: Sioux Energy Center

Job ID: 140-23062-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

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: 140-9346-2811.1
Client Contact: Jeffrey Ingram	Phone:	E-Mail: williamr.henry@eurofinset.com	State of Origin: MO	Page: Page 1 of 1
Company: Golder Associates Inc.	PWSID:			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: Sioux Energy Center	Project #: 14006318			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - SEP Metals	6010B - Total Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
IW-2S	5-5-21	0900	G	S	N	N	1	1		
IW-2M	"	1025	"	"	"	"	1	1		
IW-2D	"	1530	"	"	"	"	1	1		
EW-3S	5-11-21	1020	"	"	"	"	1	1		
EW-3M	"	1110	"	"	"	"	1	1		
EW-3D	"	1225	"	"	"	"	1	1		
EW-3-FA (10-17)	"	1200	"	"	"	"	1	1		
~~EW-3-FA~~										

140-23062 Chain of Custody

RT CT
REC. @ 0.4°C 0.5°C
CUSTODY SEAL INTACT
1 COOLER RH 5/13/21
FED EX# 789095387939

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Brendan Talbert	5-11-21 1630	Golder	Ryan Henry	5/13/21 0930	TA 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
23062

EUROFINS/TESTAMERICA 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 : SC71 Correction factor: +0.1	✓			☐ **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

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 #: 14006318 PM Instructions: _____

Sample Receiving Associate: Ryan Henry Date: 5/13/21

QA026R32.doc, 062719

6/21/2021

wsp.com