

TECHNICAL MEMORANDUM

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GROUNDWATER AND GEOCHEMICAL MODELING SUMMARY FOR AMEREN RUSH ISLAND ENERGY CENTER CORRECTIVE MEASURES ASSESSMENT

1.0 INTRODUCTION

Golder Associates Inc. (Golder) is pleased to submit this Technical Memorandum summarizing modeling results under various closure scenarios at the Ameren Missouri (Ameren) Rush Island Energy Center (RIEC) in Jefferson County Missouri. As part of the RIEC Corrective Measures Assessment (CMA), the fate and transport of metals under various closure scenarios were investigated through field, laboratory, and modeling (groundwater and geochemical) tasks. This memo summarizes the modeling tasks conducted in support of the CMA.

2.0 FIELD INVESTIGATION

A field investigation including borehole drilling, soil sampling, groundwater sampling, groundwater elevation measurements and surface water sampling was completed in October and November 2018. Sample locations are provided in Figure 1. Drilling was completed using a rotasonic drill rig under direct supervision of a Golder Geologist or Engineer. Continuous soil core samples were obtained at each well borehole location and were logged in the field by Golder. Soils were classified according to the Unified Soil Classification System and boring logs are provided in Appendix A.

At each borehole, a shallow, middle and deep soil sample was collected and submitted to an independent laboratory for analysis. Soil testing was completed for the following analysis:

- 1) Rietveld XRD testing
- 2) Near-total metal extraction (EPA 3050/6010)
 - a. Testing for - Iron, Aluminum, Arsenic, Lithium, Lead, Molybdenum
- 3) Sequential Extraction (SWP-846/6010)
 - a. Testing for - Iron, Aluminum, Arsenic, Lithium, Lead, Molybdenum

Laboratory data results from these analyses are provided in Appendix B. In addition to the soil sampling, groundwater samples were collected at the same intervals using a discrete groundwater sampler. Groundwater samples were tested for iron speciation, as well as major cation/anion analysis. Laboratory data results are provided in Appendix B. After completion of the soil borings, they were abandoned in accordance with the

Missouri Department of Natural Resources (MDNR) Well Construction Rules (10 CSR 23-4.060 Construction Standards for Monitoring Wells) and a soil boring registration form will be submitted to MDNR.

Surface water sampling was completed at locations near the banks of the Mississippi River in the downgradient direction of the soil borings and discrete groundwater samples. Additionally, upgradient samples were collected in both the Mississippi River and the Isle de Bois Creek. Laboratory data results from this analysis are provided in Appendix B.

In November, groundwater samples were completed using low flow sampling techniques and guidelines as provided in the RCPA GMP at monitoring well locations as shown on Figure 1.

3.0 GROUNDWATER FLOW MODELING

3.1 INTRODUCTION

Golder has developed a groundwater flow model for the RIEC. The area covered by the groundwater flow model is shown in Figure 2. The purpose of this groundwater model summary is to document model setup, calibration and prediction results, together with related data. This summary is being provided for the use of Ameren, Haley & Aldrich, and Golder staff familiar with the site and the model and is not intended as a detailed report for regulatory or other review.

3.2 General Setting

The primary focus of the groundwater modeling analysis is the alluvium underlying the RIEC and the adjacent reach of the Mississippi River (Figure 2).

3.3 Groundwater Modeling Objectives

The objectives of the modeling analysis are to:

- Synthesize the most recent hydrogeologic data into an integrated conceptual and numerical framework for evaluating remedial strategies at the Site
- Use the model to predict and compare groundwater conditions resulting from different closure alternatives for the RCPA
- Provide the flow model basis for the geochemical modeling analysis described later in this memo.

3.4 TECHNICAL APPROACH

The hydrogeologic conceptual model and model framework are described in this section.

3.4.1 Data Sources

1. The primary data sources used were as follows:
2. Golder (2015, 2017, 2018a, 2018b) general hydrogeology, geology, aquifer slug test results, potentiometric maps, water quality data, aerial photographs, ash pile geometry.
3. AECOM (2014) groundwater and surface water data.
4. Natural Resource Technologies (NRT 2014) general hydrogeology, geology, aquifer slug testing results, bedrock packer testing results, potentiometric maps, water quality data, groundwater elevation measurements.
5. Haley & Aldrich (2018) remediation designs and cap specifications
6. United States Geological Survey (USGS): river gauge data.

A summary of the model input data derived from these and other sources is provided in Table 1.

Table 1: Model Input Data Ranges

Parameter	Reported Range	Model Values	Data Source
Groundwater Elevations (ft MSL)	359.61-438.09	359 - 405	Golder (2015, 2017, 2018a, 2018b), NRT (2014), AECOM (2014)
River Elevation (ft MSL)	356 - 410	366 – 376.5	USGS river gauge data
Saturated Layer Thickness			
Layer 1	As listed under “model values”	9 - 410 feet	Boring Logs contained in Golder (2014, 2017, 2018a, 2018b), NRT (2014)
Layer 2		7 - 45 feet	
Layer 3		12 - 49 feet	
Layer 4		6 - 48 feet	
Layer 5		10-58 feet	
Layer 6		4 feet	
Layer 7		22 - 163 feet	
Infiltration rate			
RCPA Pond - Active	0.078 ft/day (341.9 in/year) <small>see note 8</small>	0.02 ft/day (87.6 in/yr)	Draft RIEC NPDES Permit (Ameren 2018), EPRI (1998), Calibrated Values
RCPA Pond – 1 x 10 ⁻⁵ Cap	32,627,362 gal/yr	0.0024 ft/day (10.5 in/yr)	Haley and Aldrich, (2018) HELP Model
RCPA Pond - 1 x 10 ⁻⁶ Cap	21,343,696 gal/yr	0.00157 ft/day (6.9 in/yr)	
RCPA Pond - 1 x 10 ⁻⁷ Cap	3,111,116 gal/yr	0.000229 ft/day (1.0 in/yr)	
RCPA Pond - Geomembrane Liner	1,527,343 gal/yr	0.000112 ft/day (0.5 in/yr)	
Horizontal Hydraulic Conductivity (Kx, Ky) cm/sec			
Very Shallow Alluvium (Silts/Clays)	1.0 x 10 ⁻⁴ to 1.0 x 10 ⁻⁶	9.9 x 10 ⁻⁴	Fetter, C.W. (2000), Calibrated Values
Shallow Alluvium (Sands, Silts, and Clays)	Minimum: 1.0 x 10 ⁻⁴	2.1 x 10 ⁻³	NRT (2014) - Appendix G-1
	Maximum: 1.0 x 10 ⁻²		
	Average: 2.1 x 10 ⁻³		
Intermediate/Deep Alluvium (Sands and Gravels)	Minimum: 2.0 x 10 ⁻⁴	2.6 x 10 ⁻²	NRT (2014) Appendix G-1, Golder (2017), Calibrated Values
	Maximum: 2.0 x 10 ⁻¹		
	Average: 2.2 x 10 ⁻²		
Ash (RCPA)	1.0E x 10 ⁻⁴	3.0 x 10 ⁻³	NRT (2014) Appendix G-1, Calibrated Values
Upper Bedrock (Limestone)	Minimum: 4.7 x 10 ⁻⁷	3.3 x 10 ⁻⁶	NRT (2014) Table 3-5
	Maximum: 3.0 x 10 ⁻³		
	Geomean: 3.3 x 10 ⁻⁶		
Shale	Minimum: 4.9 x 10 ⁻⁷	1.3 x 10 ⁻⁶	
	Maximum: 3.2 x 10 ⁻³		

	Geomean: 1.3×10^{-6}		
Lower Bedrock (Limestone/Dolomite)	Minimum: 4.9×10^{-7}	2.5×10^{-6}	
	Maximum: 7.1×10^{-4}		
	Geomean: 2.5×10^{-6}		
Embankment	1.0×10^{-4} to 1.0×10^{-9}	3.8×10^{-6}	Fetter, C.W. (2000), Boring logs from Geo- solutions (2015), Calibrated Values
Other Parameters			
Specific yield/effective transport porosity	0.16 to 0.46	0.25	Morris and Johnson (1967)

Notes:

- 1) NA = Not applicable
- 2) ft MSL - feet above mean sea level
- 3) in/yr - inches per year
- 4) cm/sec - centimeters per second
- 5) RIEC - Rush Island Energy Center
- 6) NPDES - National Pollutant Discharge Elimination System
- 7) gal/yr = gallons per year
- 8) Value based on EPRI 1998 water balance equation for the Sioux Energy Center (~14% groundwater recharge) and the NPDES permit inflows to the pond (17.83 million gallons a day).

3.5 Conceptual Model

The geology immediately surrounding the Facility is comprised of two distinctly different geological terrains; (1) floodplain deposits of the Mississippi River Valley and (2) older sedimentary bedrock formations. Most of the Facility, including all the plant infrastructure and the RCPA, lies within the Mississippi River Valley on floodplain and alluvial soil deposits. The Mississippi River Valley in this region is an approximately 4- to 5-mile wide area of floodplain with alluvial deposits that are the result of the water flow and deposition from the Mississippi River. Based on boring logs, the alluvial deposits are typically comprised of sands and gravels with lesser amounts of silts and clays, with an overall fining upward sequence. With depth, silt and clay deposits are less abundant and the sands and gravels typically coarsen. The depth of the alluvial deposits near the Surface Impoundment ranges from approximately 50 to 150 feet bgs (250 to 330 feet MSL).

Beneath the alluvial deposits of the Mississippi River Valley lie bedrock deposits from the lower part of the Ordovician-aged Plattin group. Based on the borings completed by NRT (2014), this bedrock unit is comprised of massive, gray to brown, micritic, fossiliferous limestone with shale interbeds. The depth to bedrock typically increases towards the Mississippi River and bedrock beneath the Surface Impoundment dips towards the east-northeast at approximately 3 to 7 degrees. The Plattin group is stratigraphically underlain by the Joachim Dolomite. The higher portions of the bluffs to the west of the facility are comprised of Mississippian-age limestone and shales, which are exposed along the eastern portions of the bluffs.

A 1,300 ft long sheet pile wall was installed into the upper 30 ft of the embankment and shallow alluvium along the northeastern perimeter of the ash pile (RCPA) as shown in Figure 1.

Groundwater flow is generally from the topographic high in the bluffs to the west toward the Mississippi River in the East. A small amount of groundwater flow beneath and parallel with The Mississippi River likely also occurs. Locally, groundwater flows into the Isle de Bois Creek to the south, the Muddy and Saline Creeks to the north, and the unnamed swale between the RCPA and the bluffs. In addition, some upward flow into the alluvium occurs from bedrock, which is recharged outside the model area.

The water level in the Mississippi River varies daily, particularly during floods which can occur annually in the spring and during major storm events. Flood can range from minor flooding that may only last days to major flooding which can last months.

Hydraulic sources (inflows) consist primarily of recharge from precipitation, groundwater inflows from the bedrock to the east and underlying the alluvium, inflows from the Mississippi River, and seepage from the RCPA and the pond on top of the RCPA. Hydraulic sinks (outflows) includes discharge to creeks and rivers.

3.6 Selection of Computer Code

The numerical computer code MODFLOW – developed by the USGS – was selected for much of this analysis 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. The particular software package used to develop the model and execute simulations was MODFLOW-2000 (McDonald and Harbaugh 1988, Harbaugh et al., 1996, 2000, 2005), using the graphical user interface of the Groundwater Vistas™ software package (Rumbaugh and Rumbaugh 2011, ESI 2016).

3.7 Groundwater Model Construction

The model grid was oriented to align with the RCPA and river bank and parallel with the primary groundwater flow direction (Figure 3). The grid sizes are uniform horizontally (100 ft by 100 ft) and vary with the geologic layer thicknesses and RCPA geometry in the vertical. The seven layers modeled are shown in Figures 4 and 5.

Model boundary conditions include: recharge at the ground surface and on the surface of the RCPA (Figure 6), river boundary conditions at the river, creeks, and ponded portion of the RCPA (Figure 7). The Mississippi River has a boundary k of $9.9 \text{ E-}3 \text{ cm/sec}$ and a thickness of 5 feet. The Creeks have a boundary k of $9.9\text{E-}5 \text{ cm/sec}$ and a thickness of 4 feet. The ponded portion of the RCPA has a boundary k of $9.9\text{E-}5 \text{ cm/sec}$ and a thickness of 5 feet. The river level fluctuates and affects groundwater flow patterns in the alluvium. Since steady-state flow models are being used for both geochemical analyses and closure alternatives analyses, an equivalent river elevation was derived (from a 7-month transient model incorporating weekly river level fluctuations) and used in the analyses that follow.

3.8 Flow Calibration

Flow model calibration was carried out for April 2014, for which 51 groundwater elevations both within and outside the RCPA (at various depths) were available as targets. Manual and automated parameters estimation approaches were used to derive reasonable estimates hydraulic conductivities and natural recharge rates that produce groundwater elevations close to the observed data. The results are summarized in Figure 8. The average head residual is less than 2 feet and the normalized root mean square error is 10.1%. It should be noted that observed groundwater elevations vary from 367.1 – 385.1 feet above mean sea level in the bedrock and alluvial

aquifers and from 393.6 – 400.8 in the RCPA pore-water for this April 2014 event. The calibrated model was found to be acceptable for current purposes.

3.9 MODEL PREDICTIONS

The calibrated model was used to predict flows from the RCPA, flows rates in the alluvium, flows to/from the river, and to optimize recovery well placement and pumping rates for alternate closure scenarios. The scenarios modeled are summarized in Table 2 and Figures 9 to 15.

Table 2: Summary of Steady-State Groundwater Flow Model Predictions for Future Scenarios

Future Prediction Model Scenario	Related Figure	Mississippi River Stage	Number of Wells	Well Pumping Rate	Total Pumping Rate	Slurry Wall?	Inward Hydraulic Gradient from Mississippi River toward the RCPA?
Units	NA	(ft amsl)	NA	(gpm)	(gpm)	NA	NA
RCPA Cap of 1×10^{-6} cm/s	10	366	--	--	--	No	No
RCPA Cap, Hydraulic Containment with Pumping Wells #1	11	366	6	13.0	78	No	Yes
RCPA Cap, Hydraulic Containment with Pumping Wells #2	12	366	6	10.4	62.3	No	No
RCPA Cap, Hydraulic Containment with Pumping Wells #3	13	374.2	6	14.5	87.3	No	Yes
RCPA Cap, Hydraulic Containment with Slurry Wall and Pumping Wells #1	14	366	6	10.4	62.3	Yes	Yes
RCPA Cap, Hydraulic Containment with Slurry Wall and Pumping Wells #2	15	374.2	6	10.4	62.3	Yes	Yes

Notes:

- 1) cm/s = centimeters per second
- 2) ft amsl = feet above mean sea level
- 3) gpm = gallons per minute
- 4) In all future model scenarios (Figures 11-15), the RCPA was modeled as drained, inactive, and capped with RCPA recharge of 7 inches per year based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1×10^{-6} cm/s soil cover.
- 5) Mississippi River stage of 366 ft amsl is the steady-state equivalent river stage and 374.2 ft amsl is the long-term average river stage calculated from 1983 to 2017.
- 6) Hydraulic head control was predicted using proposed pumping wells placed at approximately 1000 foot spacing (see reference figures for locations). Each proposed well screen extends from near surface to intermediate alluvium.
- 7) RCPA hydraulic containment was evaluated using predicted flow velocity vectors and predicted pumping well capture of particles distributed along the outside edge of the RCPA in each model ash layer (see figure 9).

8) The proposed slurry wall was modeled as constructed along the east side of the RCPA from the very shallow alluvium to the deep alluvium/top of bedrock, 2 feet thick, and a hydraulic conductivity of 1×10^{-6} cm/s. Groundwater pumping rates were compared to seepage from the RCPA and natural infiltration and found to be reasonable (Table 3).

Table 3: Mass Balance

Inflows			Outflows		
Unit	Flow Rate		Unit	Flow Rate	
	(ft ³ /day)	(gpm)		(ft ³ /day)	(gpm)
Seepage from Ash Pile (infiltration through cap)	3,583	19	Extracted at Wells	12,000	62
Reversal of Flow from Mississippi River	201	1	Outflow to River	634	3
Infiltration of Precipitation outside Ash Pile	7,563	39	Other Components	2,318	12
Other Components	3,617	19	Total Outflows	14,951	78
Total Inflows	14,965	78			

Notes:

- 1) (ft³) = Cubic feet
- 2) gpm = Gallons per minute.

Groundwater pumping rates are low because:

- The infiltration rate through the capped RCPA is relatively low
- Under capped conditions, the hydraulic gradient is low (nearly flat)
- Under pumping conditions, a hydraulic divide is predicted to develop between the RCPA and the riverbank, minimizing the possibility of pumping river water
- For slurry wall cases, pumping rates are reduced a small amount because the small amount of river inflow is reduced.

Other things that were noted during the closure scenarios analysis:

- If the requirement of “inward flow from River to RCPA” is reduced to “no outward flow from RCPA toward river” the pumping rates are almost the same (Figure 11)
- A small mound is predicted to remain beneath the RCPA (Figures 10 to 15)
- Due to this mound, a closure pumping well to the north of the impoundment was predicted to be required and was included in the design.

4.0 GEOCHEMICAL MODELING

4.1 Purpose

A series of geochemical simulations to predict long-term groundwater quality surrounding the RCPA were evaluated. These simulations were conducted to assess how geochemical attenuation mechanisms and variable

geochemical properties influence the transport of constituents from the CCR impoundment into the natural environment. The geochemical modeling complements the groundwater modeling previously described in this report.

The geochemical simulations described in this section were specifically developed to evaluate the potential for arsenic, boron, and molybdenum migration from the RCPA into groundwater after the installation of a semi-permeable barrier cap as described in the sections above. These simulations were conducted to complement fate and transport modeling previously described in this report, and to build on that effort by integrating geochemical controls and processes. Due to considerable complexity and heterogeneity in both groundwater flow and geochemical properties of the aquifer, the geochemical simulations use the geometric mean and maximum concentrations measured in monitoring wells for arsenic, boron, and molybdenum in the RCPA. The latter presents a conservative approach to determining attenuation and the longevity of the likely plume present at the RCPA site. Both cases are presented to evaluate the range of possible outcomes associated with the geochemical modeling. However, the groundwater flow at the Rush Island site substantially impacts the geochemical conditions in groundwater surrounding the RCPA and have a great effect on predicted migration and concentration changes over time.

4.2 Model Design

The geochemical model was designed based on the results from hydrogeological modeling. Two phases of geochemical modeling were undertaken:

- Simulation of current conditions using a constant source and geometric mean and maximum plume concentrations for an uncapped scenario
- Forecasting of future conditions for a capped scenario

The modeling was conducted using PHAST V.3, a computer program developed by the US Geological Survey that simulates multicomponent reactive solute transport in a three-dimensional saturated groundwater flow system (Parkhurst et al. 2010). PHAST is a versatile groundwater flow and solute-transport simulator with capabilities to model a wide range of equilibrium and kinetic geochemical reactions. The flow and transport calculations are based on a modified version of HST3D that is restricted to constant fluid density and constant temperature. The geochemical reactions (e.g., mineral dissolution/precipitation; sorption/desorption) are simulated with the geochemical model PHREEQC, which is embedded in PHAST (Parkhurst and Appelo 2013). PHREEQC was also used independently to validate groundwater analytical results by checking charge balance equality and adjust redox equilibrium based on dissolved redox-sensitive metals (iron and manganese). In this approach to attenuation modeling, results from MODFLOW were directly used as initial and target values to ensure seamless model coordination. Thus, flow was fully recalculated independently in PHAST.

The modeling was conducted using the geochemical thermodynamic database Minteq V.4, which is a widely-accepted database of thermodynamic data accumulated from numerous sources by the U.S. Environmental Protection Agency (EPA). Since this database was released, however, newer and updated thermodynamic data have been published in the scientific literature and Golder has made numerous updates to the database, including the addition of data relating to aqueous arsenate/arsenite complexes that were compiled by Nordstrom et al. (2014).

4.2.1 Model Conceptual Approach

Models are used to represent site conditions using a simplified approach. The overall architecture of the PHAST model is shown in Figure 16, which is a portion of the overall MODFLOW flow model and focuses on the areas immediately upgradient and downgradient from the RCPA. The geochemical model developed is used to determine the effectiveness of capping the RCPA and estimate the time of concentration attenuation. Three generalized depths based on the model layer design were targeted for compliance. The shallow (377 ft AMSL), intermediate (328 ft AMSL), and deep (253 ft AMSL) zone elevations, represent the upper-most saturated zone, center of the model domain, and the depth at where the aquifer contacts bedrock, respectively.

At these depths, a series of compliance locations were developed based on where the likely mixing zone exists between groundwater and the Mississippi River, and locations just downgradient of the RCPA (Figure 17). To determine the time to attenuation (i.e., the time over which dissolved concentrations of arsenic, boron, or molybdenum would decrease to below target concentrations), concentrations were tracked at these locations. Locations 1 through 4 are along the river/groundwater interface, and locations 5 through 7 are at the boundary of the RCPA (locations requested by Ameren and Haley and Aldrich, confidential communication).

To determine the adsorption and potential attenuation of constituents onto soils downgradient of the RCPA, the metal content of soils was measured at various depths. Based on those samples, a geometric mean of total iron content was calculated to estimate adsorption potential downgradient of the RCPA (explained in detail in section 4.2.3.2). Natural background levels of constituents adsorbed to soils were considered in modeling, allowing the adsorptive surfaces to establish an equilibrium with background groundwater.

For modeling purpose, the RCPA was considered as one source, over a constant period of time. This is done due to historical uncertainty surrounding the volume of ash additions, variations in the type of coal used producing ash (Ameren, confidential communication), and the homogeneity of ash in the RCPA. The model time was then run forward until a steady or near steady plume, e.g. maximum concentration of constituents (based on calculated geometric mean, and maximum constituent concentrations), from the RCPA was measured at the model locations. At that time, the cap was then applied, and attenuation was tracked until compliance levels were met. The primary focus of simulations for arsenic was at the intermediate depth (where greatest concentrations typically exist), while the shallow and deep depths were of less concern, based on locations of current exceedances in monitoring wells.

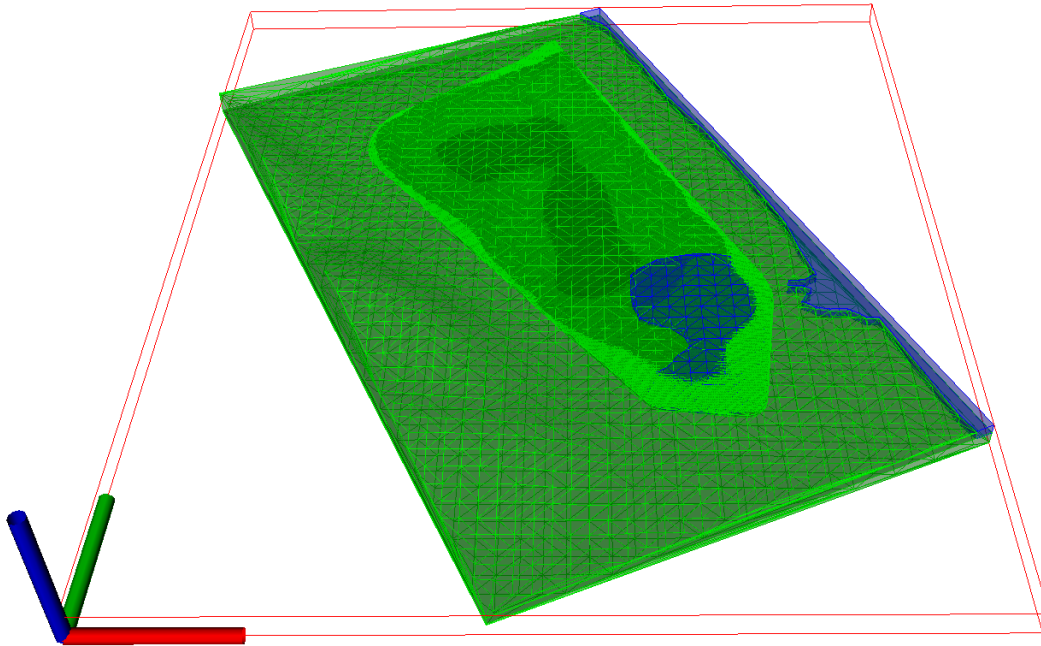


Figure 16: Model Geometry and Domain Used for USGS PHAST Geochemical Modeling

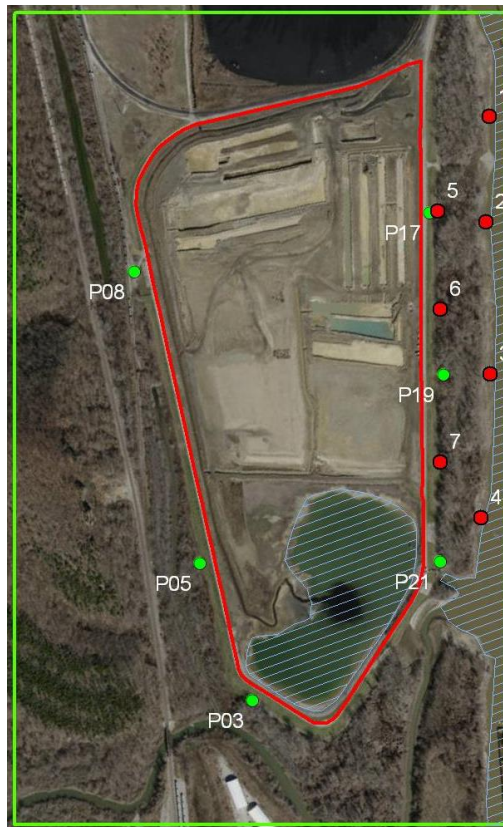


Figure 17: Location of Monitoring Wells (P prefix; green) and Model Point Locations (numbered; shown in red)

4.2.2 Model Flow Validation (uncapped scenario)

The geochemical model directly utilized results of the hydrogeological MODFLOW modeling. However, PHAST solves for a steady state flow condition independently prior to solute transport modeling. Therefore, the physical geometry of the MODFLOW model, initial head conditions, and values for Kh (horizontal conductivity) and Kz (vertical conductivity) are directly imported from MODFLOW to minimize any differences in flow models.

. The geochemical model was validated against the MODFLOW model by achieving the following:

- Recharge and flux values calculated from the geochemical model were within 5% of the values used in the MODFLOW model
- The water balance in the geochemical model realized an inflow and outflow of 1.27E9 kg/yr against a value of 1.37E9 kg/yr from MODFLOW
- The maximum and minimum fluid heads in the geochemical model were 398 ft AMSL and 366 ft AMSL, respectively, against values of 398 and 366 ft AMSL, respectively, in the MODFLOW model.
- The overall average velocity from the geochemical model was 45 ft/yr against a value of 45 ft/yr in the MODFLOW model.

4.2.3 Geochemistry Inputs

4.2.3.1 Water Quality

The water quality inputs to the geochemical model were developed using groundwater quality data from monitoring wells, an RCPA porewater sample, and a river water sample. Domain groundwater was represented by groundwater quality data collected on November 6, 2018 from monitoring well R-MW-B2 (Golder 2018 Annual Report). Monitoring well R-MW-B2 is the nearest monitoring well in the area of interest and had the lowest measured background level of arsenic. Grab sample SW-5 (Appendix B) from the Mississippi River was used to represent river water quality, which was collected upgradient of the site boundary. Pond water was also represented by the river water sample as pond discharge water quality closely resembles river water (Ameren, confidential communication). Source water from the RCPA was represented by porewater quality measured in PZ-27S. Source water composition was kept constant throughout the geochemical modeling, with the exception of variable concentrations for arsenic, boron, and molybdenum to a range of potential plume attenuation. Table 4 presents the water quality inputs used for the geochemical modeling and also includes the geometric mean and maximum values for arsenic, boron, and molybdenum.

Table 4: Water Quality Inputs

Analyte	Unit	Groundwater	Porewater	River Water
Temperature	°C	16.0	16.0	16.0
pH	s.u.	7.35	11.0	7.45
Redox ¹	mV	+195	-59.2	+314
Alkalinity	mg/L as CaCO ₃	338	301	180
Chloride	mg/L	46.3	23.6	16.6
Fluoride	mg/L	0.190	0.240	0.290
Sulfate	mg/L	42.5	204	95.2
Calcium	mg/L	107	137	58.7
Magnesium	mg/L	19.4	0.050	21.9
Arsenic	mg/L	0.002	0.070/0.293	0.002
Boron	mg/L	0.115	6.0/14.7	0.059
Iron	mg/L	0.235	6.10	0.013
Manganese	mg/L	0.236	0.050	0.111
Molybdenum	mg/L	0.020	0.312/1.04	0.002
Potassium	mg/L	8.76	45.0	4.89
Sodium	mg/L	23.4	187	25.3

Notes:

- 1) pe was calculated in PHREEQC to achieve redox equilibrium
- 2) mg/L – milligrams per liter
- 3) mV – millivolts
- 4) s.u. – standard units
- 5) °C – degrees Celsius
- 6) xx/xx represents the geometric mean/maximum values

4.2.3.2 Composition of Sediments and Reactive Surfaces

Surface complexation is typically described using a mechanistic model for adsorption onto metal oxide surfaces (Dzombak and Morel 1990). Sorption was simulated assuming the presence of hydrous ferric oxide [Hfo] in the

form of ferrihydrite [Fe(OH)₃], a mineral surface capable of adsorbing pertinent dissolved species. Based on the chemical and/or mineralogical composition of the solids of interest, surface site densities were calculated using formulas for Hfo. Surface sites can achieve equilibrium with ambient groundwater to allow for a pre-loaded natural condition (Wilson et al. 2017).

The oxidized arsenic, as arsenate, has a high affinity for adsorption onto metal oxide surfaces while the affinity of the reduced species, arsenite, is substantially lower, especially in the presence of dissolved sulfate (Jain et al. 1999). Both boron and molybdenum have very low adsorption potential on Hfo at circumneutral pH, and adsorption is typically not a controlling factor in their transport in groundwater (Dzombak and Morel 1990). Thus, it is important to consider the presence and nature of the sorbents, the redox state of the parameter of interest, and the presence of competing species when evaluating sorption.

To determine adsorption sites for surface complexation, the total mass of iron in sediment/soil samples was converted using methods described by Dzombak and Morel (1990). This is a conservative assumption and may result in an overestimate of sorption as, in reality, a portion of the iron will likely be present in the form of minerals that have no sorption capacity. Borehole data were collected from three cores obtained east of the RCPA at three different, varying depths in each borehole (not based on model layers; Appendix B). The minimum, geometric mean, and maximum iron concentrations were used to calculate the number of adsorption sites of the iron substrates (Table 5). Simulations presented in this report used only the geometric mean Hfo concentrations. Minimum and maximum Hfo site density are shown for reference purposes.

Table 5: Density of Sorption Sites Per Gram of Sediment/Soil in Boreholes

Measure	Hfo (mol sites per gram)
Minimum	7.6E-06
Geometric Mean	1.2E-05
Maximum	3.4E-05

4.2.4 Numerical Dispersion

The Peclet and Courant numbers are used in reactive/ solute transport modeling to evaluate model validity and manage numerical dispersion during simulations. These values are calculated based on the cell size, time step, dispersivity, and average velocity of groundwater in the model. Formula 4.1 is used to control numerical dispersion based on documentation included with PHAST using an upstream-in-space and backwards-in-time differencing solution using a derivation of both the Peclet and Courant numbers (Parkhurst et al. 2010).

$$\text{Peclet: } \Delta X / \alpha = 1.0$$

$$\text{Courant: } (V_x \cdot \Delta t) / \Delta X = 0.57$$

$$\text{Or } \Delta X / 2 + (V_x \cdot \Delta t) / 2 \ll \alpha \tag{4.1}$$

Where:

ΔX = Cell size (20 ft)

V_x = Average Velocity (45 ft/yr.)

Δt = Timestep (0.22 yr / 80 days)

α = Longitudinal dispersivity (20)

4.2.5 Model Assumptions

Various assumptions were required to simulate the plume representing current conditions. They include:

- Due to the wide range of concentrations in RCPA monitoring wells, an initial plume was developed for three different elevations. The geometric mean and maximum concentrations for arsenic, boron, and molybdenum measured in wells on the east side of the RCPA, the area of focus for regulatory compliance, were used.
- The RCPA was considered a constant flux source with constant groundwater quality until cap installation. The model was run forward in time until a constant or near-constant concentration of each constituent of interest was present in each of the designated compliance locations (Figure 17). Full calibration to measured values in each monitoring well at multiple depth intervals was unfeasible within the scope of this modeling effort given the significant complexity and heterogeneity of the site.
- The flow modeling presented in Section 2 of this report is assumed to adequately estimate groundwater velocities, fluid head, hydraulic conductivities, porosities, and boundary conditions associated with and adjacent to the RCPA.
- Adsorption surfaces are constant across the domain. To minimize multiple diverging variables, the geometric mean of the Hfo site density was used throughout the non-RCPA domain. All iron in boreholes is present as Hfo in adsorption calculations.
- No adsorption sites were assigned to the interior of the RCPA zone. This assumption is based on results of SPLP testing results indicating leachates from CCR material did not contain detectable arsenic concentrations (Haley and Aldrich, confidential communication). Any arsenic present in the CCR solids likely occurs in a form that is would not be accurately represented by adsorption onto Hfo in the CCR materials.
- By using the geometric means and maximum measured concentration of arsenic, boron, and molybdenum from monitoring wells located on the downgradient side of the RCPA, the modeling results bracket a range that includes a conservative scenario (i.e. predicted concentrations based on the maximum values are biased high). Actual attenuation may, therefore, occur sooner than simulated.
- The cap limits annual average infiltration into the RCPA to 0.0016 ft/day (Section 2).
- The pond in the southern region of the RCPA will contain no surface water three years after cap installation.
- Reaction kinetics can be ignored due to the rapid nature of the attenuation reactions of interest.
- Thermodynamic and other constants contained in the modified Minteq V.4 database are valid for the conditions observed in and surrounding the RCPA.

- The system is at and will continue to be, in a steady state flow condition.
- The Mississippi River is at a constant fluid head elevation.
- Preferential flow at the Rush Island site may exist, leading to the highly variable concentration of arsenic, boron, and molybdenum, but cannot be captured in the flow model.
- The geochemical data obtained from groundwater, porewater, river water and sediments/soils samples are representative of site conditions.

4.3 Results

The geochemical simulations indicate that installing a cap over the RCPA is beneficial and results in lower groundwater concentrations for arsenic, boron and molybdenum than in an uncapped scenario (Figures 18-32). The main findings can be summarized as follows:

- Simulations of arsenic attenuation indicate there is still adequate sorption capacity in soils downgradient of the RCPA to attenuate arsenic to below regulatory limits (Figure 33 and 34).
- Boron and molybdenum adsorption on soils downgradient of the RCPA is very low (sorbed concentrations are simulated to be below analytical detection limits (<0.1 mg/kg). Therefore, attenuation of boron and molybdenum is primarily due to groundwater dilution, and site geochemical conditions have minimal effect on these two parameters achieving desired levels.
- In scenarios developed using geometric means of arsenic (0.07 mg/L), boron (6.0 mg/L), and molybdenum (0.312) to describe the source, concentrations decreased to below desired levels (arsenic 0.03 mg/L; boron 2 mg/L; and molybdenum 0.1 mg/L) at simulation locations 1 through 7 within approximately 20 years after cap installation due to attenuation (Figures 35-41). Boron and molybdenum were the slowest to attenuate in the deeper locations. Arsenic attenuation to below regulatory limits occurred quicker, especially in intermediate locations, at around 5 years after the cap installation.
- Simulations indicate that once regulatory limits are met using geometric mean concentrations, the cap will maintain levels of arsenic, boron, and molybdenum at those levels or lower in the future.
- Geochemical models indicated that future arsenic levels above regulatory limits in deep wells are not likely, and the addition of a cap on the RCPA would minimize potential future arsenic exceedances at deep locations.
- Boron and molybdenum at the majority of locations reach desired levels within 15 years of cap installation (locations 2,3,4,6, and 7). Deep simulated locations were observed to be the slowest to meet desired levels, indicating the importance of recharge and plume dilution in achieving compliance for boron and molybdenum.
- Using the maximum source arsenic (0.293 mg/L), boron (14.7 mg/L), and molybdenum (1.04 mg/L) concentrations, attenuation to below desired levels occurred within 30 years at all locations except 3 and 6 for arsenic (Figure 42-48). At location 3, results for intermediate levels indicated levels slightly over desired concentrations (0.06 mg/L), but well below the original source concentration of 0.293 mg/L. These locations demonstrated a “rebound effect”, where arsenic levels in groundwater increase

after an initial decrease. This indicates the effect of low-arsenic groundwater establishing equilibrium with significant concentrations of adsorbed arsenic due to loading from earlier, high-arsenic source water. The rebound leads to slight increases of dissolved arsenic levels until groundwater travels further downgradient where adequate free adsorption surfaces exist. Deep aquifer simulations of arsenic are not considered for attenuation feasibility, as current arsenic levels already meet regulatory limits.

- Attenuation of arsenic in the shallow soils takes place directly around the RCPA (Figure 33), forming a tight ring around the RCPA. In the intermediate aquifer, attenuation is more disperse, primarily due to higher aquifer conductivities and faster groundwater velocities (Figure 34). As groundwater with background levels of arsenic contact built-up arsenic adsorbed on soils, it can re-mobilize arsenic temporarily until groundwater travels further downgradient.

In summary, based on a simulated constant source plume using a geometric mean and maximum concentration for arsenic, boron, and molybdenum, it is predicted that all each constituents of concern will meet desired groundwater quality levels within approximately 20 years of the installation of a cap over the RCPA with a ≤ 0.0016 ft/day infiltration rate. Arsenic presents a greater attenuation potential and should meet regulatory limits in a shorter timeframe than boron and molybdenum. At many intermediate zone locations where arsenic levels are highest, arsenic is predicted to attenuate below groundwater protection standards as quickly as 5 years after capping and pond closure.

5.0 CONCLUSIONS

Based on both the groundwater flow model and the geochemical simulations described in this report, the following conclusions can be made:

- Based simulations of arsenic, boron, and molybdenum at the Rush Island site, the installation of a cap achieving ≤ 0.0016 ft/day on the RCPA would improve the levels of the constituents of concern in groundwater downgradient of the RCPA.
- Boron and molybdenum will attenuate primarily through dilution and mixing in groundwater once the cap is in place and will meet regulatory limits at modeled locations in approximately 20 years.
- Adequate attenuation capacity exists downgradient of the RCPA for arsenic, and arsenic will attenuate to below regulatory limits in intermediate zone locations, where arsenic levels are highest, as quickly as 5 years after capping and pond closure.
- Based on geochemical simulations and the above stated results, arsenic, boron, and molybdenum at the RCPA are reasonable candidates for monitored natural attenuation as a corrective action under the CCR Rule, using a long-term monitoring program and updating models as new data become available.

6.0 LIMITATIONS

The modeling analyses presented in this report are a simplification of reality and the model-predicted results should be used with this understanding. The limitations associated with analyses such as these are detailed below.

Hydrogeologic investigations and groundwater modeling are dynamic and inexact sciences. They are dynamic in the sense that the state of any hydrological system is changing with time, and in the sense that the science is

continually developing new techniques to evaluate these systems. They are inexact in the sense that groundwater systems are complicated beyond human capability to evaluate them comprehensively in detail, and we invariably do not have sufficient data to do so. A groundwater model uses the laws of science and mathematics to draw together the available data into a mathematical or computer-based representation of the essential features of an existing hydrogeologic system. While the model itself obviously lacks the detailed reality of the existing hydrogeologic system, the behavior of a valid groundwater model reasonably approximates that of the real system. The validity and accuracy of the model depends on the amount of data available relative to the degree of complexity of the geologic formations, the site geochemistry, the fate and transport of the dissolved compounds, and on the quality and degree of accuracy of the data entered. Therefore, every groundwater model is a simplification of a reality and the model described in this report is not an exception.

The professional groundwater and geochemical modeling services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the quality and quantity of available data, the time limits and financial and physical constraints applicable to the services. Unless otherwise specified, the results of previous or simultaneous work provided by sources other than Golder and quoted and/or used herein are considered as having been obtained according to recognized and accepted professional rules and practices, and therefore deemed valid. This model provides a predictive scientific tool to evaluate the impacts on a real groundwater system of specified hydrological stresses and/or to compare various scenarios in a decision-making process. However, and despite the professional care taken during the construction of the model and in conducting the simulations, its accuracy is bound to the normal uncertainty associated to groundwater modeling and no warranty, express or implied, is made.

Tables:

Table 1 – Model Input Data Ranges

Table 2 – Summary of Steady-State Groundwater Flow Model Predictions for Future Scenarios

Table 3 – Mass Balance

Table 4 – Water Quality Inputs

Table 5 – Density of Sorption Sites Per Gram of Sediment/Soil in Boreholes

Figures:

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Figure 3 – Groundwater Model Domain and Cross Section Location Map

Figure 4 – A-A' Cross-Section and Hydraulic Conductivities

Figure 5 – B-B' Cross-Section and Hydraulic Conductivities

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Figure 7 – Model Boundary Conditions

Figure 8 – Scatter Diagram for Predicted and Observed Hydraulic Heads

Figure 9 – Steady-State Groundwater Model Starting Particle Locations for Forward Particle Tracking

Figure 10 – Steady-State Groundwater Model Predictions - Historical (No Cap) and Future (With Cap) Conditions With Forward Particle Flow Paths

Figure 11 – Steady-State Groundwater Model Predictions – Capped RCPA With Six Proposed Pumping Wells, River Stage 366 Feet AMSL

Figure 12 – Steady-State Groundwater Model Predictions – Capped RCPA with Six Proposed Pumping Wells, River Stage 366 Feet AMSL, No Inward HYD Gradient

Figure 13 – Steady-State Groundwater Model Predictions – Capped RCPA with Six Proposed Pumping Wells, Long-Term Ave River Stage 374.2 Feet AMSL

Figure 14 – Steady-State Groundwater Model Predictions – Capped RCPA with Slurry Wall and Proposed Pumping Wells, River Stage 366 Feet AMSL

Figure 15 – Steady-State Groundwater Model Predictions – Capped RCPA with Slurry Wall and Proposed Pumping Wells, Long-Term Average River Stage

Figure 16 – Model Geometry and Domain Used for USGS PHAST Geochemical Modeling

Figure 17 – Location of Monitoring Wells and Model Point Locations

Figure 18 – Simulated Dissolved Arsenic 0 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 19 – Simulated Dissolved Arsenic 5 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 20 – Simulated Dissolved Arsenic 10 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 21 – Simulated Dissolved Arsenic 15 Years Post Cap – Intermediate (330 FT AAMSL) Depth

Figure 22 – Simulated Dissolved Arsenic 20 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 23 – Simulated Dissolved Molybdenum 0 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 24 – Simulated Dissolved Molybdenum 5 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 25 – Simulated Dissolved Molybdenum 10 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 26 – Simulated Dissolved Molybdenum 15 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 27 – Simulated Dissolved Molybdenum 20 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 28 – Simulated Dissolved Boron 0 Years Post Cap – Intermediate (330 FT AMSL) Depth

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Figure 32 – Simulated Dissolved Boron 20 Years Post Cap – Intermediate (330 FT AMSL) Depth

Figure 33 – Simulated Attenuated Arsenic at Cap Installation – Shallow (375 FT AMSL) Depth

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Figure 35 – Time Series Plot – Average Concentrations at Location 1

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Figure 37 – Time Series Plot – Average Concentrations at Location 3

Figure 38 – Time Series Plot – Average Concentrations at Location 4

Figure 39 – Time Series Plot – Average Concentrations at Location 5

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Figure 42 – Time Series Plot – Maximum Concentrations at Location 1

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Figure 45 – Time Series Plot – Maximum Concentrations at Location 4

Figure 46 – Time Series Plot – Maximum Concentrations at Location 5

Figure 47 – Time Series Plot – Maximum Concentrations at Location 6

Figure 48 – Time Series Plot – Maximum Concentrations at Location 7

Appendices:

Appendix A – Boring Logs

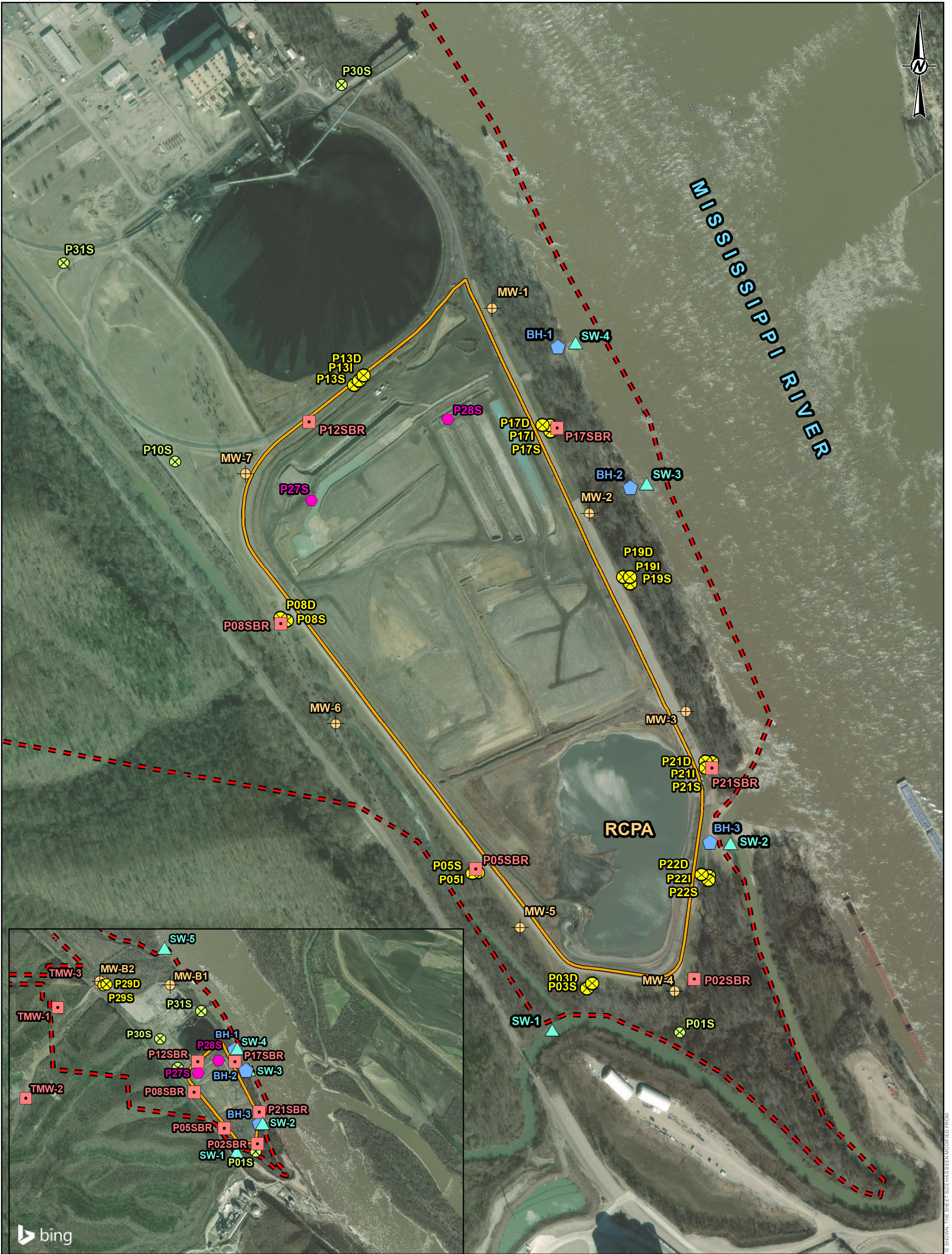
Appendix B – Laboratory Analytical Data

7.0 REFERENCES

- AECOM 2014. Groundwater and Surface Water Data Demonstrate No Off-Site Impact From Rush Island Energy Center.
- Ameren Missouri, 2018. Draft Missouri State Operating Permit MO-0000043. Available at <https://dnr.mo.gov/env/wpp/permits/pn/documents/0000043.pdf>
- Dzombak, D., and Morel, F.D., 1990. Surface complexation modeling: hydrous ferric oxide. John Wiley & Sons.
- Environmental Simulations Inc. (ESI), 2016. Groundwater Vistas version 6.85 Build 16.
- Electric Power Research Institute (EPRI). 1998, Field Evaluation of the Comanagement of Utility Low-Volume Wastes with High-Volume Coal Combustion By-Products: SX Site. September 1998.
- Fetter, C.W. 2000. Applied Hydrogeology, Fourth Edition. Pearson Education.
- GEO-Solutions 2015. Ash Pond Slurry Wall, Ameren Rush Island Energy Center, Festus, Missouri. Slurry Wall Construction Plan.
- Golder 2015. Bedrock Aquifer Piezometer Installation and Sampling, Surface Water Sampling, April-June 2014.
- Golder 2017. 40 CFR PART 257 Groundwater Monitoring Plan, RCPA - Rush Island Energy Center Jefferson County, Missouri, USA.
- Golder 2018a. 2017 Annual Groundwater Monitoring Report, RCPA Surface Impoundment, Rush Island Energy Center Jefferson County, Missouri, USA
- Golder 2018b. Nature and Extent Investigation, Rush Island Energy Center, Jefferson County, Missouri.
- Haley and Aldrich 2018. HELP Model results for different cap scenarios.
- Harbaugh, Arlen W., 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, Arlen W., E.R. Banta, M.C. Hill, and M.G. McDonald, 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.
- Harbaugh, Arlen W. and M.G. McDonald, 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.
- Jain, A., Raven, K., and Loeppert, R., 1999. Arsenite and arsenate adsorption on ferrihydrite: surface charge reduction and net OH-release stoichiometry. Environmental Science & Technology 33, no. 8: 1179-1184.
- Merkel, B., Planer-Friedrich, B., and Nordstrom, K., 2005. Groundwater geochemistry: A Practical Guide to Modeling of Natural and Contaminated Aquatic Systems.
- Morris, D.A. and A.I. Johnson, 1967. Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey, U.S. Geological Survey Water-Supply Paper 1839-D, 42p.

- McDonald, M. G., and A. W. Harbaugh, 1988. A Modular Three-dimensional Finite-Difference Groundwater Flow Model. (Techniques of Water-Resources.
- Nordstrom, K., Majzlan, J., and Königsberger, E., 1990. Thermodynamic properties for arsenic minerals and aqueous species." Reviews in Mineralogy and Geochemistry 79, no. 1: 217-255.
- NRT 2014. Draft Materials Provided by Ameren That Are to Be Used as Part of Detailed Site Investigation Report. Ameren Missouri, Rush Island Energy Center. Jefferson County, Missouri. Natural Resource Technology.
- 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.
- Parkhurst, D., Kenneth, K., and Scott C., 2010. PHAST Version 2—A program for simulating groundwater flow, solute transport, and multicomponent geochemical reactions." US Geological Survey techniques and methods 6: A35.
- Rumbaugh, J.O., and Rumbaugh, D.B., 2011. Guide to Using Groundwater Vistas Version 6. Environmental Simulations, Inc., Reinholds, Pennsylvania
- USGS 2018. National Water Information System USGS gauges 0701000 and 07020500.
- Wilson, T., Velleux, M., Hallden, J., Filardi, M., Miller, W., Nolan, P.J., 2017. Surface complexation model use and sorptive capacity evaluations for inorganic constituents from coal combustion residuals to guide monitored natural attenuation assessment. Proceedings of the World of Coal Ash.

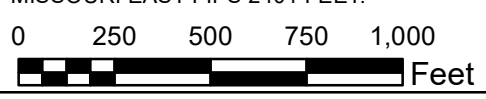
Figures



- LEGEND**
- Rush Island Energy Center Property Boundary
 - RCPA Surface Impoundment
 - Existing Wells Proposed to be Used for Assessment Monitoring
 - RCPA CCR Well Location
 - Additional Alluvial Aquifer Well to Sample for Nature and Extent
 - Bedrock Well Used for Groundwater Elevation Measurements
 - Investigation Borehole Location
 - Pore-water Sampling Location
 - Surface Water Sampling Location

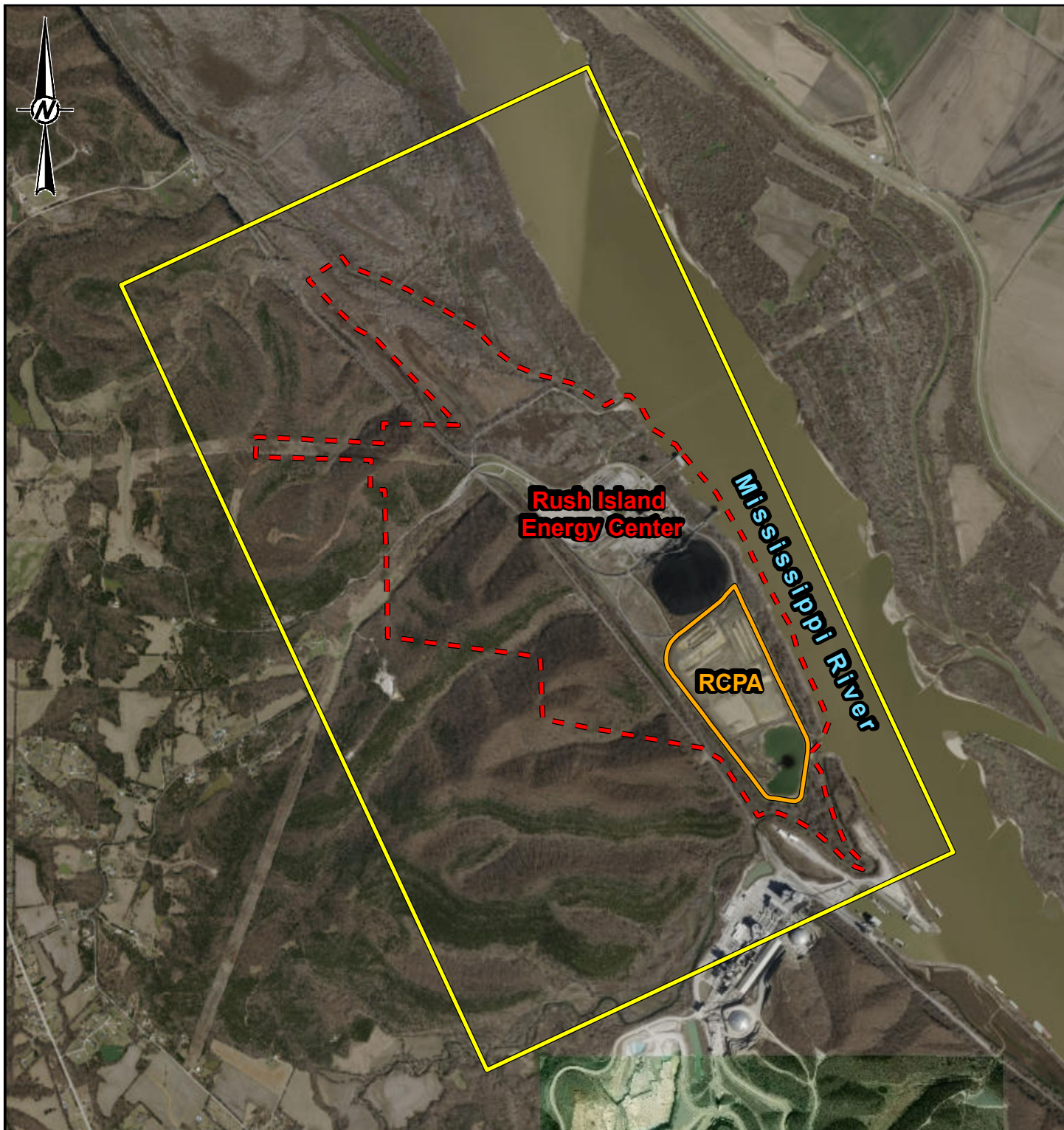
NOTES
 1. ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE. SOME PIEZOMETER LOCATIONS OFFSET FOR CLARITY PURPOSES.

REFERENCE
 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
 2.) NRT 2014, NATURAL RESOURCE TECHNOLOGY, RUSH ISLAND IMPOUNDMENT POND CLOSURE GROUNDWATER MONITORING AND SAMPLING PLAN, MARCH 4, 2014.
 3.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET.






CLIENT AMEREN MISSOURI RUSH ISLAND ENERGY CENTER			
PROJECT GROUNDWATER MONITORING PROGRAM			
TITLE SAMPLING LOCATION MAP			
CONSULTANT		YYYY-MM-DD	2019-01-21
		PREPARED	EFT
		DESIGN	JSI
		REVIEW	RJF
		APPROVED	MNH
PROJECT No. 153-1406	PHASE 0002	REVIEW 0.0	FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM 11m

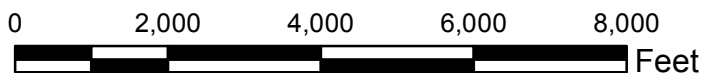


LEGEND

-  Groundwater Model Boundary
-  Approximate Rush Island Energy Center Property Boundary
-  RCPA Surface Impoundment

REFERENCE

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET



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DESIGN JSI

REVIEW JM

APPROVED MNH

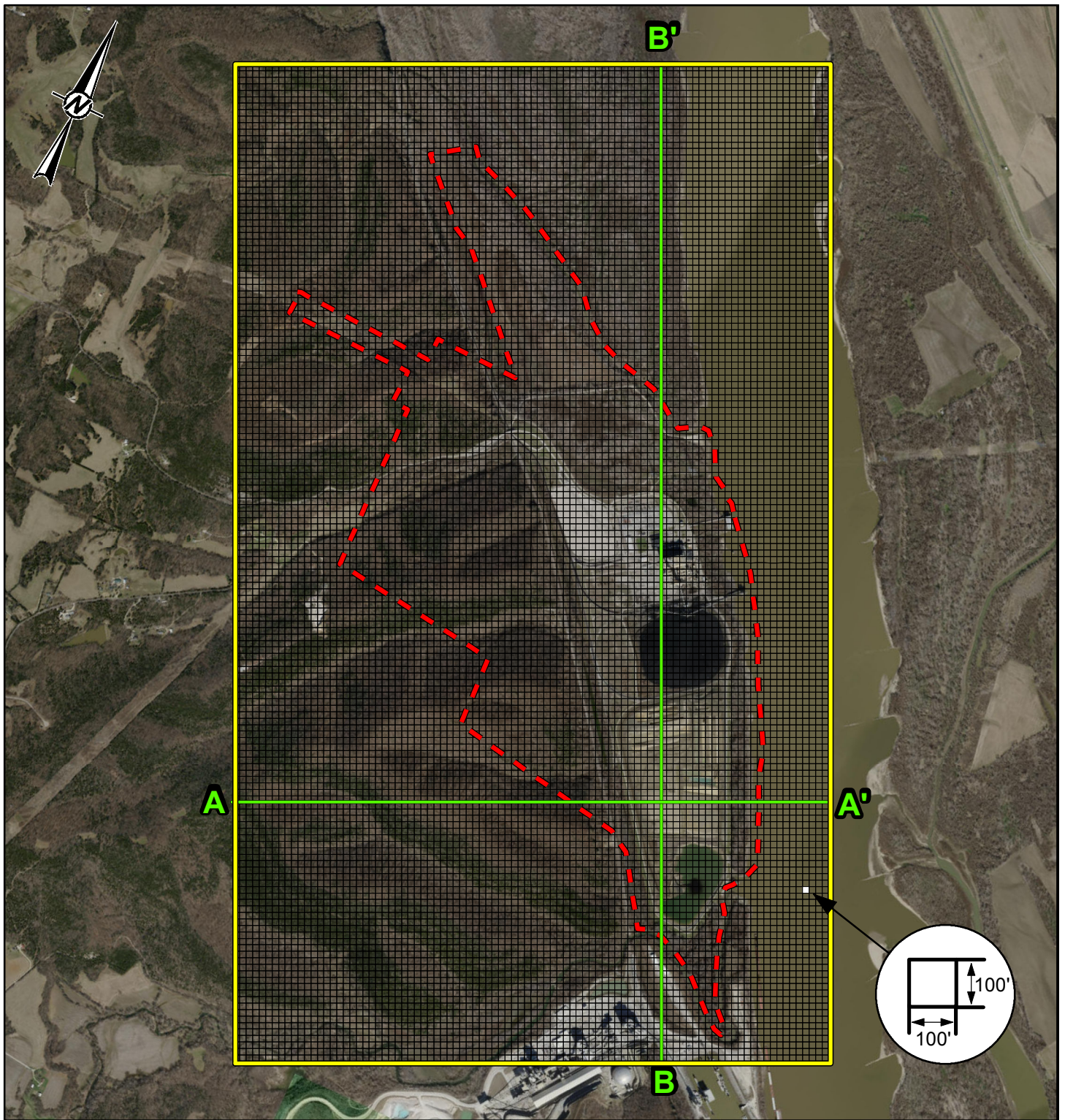
PROJECT
GROUNDWATER MONITORING

TITLE
GROUNDWATER MODEL DOMAIN




PROJECT
 1531406

Rev.
 A

FIGURE
2



LEGEND

-  Groundwater Model Boundary
-  Approximate Rush Island Energy Center Property Boundary
-  Cross Section Locations

REFERENCE

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET



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YYYY-MM-DD	2019-01-12
PREPARED	JSI
DESIGN	JSI
REVIEW	JM
APPROVED	MNH

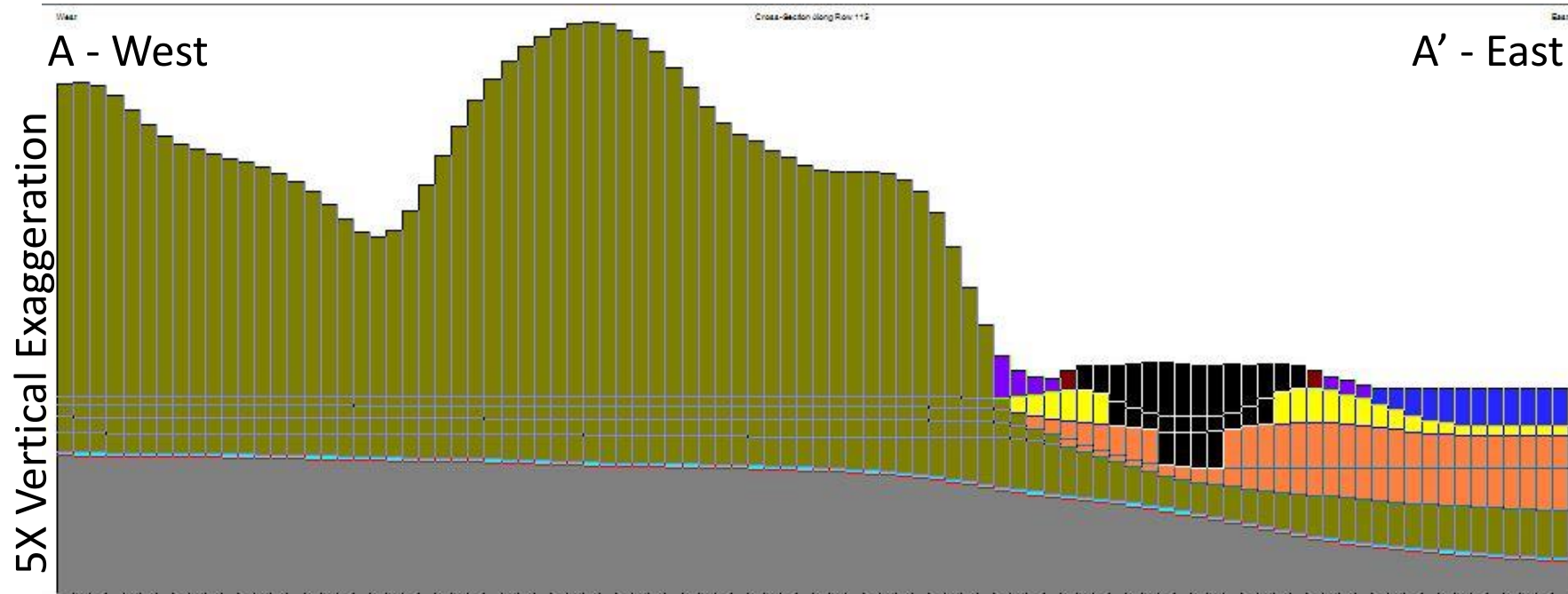
PROJECT
GROUNDWATER MONITORING

TITLE
**GROUNDWATER MODEL DOMAIN AND CROSS SECTION
 LOCATION MAP**

PROJECT
 1531406

Rev.
 A

FIGURE
3



Color	Layer	Kx, Ky		Kz	
		cm/sec	ft/day	cm/sec	ft/day
Very Shallow Alluvium (Silts/Clays)		9.9E-04	2.8	9.9E-04	2.8
Shallow Alluvium (Sands, Silts, and Clays)		2.1E-03	6	2.1E-03	6
intermediate/Deep Alluvium (Sands and Gravels)		2.6E-02	75	2.6E-02	75
Ash (RCPA)		3.0E-03	8.5	9.9E-06	0.028
Upper Bedrock (Limestone)		3.3E-06	0.0094	3.3E-07	0.00094
Shale		1.3E-06	0.0037	1.3E-07	0.00037
Lower Bedrock (Limestone/Dolomite)		2.5E-06	0.0071	2.5E-07	0.00071
Embankment		3.8E-06	0.011	9.9E-07	0.0028
Surface Water		NA	NA	NA	NA

NOTE(S)

- 1) Cross-section has a 5X vertical exaggeration.
- 2) Cm/sec = centimeters per second.
- 3) Ft/day = feet per day.
- 4) See Figure 2 for cross section location.

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DESIGN JSI

REVIEW JM

APPROVED MNH

TITLE

A-A' Cross-Section and Hydraulic Conductivities

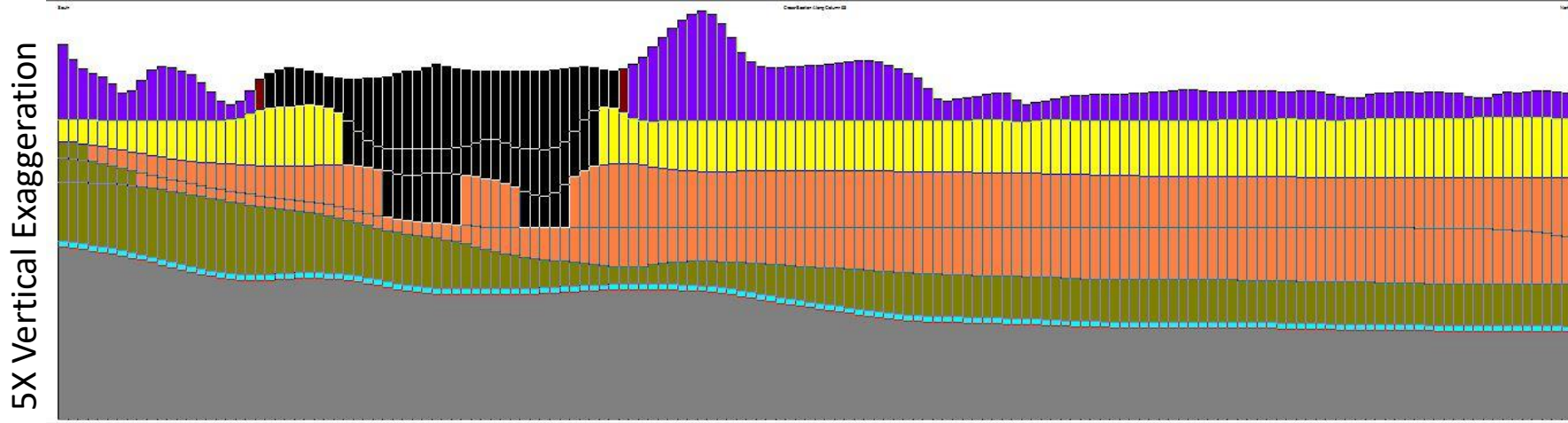
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1531406

REV.
A

FIGURE
4

South - B

North - B'



Color	Layer	Kx, Ky		Kz	
		cm/sec	ft/day	cm/sec	ft/day
Purple	Very Shallow Alluvium (Silts/Clays)	9.9E-04	2.8	9.9E-04	2.8
Yellow	Shallow Alluvium (Sands, Silts, and Clays)	2.1E-03	6	2.1E-03	6
Orange	intermediate/Deep Alluvium (Sands and Gravels)	2.6E-02	75	2.6E-02	75
Black	Ash (RCPA)	3.0E-03	8.5	9.9E-06	0.028
Olive Green	Upper Bedrock (Limestone)	3.3E-06	0.0094	3.3E-07	0.00094
Cyan	Shale	1.3E-06	0.0037	1.3E-07	0.00037
Grey	Lower Bedrock (Limestone/Dolomite)	2.5E-06	0.0071	2.5E-07	0.00071
Dark Red	Embankment	3.8E-06	0.011	9.9E-07	0.0028
Blue	Surface Water	NA	NA	NA	NA

NOTE(S)

- 1) Cross-section has a 15X vertical exaggeration.
- 2) Cm/sec = centimeters per second.
- 3) Ft/day = feet per day.
- 4) See Figure 2 for cross section location.

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DESIGN JSI

REVIEW JM

APPROVED MNH

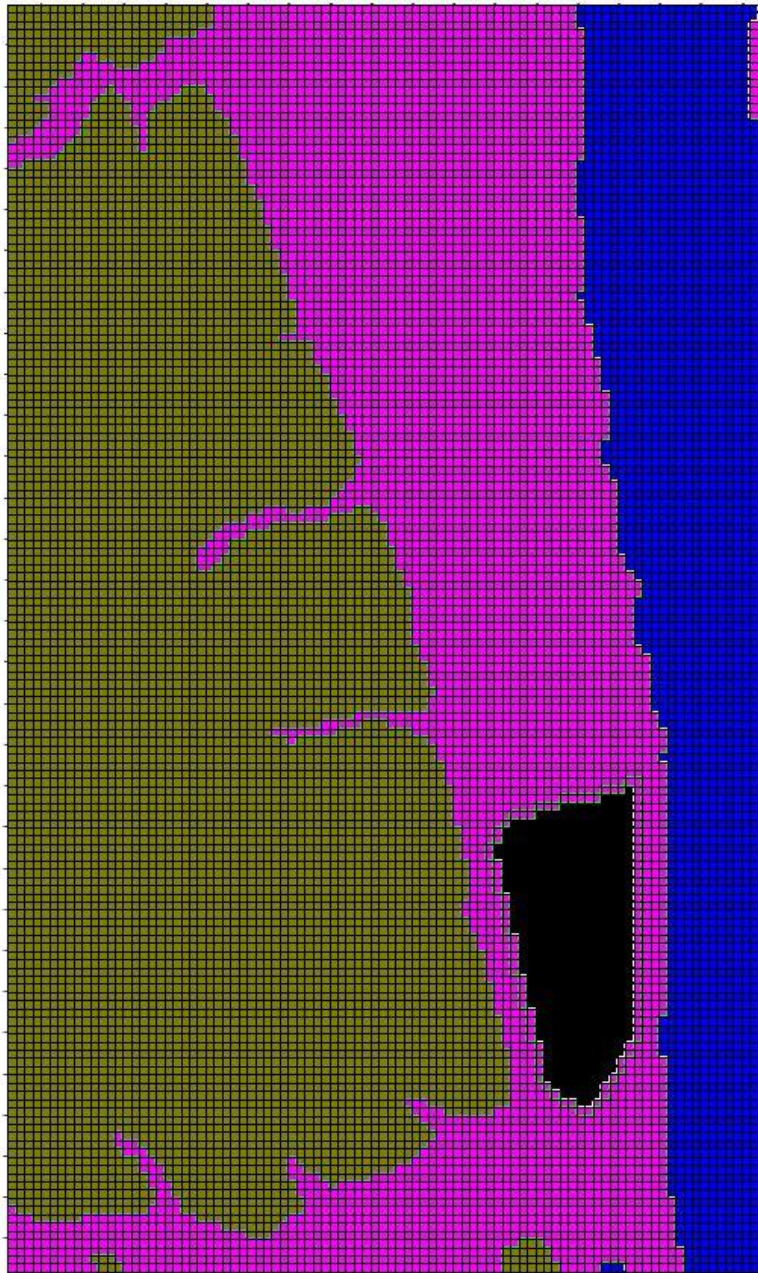
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B-B' Cross-Section and Hydraulic Conductivities

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1531406

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FIGURE
5



Color	Layer	feet per day	Inches per year
Red	Alluvium	5.94E-05	0.26
Green	Bedrock	5.00E-06	0.02
Blue	Surface Water	NA	NA
RCPA Conditions			
Black	Active RCPA	2.00E-02	87.6
	1.00E-05 cm/s Cap	2.40E-03	10.5
	1.00E-06 cm/s Cap	1.57E-03	6.9
	1.00E-07 cm/s Cap	2.29E-04	1.0
	Geomembrane Cap	1.12E-04	0.5

Cm/s = centimeters per second

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PROJECT
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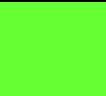


TITLE
RECHARGE DISTRIBUTION

PROJECT NO.
1531406

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A

FIGURE
6



Boundary Conditions	Color	Description
Constant Head		Constant head boundary used to represent bedrock water levels from the west. Present in all 7 layers
River		River boundary used to represent the Mississippi River, small creeks including the Isle de Bois Creek, Muddy Creek, and Saline Creek as well as the ponded portion of the RCPA. Only present in Layer 1.
Drain		Drain represents flowing channel present on the west side of the RCPA that flows into the ponded portion of the RCPA. Only present in layer 1.
Cut Off Wall		Cut off wall on east side of the RCPA that extends ~30 feet below ground surface and has a permeability of 1E-7 centimeters per second.

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PROJECT
GROUNDWATER MONITORING PROGRAM

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REVIEWED JM
APPROVED MNH

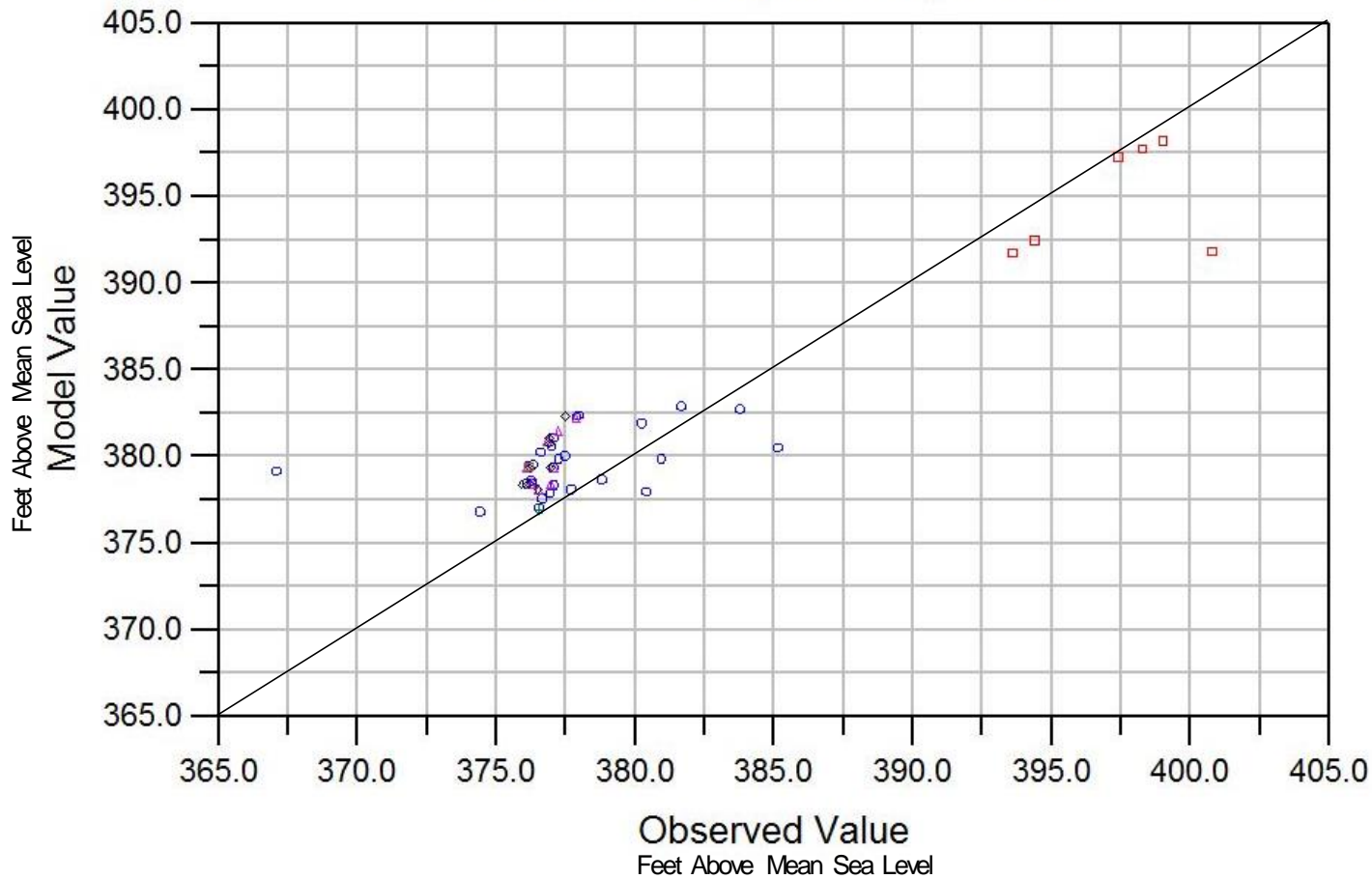
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Model Boundary Conditions

PROJECT NO.
1531406

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FIGURE
7

Observed vs. Computed Target Values



- Layer 1 RPCA – Pore-Water
- Layer 2 Shallow Alluvium
- △ Layer 3 Intermediate Alluvium
- ◇ Layer 4 Deep Alluvium
- + Layer 5 Shallow Bedrock
- Layer 7 Deep Bedrock

Residual Mean	= -1.78
Residual Standard Dev.	= 2.90
Absolute Residual Mean	= 2.70
Residual Sum of Squares	= 5.89e+002
RMS Error	= 3.40
Minimum Residual	= -12.08
Maximum Residual	= 8.95
Range of Observations	= 33.72
Scaled Res. Std. Dev.	= 0.086
Scaled Abs. Mean	= 0.080
Scaled RMS	= 0.101
Number of Observations	= 51

NOTE(S)

- 1) Values from water levels collected April 9, 2014 when the RCPA was in active conditions.
- 2) River level on April 9, 2014 was 376.60 feet above mean sea level.

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YYYY-MM-DD	201901-13
PREPARED	JSI
DESIGN	JSI
REVIEW	JM
APPROVED	MNH

TITLE

Scatter Diagram for Predicted and Observed Hydraulic Heads

PROJECT No.
1531406

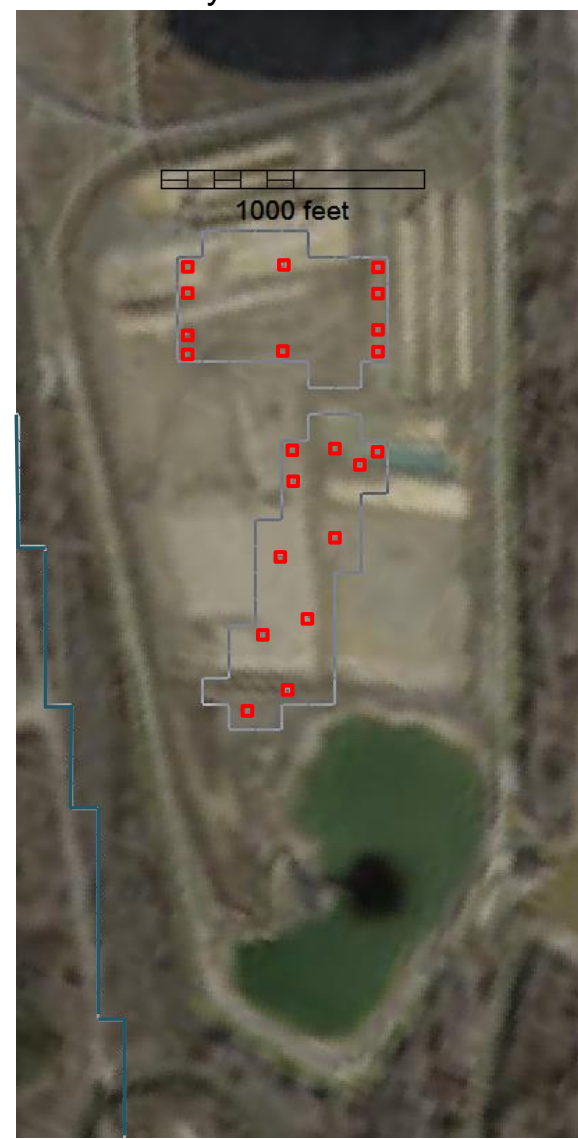
REV.
A

FIGURE
8

Layer 1 RCPA

Layer 2 RCPA

Layer 3 RCPA



□ RCPA Outline in each model layer

■ Starting Particle Location for Forward Particle Tracking

Model Boundary Condition Cells

▲ Drain
 ■ River

NOTE(S)

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YYYY-MM-DD	2019-01-15
PREPARED	RT
DESIGN	RT
REVIEW	JM
APPROVED	MNH

TITLE
**STEADY-STATE GROUNDWATER MODEL
 STARTING PARTICLE LOCATIONS FOR FORWARD
 PARTICLE TRACKING**

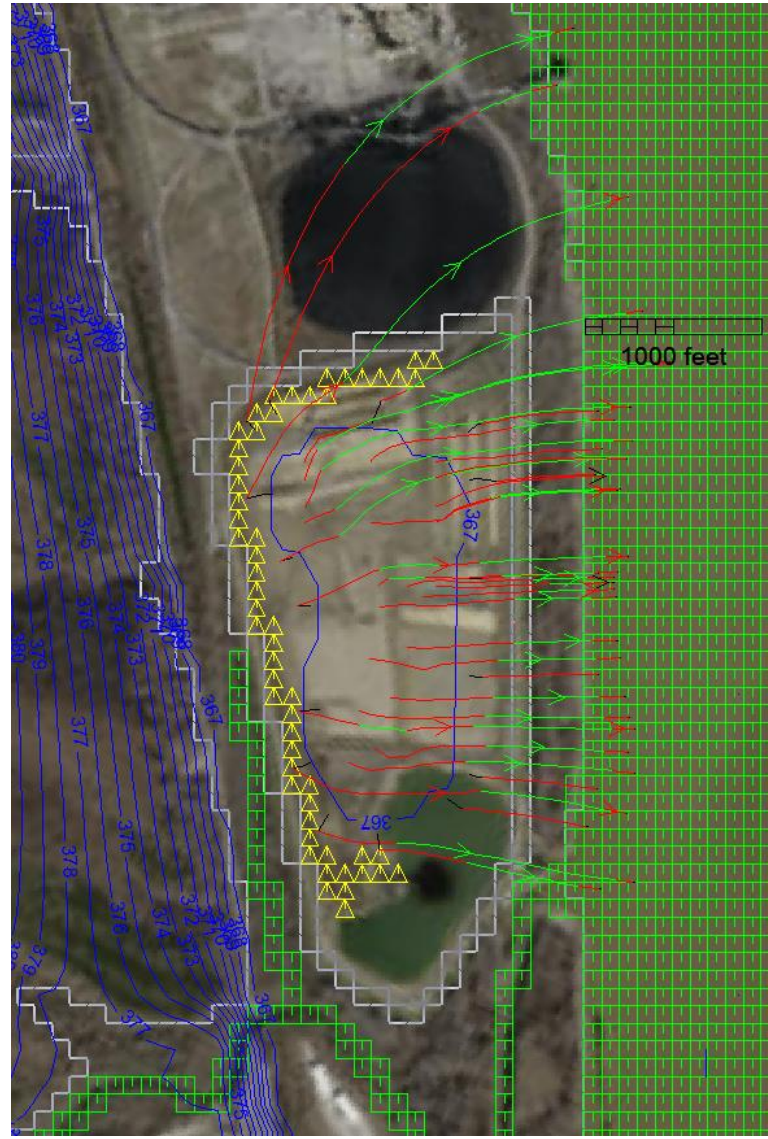
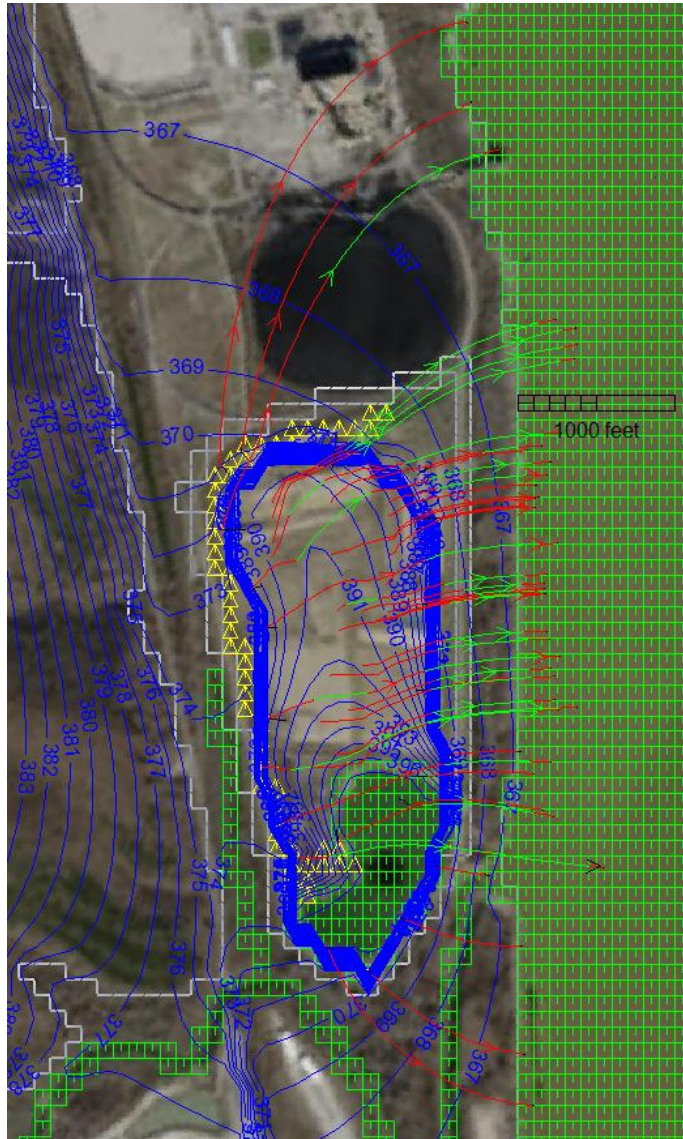
PROJECT No.
1531406


REV.
A

FIGURE
9




Predicted Historical Condition: No Cap

Predicted Future Condition: 1 x 10⁻⁶ cm/s Cap





 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Model Boundary Condition Cells

	Drain
	River/Pond

NOTE(S)

1. Steady-state groundwater model predictions.
2. Mississippi River at steady-state equivalent river stage of 366 feet above mean sea level.
3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
4. No Cap model includes 87.6 inches/year recharge to the RCPA.
5. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1 x 10⁻⁶ cm/s soil cover.

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DESIGN	RT
REVIEW	JM
APPROVED	MNH

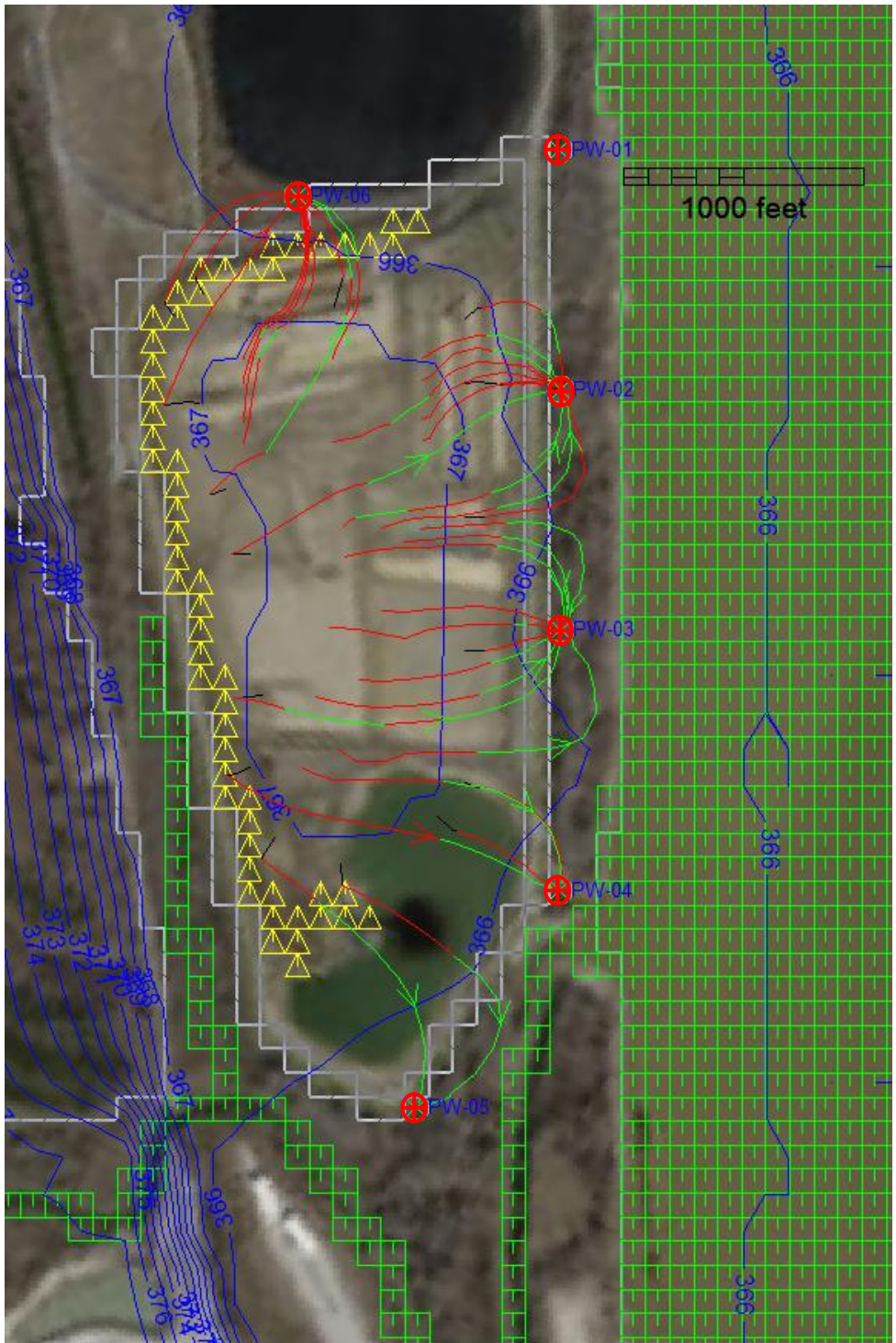
TITLE

**STEADY-STATE GROUNDWATER MODEL PREDICTIONS
HISTORICAL (NO CAP) AND FUTURE (WITH CAP)
CONDITIONS WITH FORWARD PARTICLE FLOW PATHS**

PROJECT No.
1531406

REV.
A

FIGURE
10



367 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Proposed Pumping Wells for Hydraulic Containment

PW-01 Proposed Pumping Well

6 Proposed Pumping Wells
 Approx. 1000 foot spacing
 Screened from Very Shallow Alluvium to Intermediate Alluvium
 Upward Vertical Hydraulic Gradient predicted in Deep Alluvium near each well

Predicted hydraulic containment of RCPA particles and inward hydraulic gradient from the Mississippi River toward the RCPA maintained based on:
 Each Well Pumping Rate = 13 gpm
 Total Pumping Rate = 78 gpm

Model Boundary Condition Cells

	Drain
	River

- NOTE(S)
1. Steady-state groundwater model predictions.
 2. Mississippi River at steady-state equivalent river stage of 366 feet above mean sea level.
 3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
 4. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1 x 10⁻⁶ cm/s soil cover.

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PROJECT
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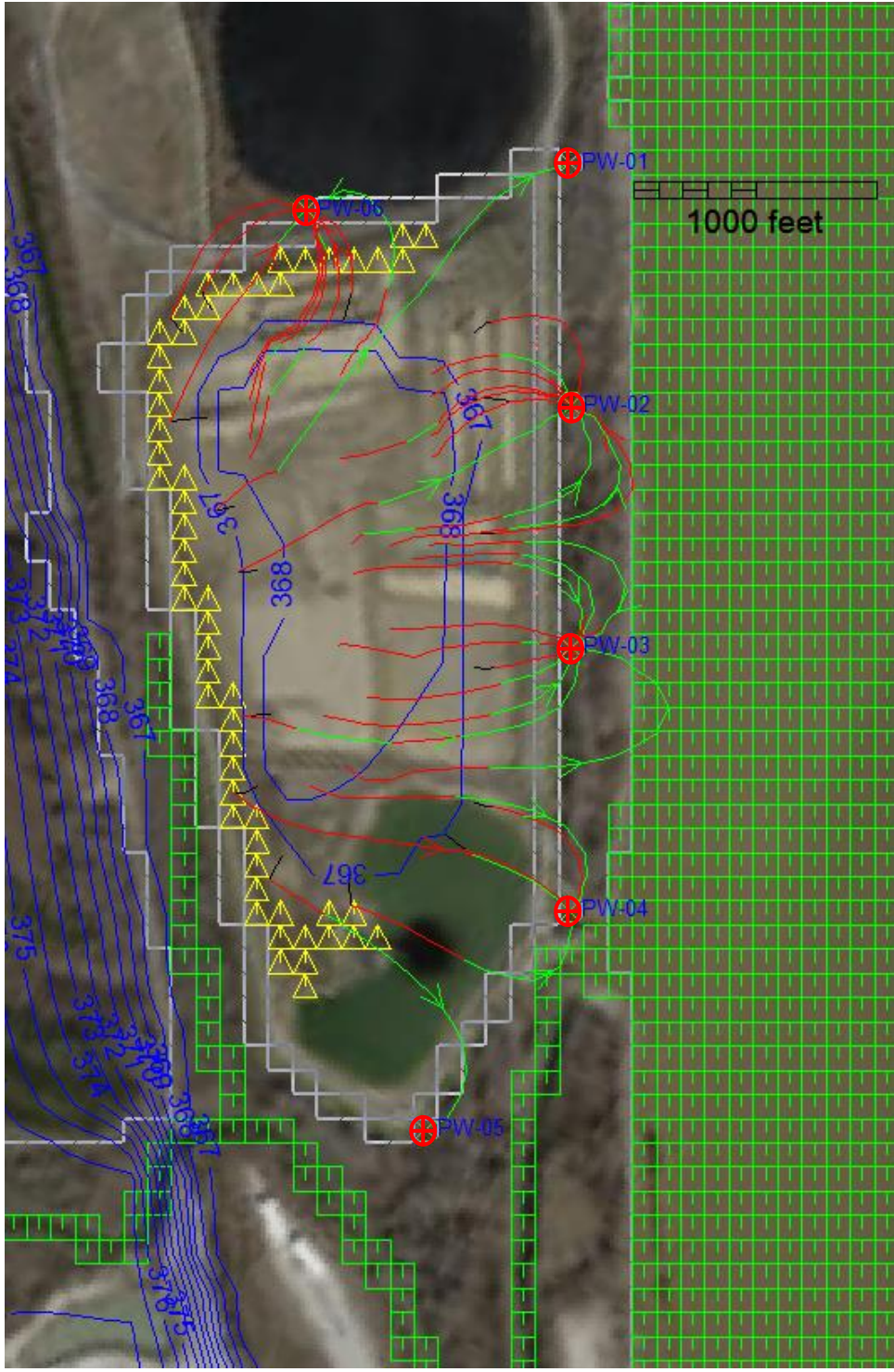
YYYY-MM-DD	2019-01-15
PREPARED	RT
DESIGNED	RT
REVIEWED	JM
APPROVED	MNH


TITLE
**STEADY-STATE GROUNDWATER MODEL PREDICTIONS
 CAPPED RCPA WITH SIX PROPOSED PUMPING WELLS,
 RIVER STAGE 366 FEET AMSL**

PROJECT NO.
 1531406




REV.
 A

FIGURE
 11



 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Proposed Pumping Wells for Hydraulic Containment



 **PW-01** Proposed Pumping Well

6 Proposed Pumping Wells
 Approx. 1000 foot spacing
 Screened from Very Shallow Alluvium to Intermediate Alluvium
 Upward Vertical Hydraulic Gradient predicted in Deep Alluvium near each well

Predicted hydraulic containment of RCPA particles based on:
 Each Well Pumping Rate = **10.4 gpm**
 Total Pumping Rate = **62.3 gpm**

Inward hydraulic gradient from the Mississippi River toward the RCPA not maintained

Model Boundary Condition Cells

	Drain
	River

- NOTE(S)
1. Steady-state groundwater model predictions.
 2. Mississippi River at steady-state equivalent river stage of 366 feet above mean sea level.
 3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
 4. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1×10^{-6} cm/s soil cover.

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PROJECT
GROUNDWATER MONITORING PROGRAM

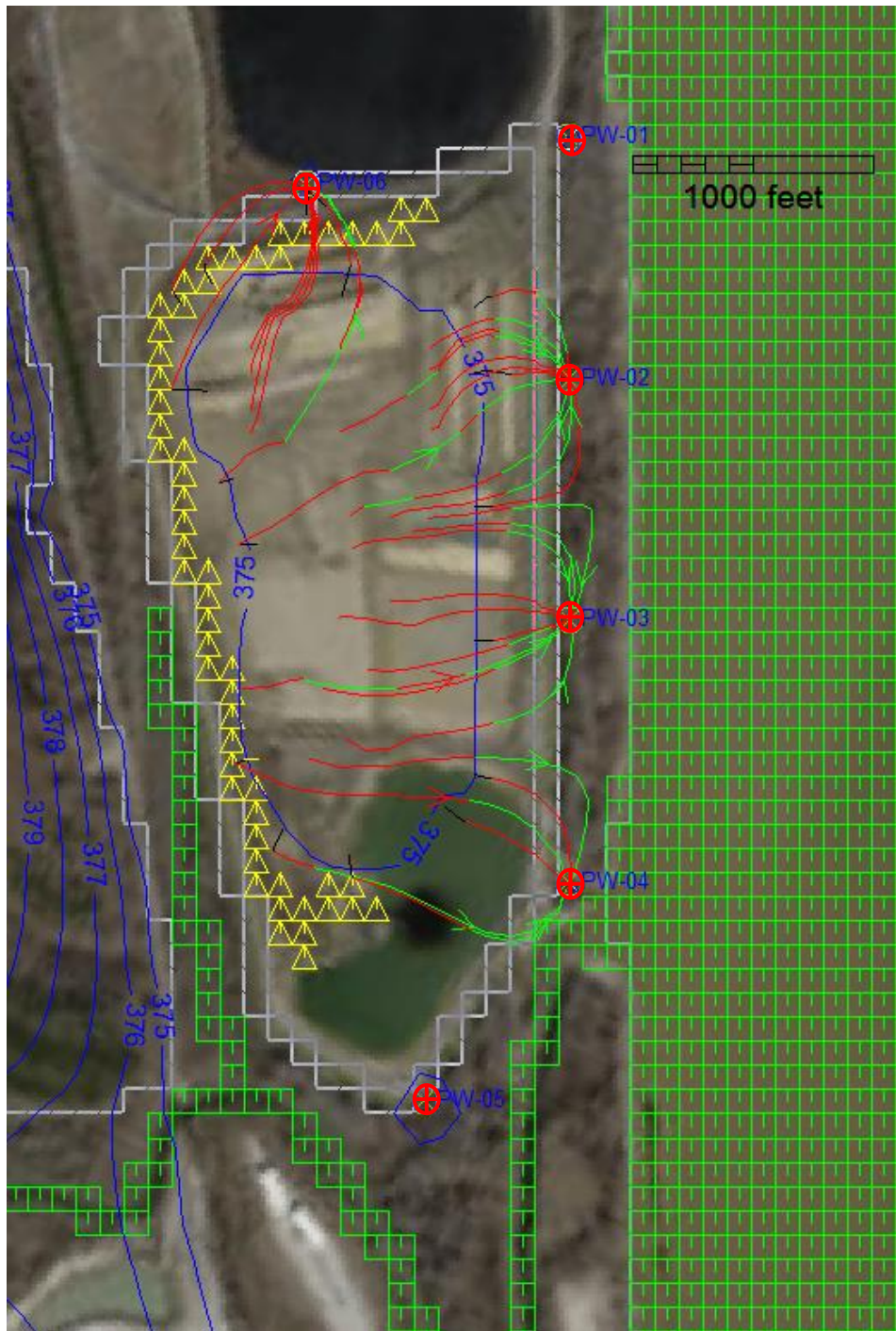
CONSULTANT



YYYY-MM-DD	2019-01-15
PREPARED	RT
DESIGNED	RT
REVIEWED	JM
APPROVED	MNH

TITLE
STEADY-STATE GROUNDWATER MODEL PREDICTIONS
CAPPED RCPA WITH SIX PROPOSED PUMPING WELLS,
RIVER STAGE 366 FEET AMSL, NO INWARD HYD GRADIENT

PROJECT NO.	REV.	FIGURE
1531406	A	12



367 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Proposed Pumping Wells for Hydraulic Containment

PW-01 Proposed Pumping Well

6 Proposed Pumping Wells
 Approx. 1000 foot spacing
 Screened from Very Shallow Alluvium to Intermediate Alluvium
 Upward Vertical Hydraulic Gradient predicted in Deep Alluvium near each well

Predicted hydraulic containment of RCPA particles and inward hydraulic gradient from the Mississippi River toward the RCPA maintained based on:
 Each Well Pumping Rate = **14.5 gpm**
 Total Pumping Rate = **87.3 gpm**

Model Boundary Condition Cells

	Drain
	River

- NOTE(S)
1. Steady-state groundwater model predictions.
 2. Mississippi River at long-term average river stage of 374.2 feet above mean sea level.
 3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
 4. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1 x 10⁻⁶ cm/s soil cover.

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YYYY-MM-DD 2019-01-15

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DESIGNED RT

REVIEWED JM

APPROVED MNH

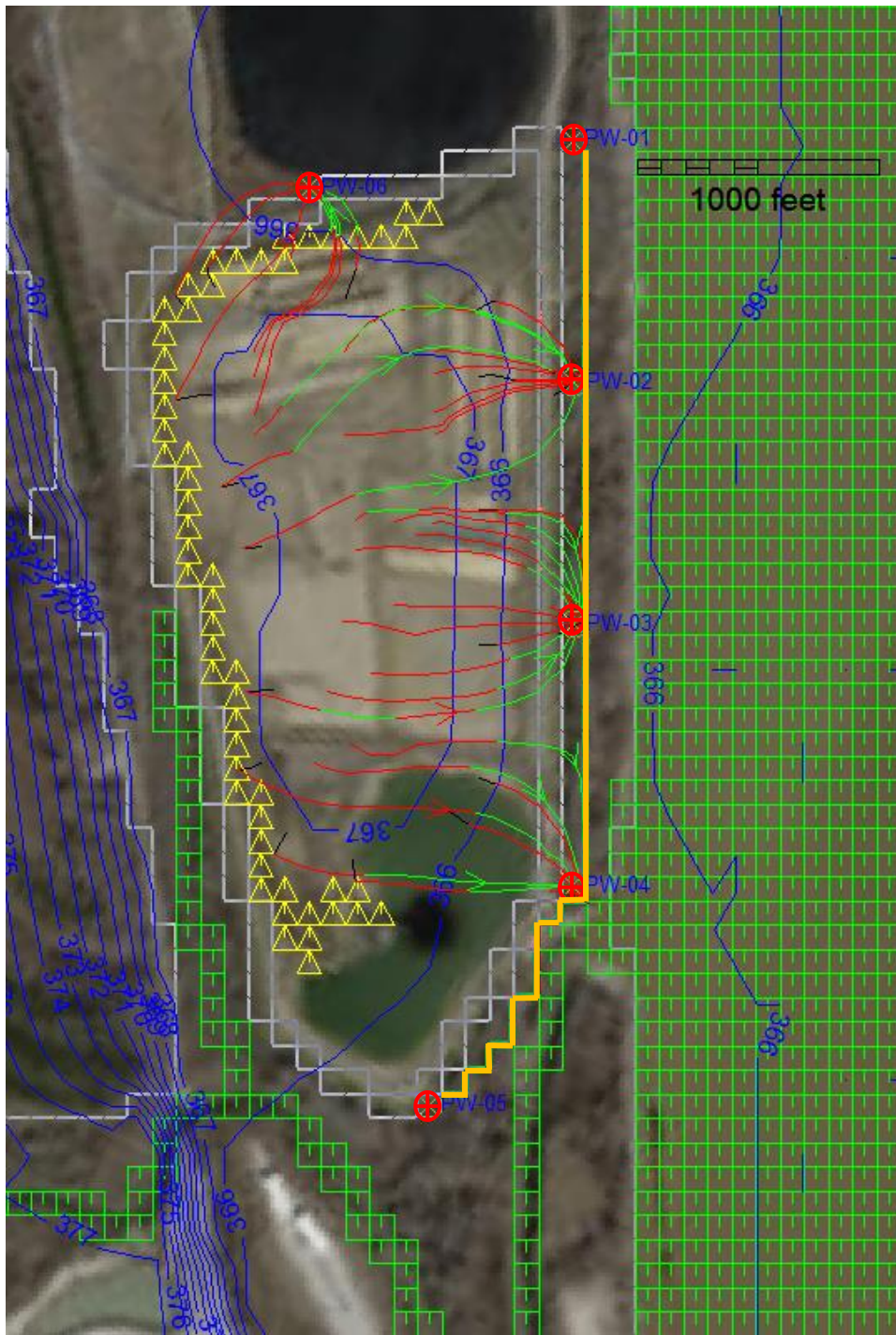
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**STEADY-STATE GROUNDWATER MODEL PREDICTIONS
 CAPPED RCPA WITH SIX PROPOSED PUMPING WELLS,
 LONG-TERM AVG RIVER STAGE 374.2 FEET AMSL**

PROJECT NO.
1531406

REV.
A

FIGURE
13



367 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Proposed Pumping Wells for Hydraulic Containment

PW-01 Proposed Pumping Well

6 Proposed Pumping Wells
 Approx. 1000 foot spacing
 Screened from Very Shallow Alluvium to Intermediate Alluvium
 Upward Vertical Hydraulic Gradient predicted in Deep Alluvium near each well

Predicted hydraulic containment of RCPA particles and inward hydraulic gradient from the Mississippi River toward the RCPA maintained based on:
 Proposed Slurry Wall
 Each Well Pumping Rate = **10.4 gpm**
 Total Pumping Rate = **62.3 gpm**

Model Boundary Condition Cells

- Drain
- River
- Proposed Slurry Wall
 Constructed from Very Shallow Alluvium to Deep Alluvium/
 Top of Bedrock
 2 foot thick wall
 Hydraulic Conductivity = 1×10^{-6} cm/s

- NOTE(S)
1. Steady-state groundwater model predictions.
 2. Mississippi River at steady-state equivalent river stage of 366 feet above mean sea level.
 3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
 4. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1×10^{-6} cm/s soil cover.

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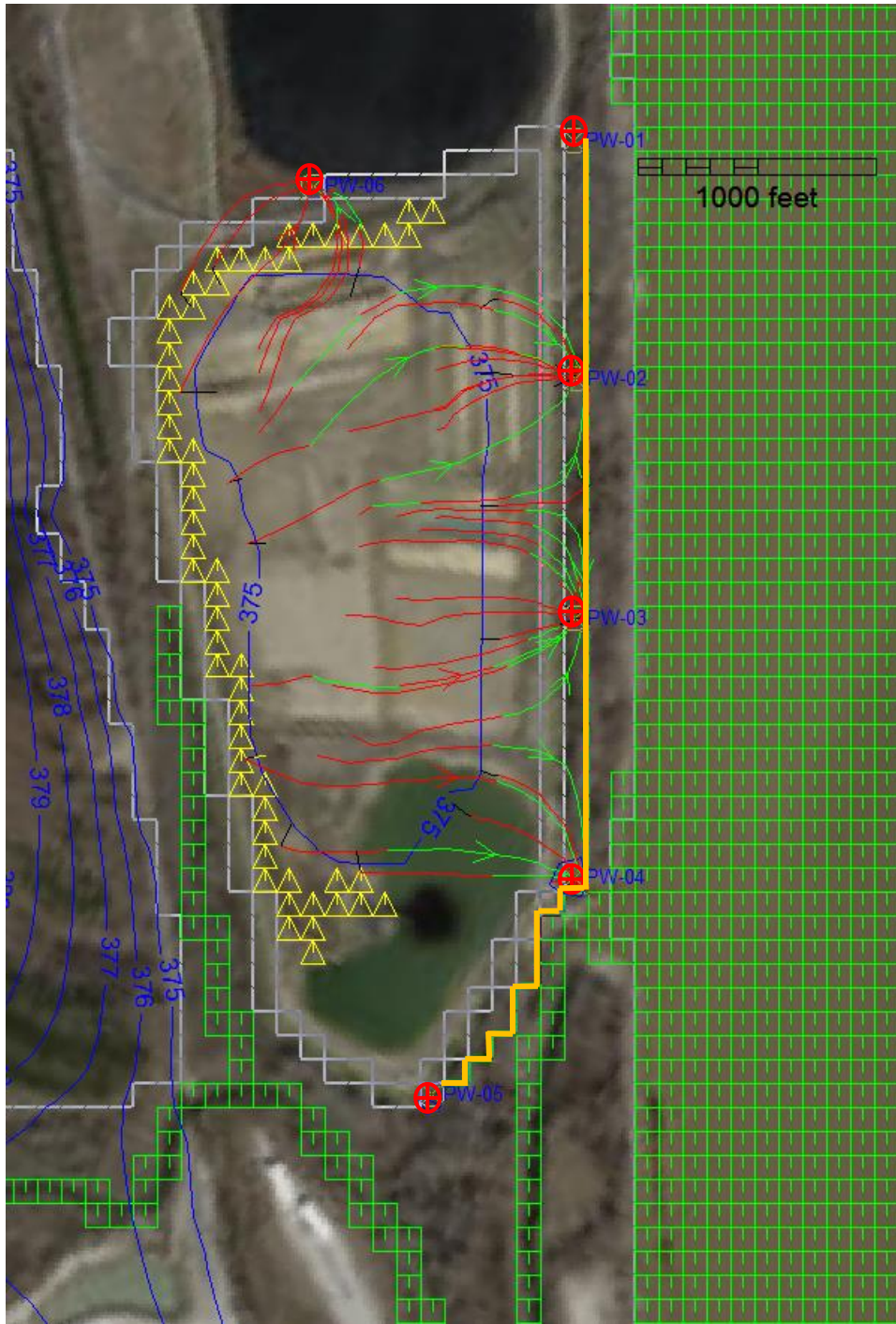
YYYY-MM-DD	2019-01-15
PREPARED	RT
DESIGNED	RT
REVIEWED	JM
APPROVED	MNH

TITLE
**STEADY-STATE GROUNDWATER MODEL PREDICTIONS
 CAPPED RCPA WITH SLURRY WALL AND PROPOSED
 PUMPING WELLS, RIVER STAGE 366 FEET AMSL**

PROJECT NO.
1531406

REV.
A

FIGURE
14



367 Predicted Potentiometric Surface Contour (feet above mean sea level)

Particle Trace Colors

	RCPA or Shallow Alluvium
	RCPA or Intermediate Alluvium
	Intermediate/Deep Alluvium

Proposed Pumping Wells for Hydraulic Containment

PW-01 Proposed Pumping Well

6 Proposed Pumping Wells
 Approx. 1000 foot spacing
 Screened from Very Shallow Alluvium to Intermediate Alluvium
 Upward Vertical Hydraulic Gradient predicted in Deep Alluvium near each well

Predicted hydraulic containment of RCPA particles and inward hydraulic gradient from the Mississippi River toward the RCPA maintained based on:
 Proposed Slurry Wall
 Each Well Pumping Rate = **10.4 gpm**
 Total Pumping Rate = **62.3 gpm**

Model Boundary Condition Cells

- Drain
- River
- Proposed Slurry Wall
 Constructed from Very Shallow Alluvium to Deep Alluvium/
 Top of Bedrock
 2 foot thick wall
 Hydraulic Conductivity = 1×10^{-6} cm/s

- NOTE(S)
1. Steady-state groundwater model predictions.
 2. Mississippi River at long-term average river stage of 374.2 feet above mean sea level.
 3. Particles distributed along the outside edge of the RCPA in each model ash layer. See Figure GW-1 for details on starting particle locations.
 4. Cap model includes 7.0 inches/year recharge to the RCPA based on Haley & Aldrich 2018 HELP model net infiltration prediction for 1×10^{-6} cm/s soil cover.

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YYYY-MM-DD	2019-01-15
PREPARED	RT
DESIGNED	RT
REVIEWED	JM
APPROVED	MNH

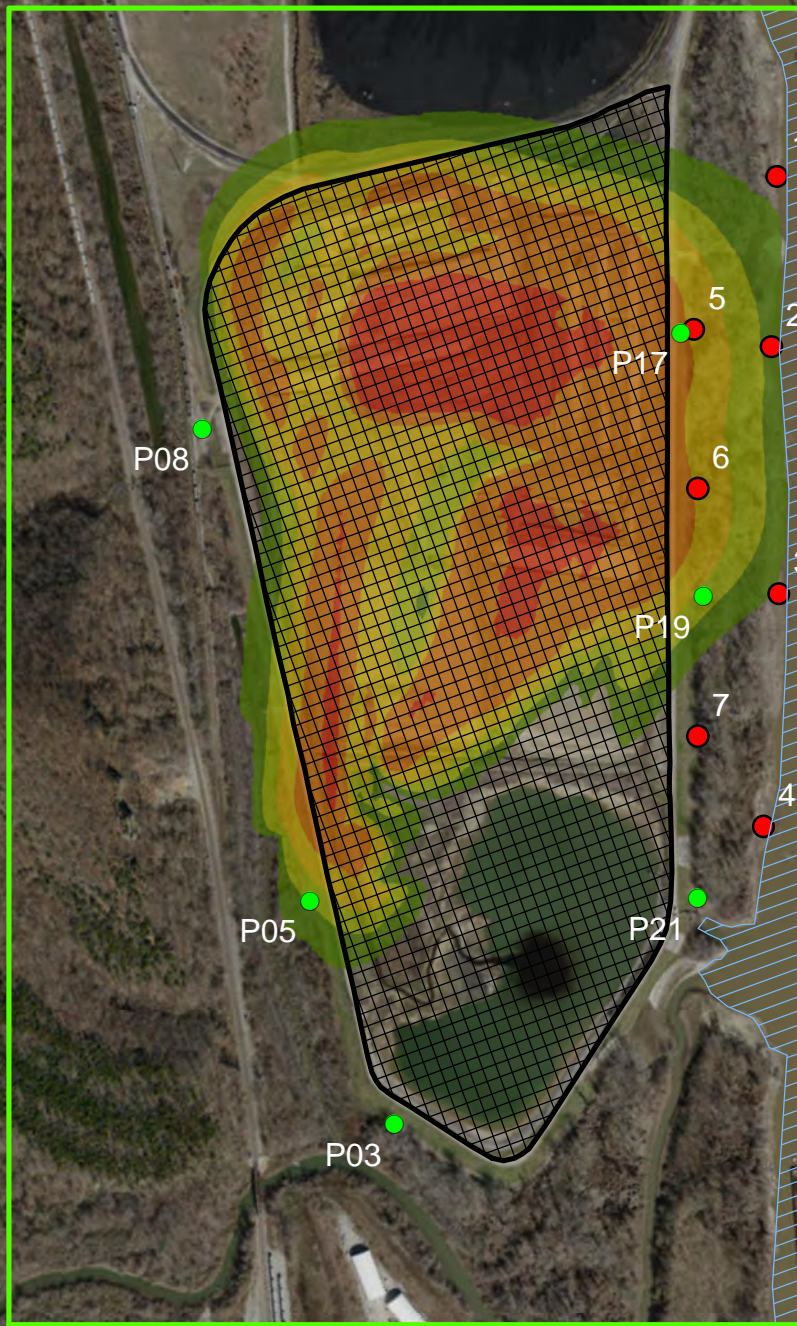
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STEADY-STATE GROUNDWATER MODEL PREDICTIONS
CAPPED RCPA WITH SLURRY WALL AND PROPOSED
PUMPING WELLS, LONG-TERM AVG RIVER STAGE

PROJECT NO.
1531406

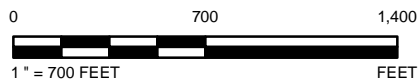
REV.
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FIGURE
15



LEGEND

- | | | | |
|--|-------------|--|----------------------|
| | 0.09 - 0.11 | | 0.01 - 0.03 |
| | 0.07 - 0.09 | | Monitoring Wells |
| | 0.05 - 0.07 | | Simulation Locations |
| | 0.03 - 0.05 | | RCPA |
| | | | Model Boundary |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



CONSULTANT	YYYY-MM-DD	2019-01-21
	DESIGNED	PJN
	PREPARED	PJN
	REVIEWED	JSI
	APPROVED	MNH

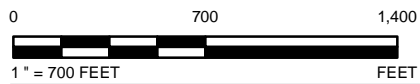
TITLE
**SIMULATED DISSOLVED ARSENIC 0 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	18



LEGEND

- | | | | |
|--|-------------|--|----------------------|
| | 0.01 - 0.03 | | Monitoring Wells |
| | 0.09 - 0.11 | | Simulation Locations |
| | 0.07 - 0.09 | | RCPA |
| | 0.05 - 0.07 | | Model Boundary |
| | 0.03 - 0.05 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
**SIMULATED DISSOLVED ARSENIC 5 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	19



LEGEND

- | | | | |
|--|-------------|--|----------------------|
| | 0.01 - 0.03 | | Monitoring Wells |
| | 0.09 - 0.11 | | Simulation Locations |
| | 0.07 - 0.09 | | RCPA |
| | 0.05 - 0.07 | | Model Boundary |
| | 0.03 - 0.05 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



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PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

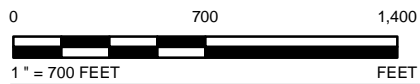
TITLE
**SIMULATED DISSOLVED ARSENIC 10 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	20



LEGEND

- | | | |
|-----------------------|--|----------------------|
| Arsenic (mg/L) | | 0.01 - 0.03 |
| | | Monitoring Wells |
| | | Simulation Locations |
| | | RCPA |
| | | Model Boundary |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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	DESIGNED	PJN
	PREPARED	PJN
	REVIEWED	JSI
	APPROVED	MNH

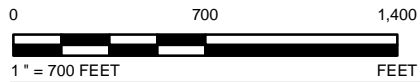
TITLE
**SIMULATED DISSOLVED ARSENIC 15 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	21



LEGEND

- | | | |
|-----------------------|----------------------|------------------|
| Arsenic (mg/L) | 0.01 - 0.03 | Monitoring Wells |
| 0.09 - 0.11 | Simulation Locations | |
| 0.07 - 0.09 | RCPA | |
| 0.05 - 0.07 | Model Boundary | |
| 0.03 - 0.05 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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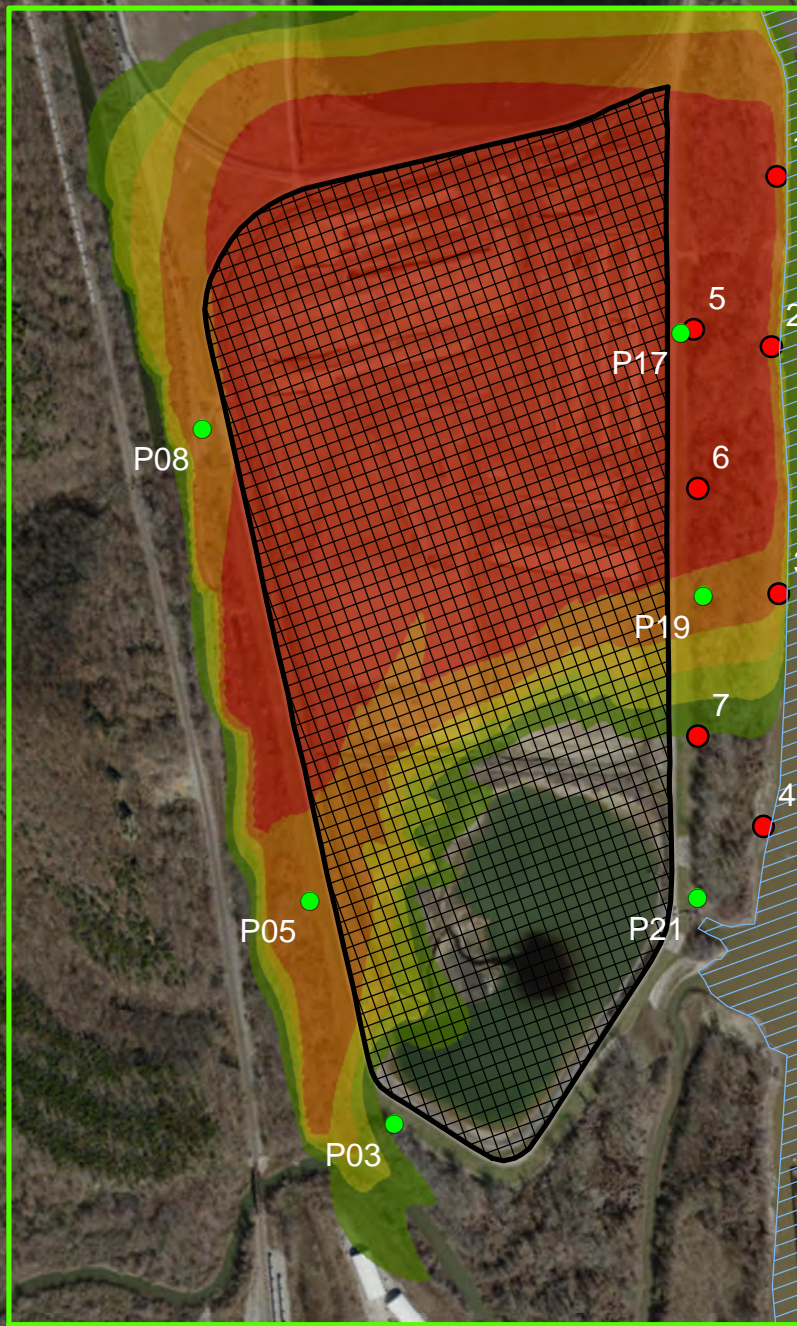
PROJECT
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YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
SIMULATED DISSOLVED ARSENIC 20 YEARS POST CAP INTERMEDIATE (330FT AMSL) DEPTH

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	22



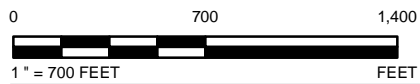
MISSISSIPPI RIVER

LEGEND

Molybdenum (mg/L)

- 0.3 - 0.35
- 0.25 - 0.3
- 0.2 - 0.25
- 0.15 - 0.2

- 0.1 - 0.15
- Monitoring Wells
- Simulation Locations
- RCPA
- Model Boundary



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.312 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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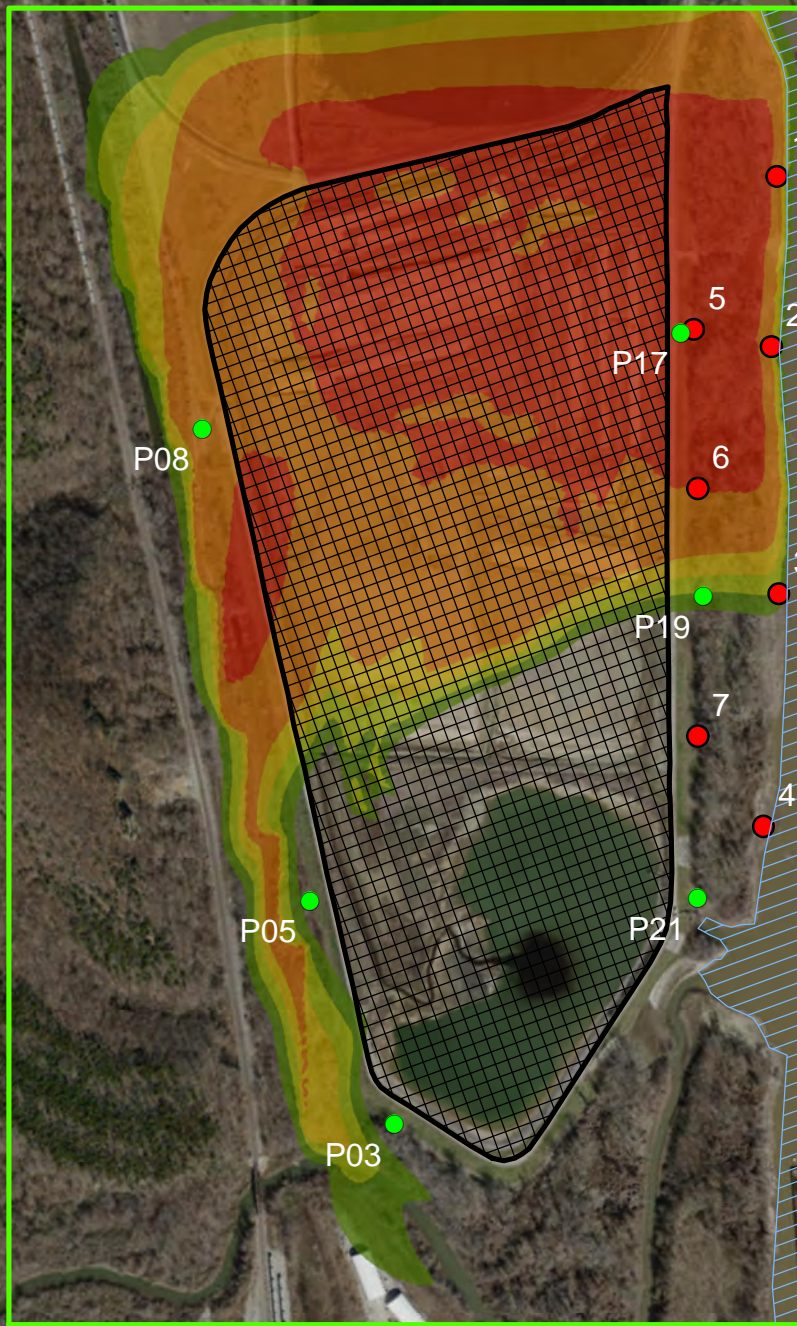


PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE	SIMULATED DISSOLVED MOLYBDENUM 0 YEARS POST CAP INTERMEDIATE (330FT AMSL) DEPTH		
PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	23

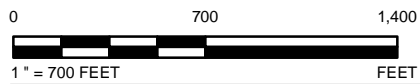


LEGEND

Molybdenum (mg/L)

- 0.3 - 0.35
- 0.25 - 0.3
- 0.2 - 0.25
- 0.15 - 0.2

- 0.1 - 0.15
- Monitoring Wells
- Simulation Locations
- RCPA
- Model Boundary



NOTE(S)

1. CONSTANT SOURCE CONCENTRATION OF 0.312 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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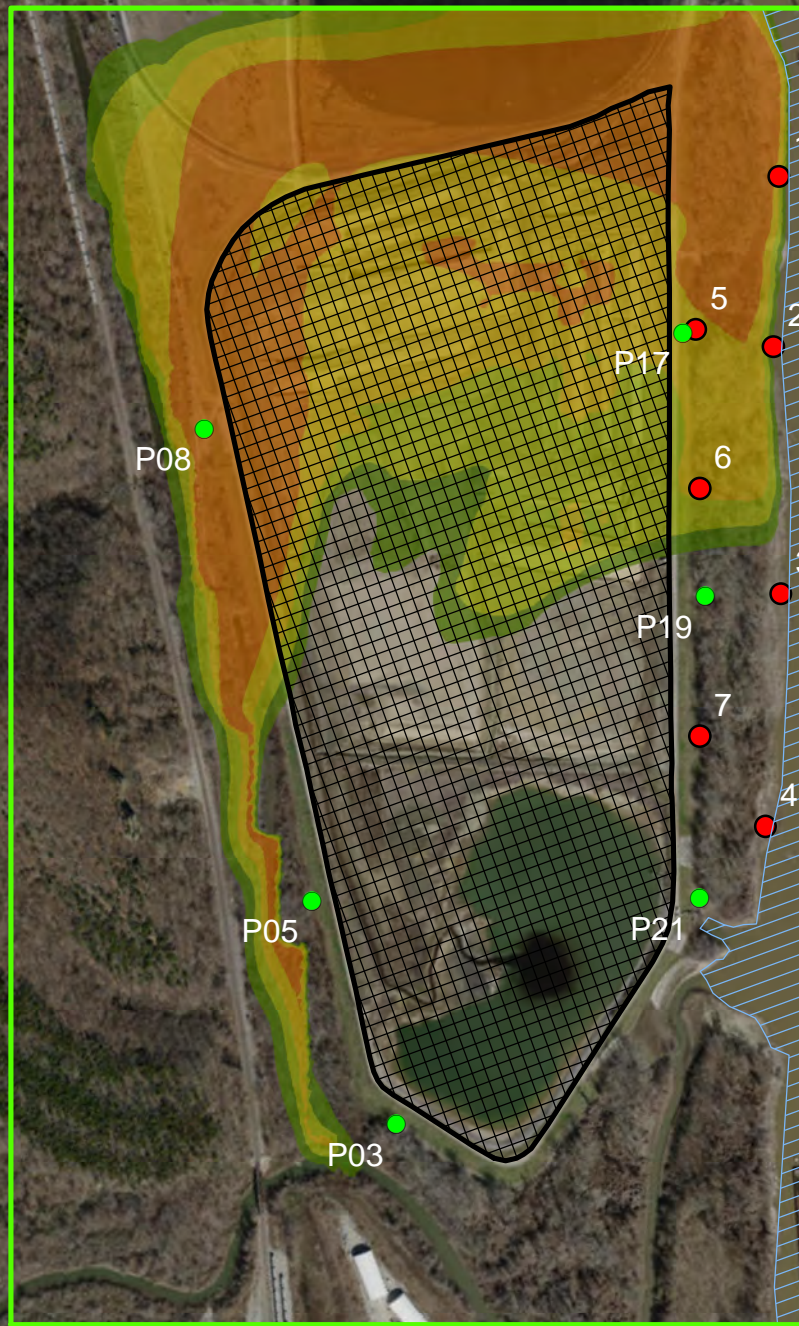
PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



CONSULTANT	YYYY-MM-DD	2019-01-21
	DESIGNED	PJN
	PREPARED	PJN
	REVIEWED	JSI
	APPROVED	MNH

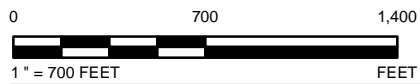
TITLE
SIMULATED DISSOLVED MOLYBDENUM 5 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	24



LEGEND

- | | | |
|--------------------------|------------------------|--------------------|
| Molybdenum (mg/L) | 0.1 - 0.15 | ● Monitoring Wells |
| 0.3 - 0.35 | ● Simulation Locations | |
| 0.25 - 0.3 | ▨ RCPA | |
| 0.2 - 0.25 | ▭ Model Boundary | |
| 0.15 - 0.2 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.312 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

CLIENT
**AMEREN MISSOURI
RUSH ISLAND ENERGY CENTER**



PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



CONSULTANT	YYYY-MM-DD	2019-01-21
	DESIGNED	PJN
	PREPARED	PJN
	REVIEWED	JSI
	APPROVED	MNH

TITLE
**SIMULATED DISSOLVED MOLYBDENUM 10 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

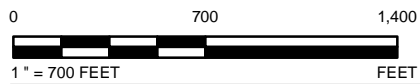
PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	25



MISSISSIPPI RIVER

LEGEND

- | | | |
|--------------------------|------------------------|--------------------|
| Molybdenum (mg/L) | 0.1 - 0.15 | ● Monitoring Wells |
| 0.3 - 0.35 | ● Simulation Locations | ▣ RCPA |
| 0.25 - 0.3 | ▣ Model Boundary | |
| 0.2 - 0.25 | | |
| 0.15 - 0.2 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.312 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

CLIENT
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PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



CONSULTANT	YYYY-MM-DD	2019-01-21
DESIGNED	PJN	
PREPARED	PJN	
REVIEWED	JSI	
APPROVED	MNH	

TITLE
**SIMULATED DISSOLVED MOLYBDENUM 15 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

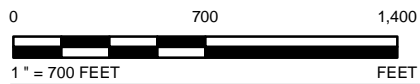
PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	26



MISSISSIPPI RIVER

LEGEND

- | | | |
|--------------------------|------------|----------------------|
| Molybdenum (mg/L) | 0.1 - 0.15 | Monitoring Wells |
| 0.3 - 0.35 | 0.25 - 0.3 | Simulation Locations |
| 0.25 - 0.3 | 0.2 - 0.25 | RCPA |
| 0.2 - 0.25 | 0.15 - 0.2 | Model Boundary |
| 0.15 - 0.2 | | |



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.312 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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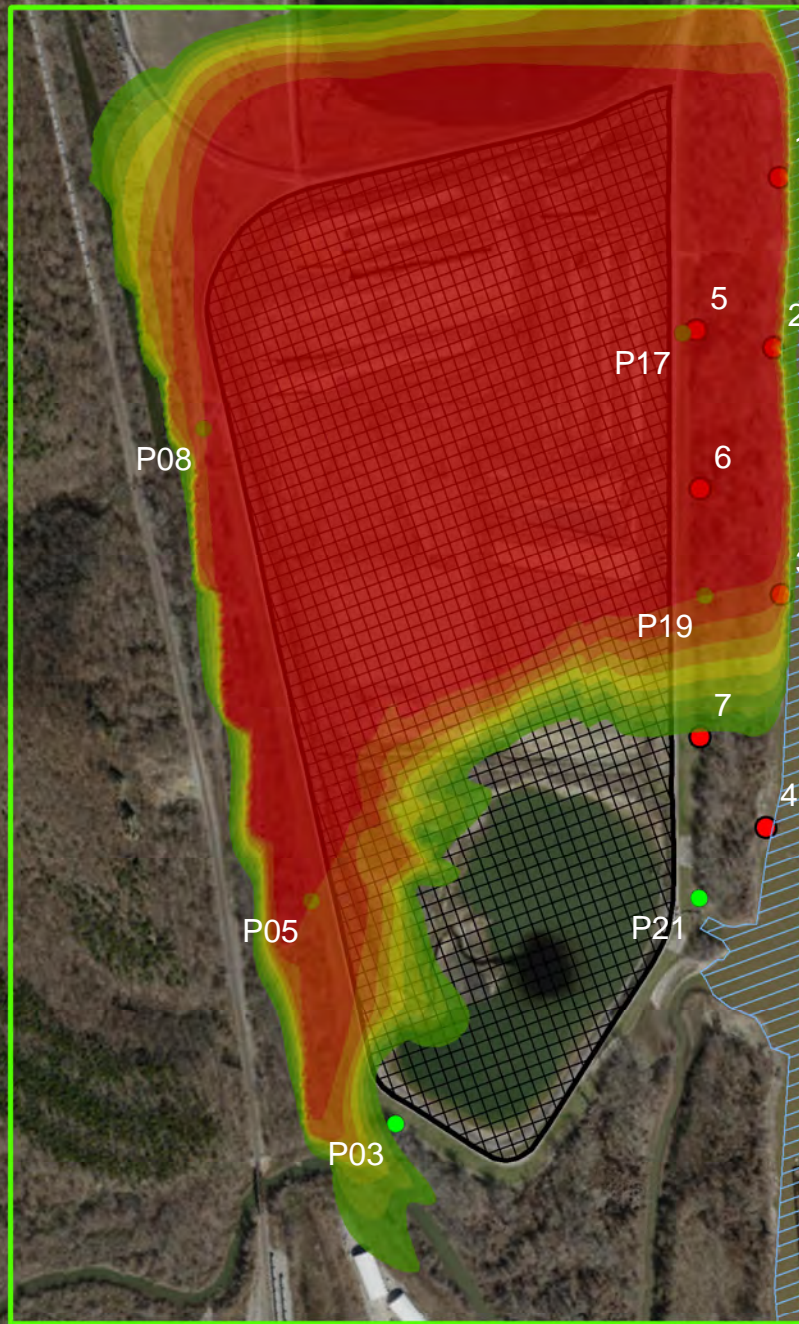


PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE	SIMULATED DISSOLVED MOLYBDENUM 20 YEARS POST CAP INTERMEDIATE (330FT AMSL) DEPTH		
PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	27



LEGEND

Boron (mg/L)	3.5 - 4.0	Monitoring Wells
5.5 - 6.0	3.0 - 3.5	Simulation Locations
5.0 - 5.5	2.5 - 3.0	RCPA
4.5 - 5.0	2.0 - 2.5	Model Boundary
4.0 - 4.5		



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 6.0 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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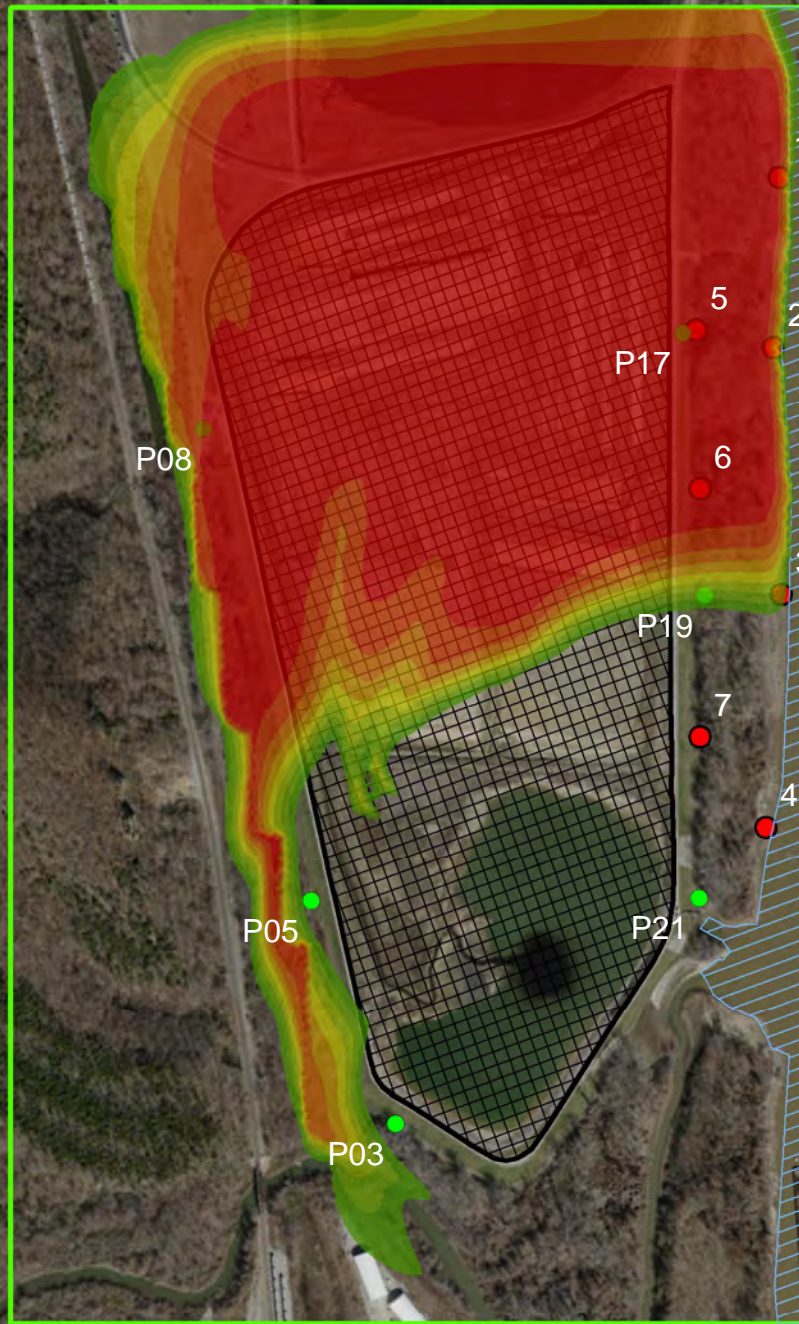
PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
**SIMULATED DISSOLVED BORON 0 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	28



LEGEND

Boron (mg/L)	3.5 - 4.0	Simulation Locations
5.5 - 6.0	3.0 - 3.5	Model Boundary
5.0 - 5.5	2.5 - 3.0	RCPA
4.5 - 5.0	2.0 - 2.5	Monitoring Wells
4.0 - 4.5		



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 6.0 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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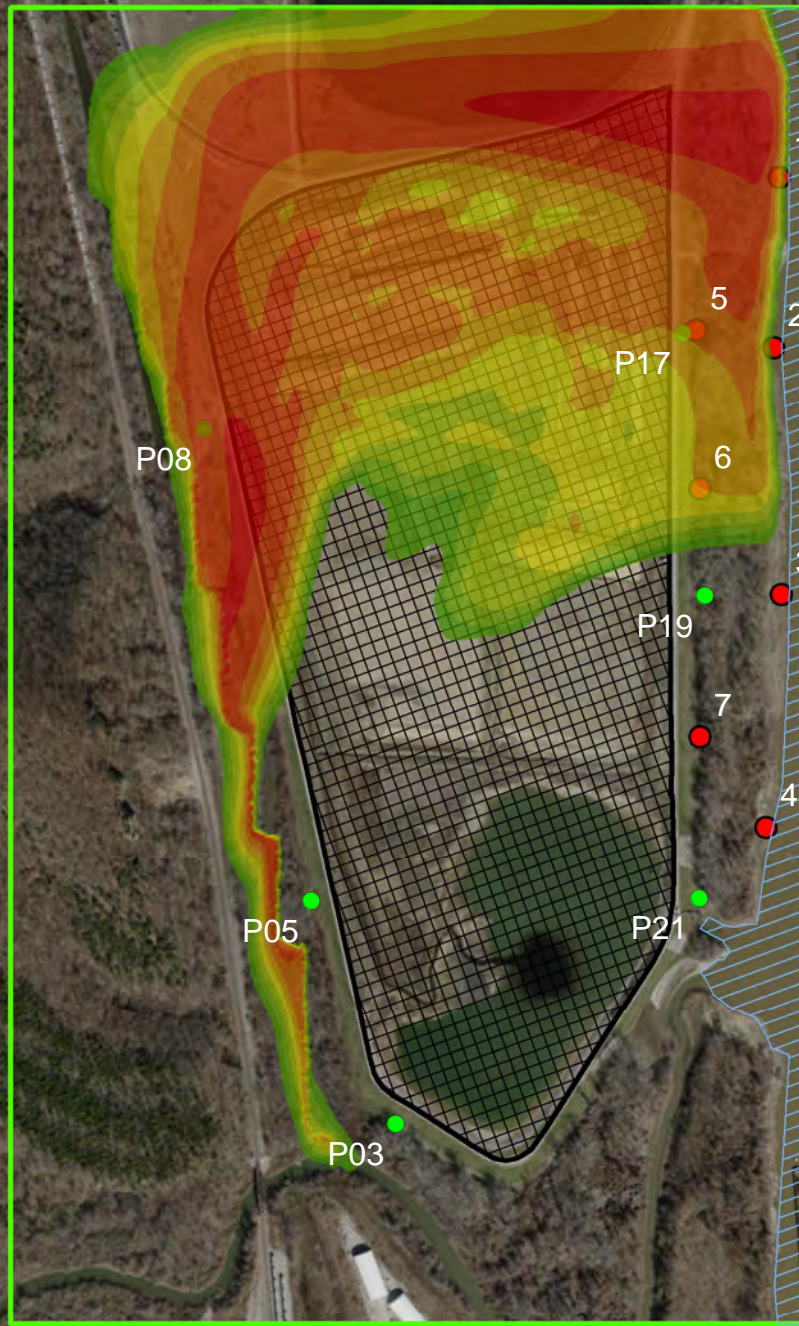
PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
**SIMULATED DISSOLVED BORON 5 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	29



MISSISSIPPI RIVER

LEGEND

	5.5 - 6.0		3.5 - 4.0		Simulation Locations
	5.0 - 5.5		3.0 - 3.5		Model Boundary
	4.5 - 5.0		2.5 - 3.0		RCPA
	4.0 - 4.5		2.0 - 2.5		Monitoring Wells

0 700 1,400



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 6.0 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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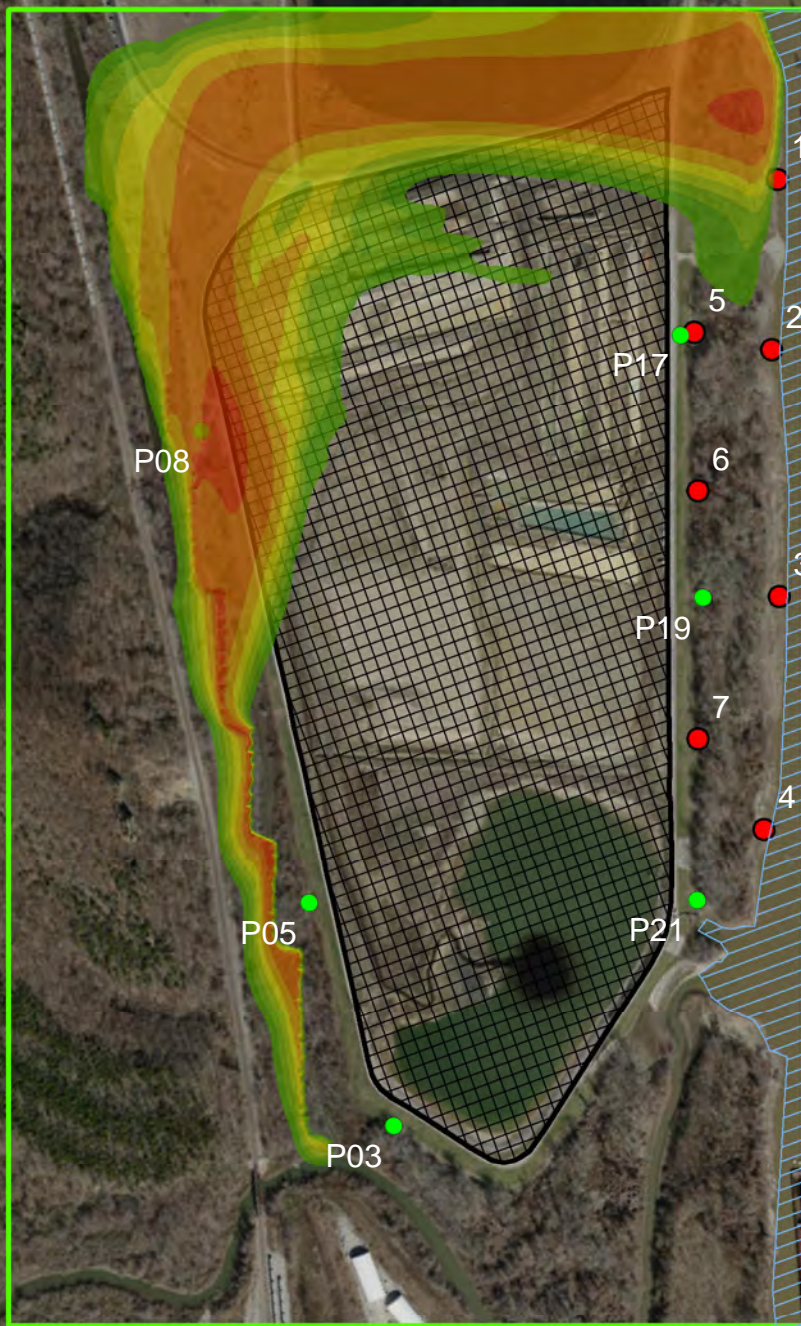
PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
**SIMULATED DISSOLVED BORON 10 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	30



MISSISSIPPI RIVER

LEGEND

	5.5 - 6.0		3.5 - 4.0		Simulation Locations
	5.0 - 5.5		3.0 - 3.5		Model Boundary
	4.5 - 5.0		2.5 - 3.0		RCPA
	4.0 - 4.5		2.0 - 2.5		Monitoring Wells



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 6.0 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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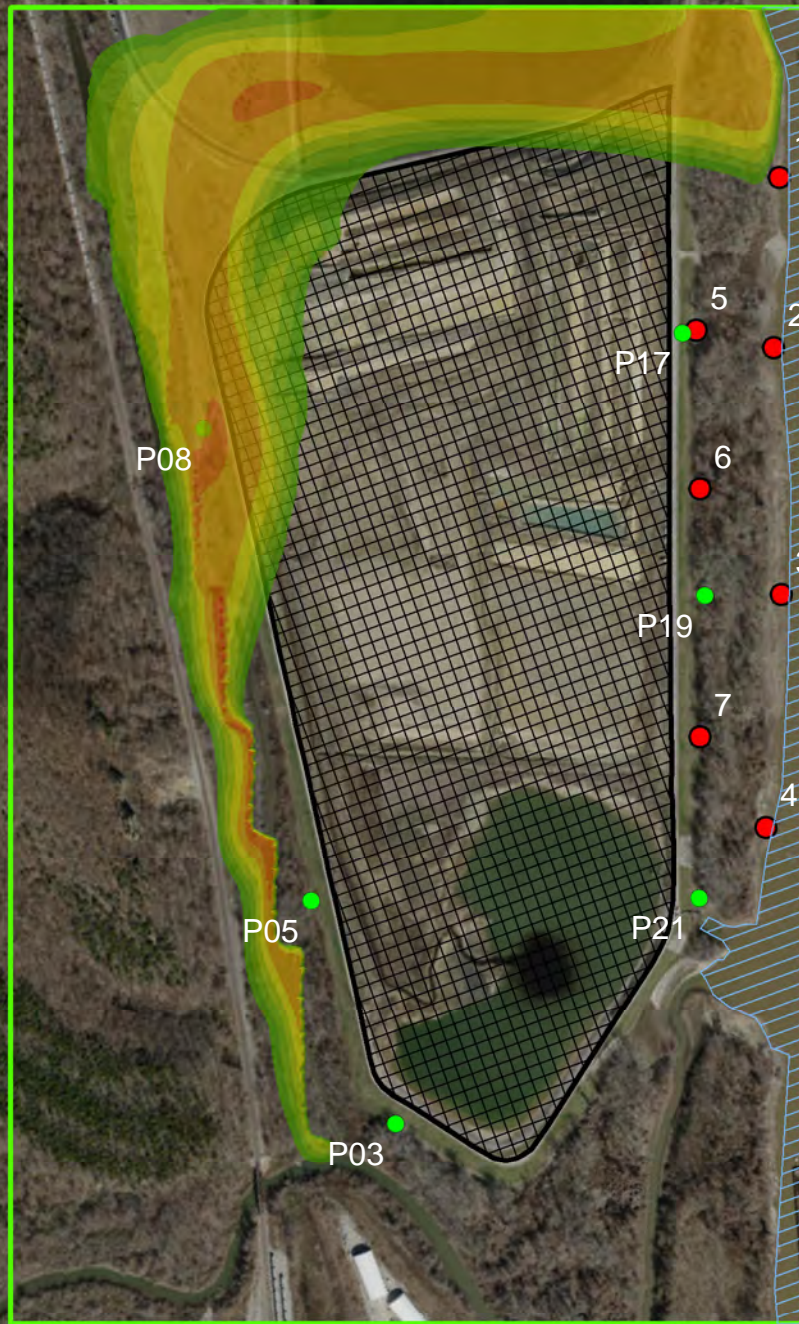
PROJECT
**GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS**



CONSULTANT	YYYY-MM-DD	2019-01-21
DESIGNED		PJN
PREPARED		PJN
REVIEWED		JSI
APPROVED		MNH

TITLE
**SIMULATED DISSOLVED BORON 15 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	31



MISSISSIPPI RIVER

LEGEND

5.5 - 6.0	3.5 - 4.0	Simulation Locations
5.0 - 5.5	3.0 - 3.5	Model Boundary
4.5 - 5.0	2.5 - 3.0	RCPA
4.0 - 4.5	2.0 - 2.5	Monitoring Wells

0 700 1,400



NOTE(S)

1. CONSTANT SOURCE CONCENTRATION OF 6.0 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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PROJECT
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GEOCHEMICAL SIMULATIONS



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DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
SIMULATED DISSOLVED BORON 20 YEARS POST CAP
INTERMEDIATE (330FT AMSL) DEPTH

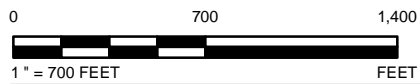
PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	32



MISSISSIPPI RIVER

LEGEND

Arsenic (mg/kg)	4.0 - 4.5	2.5 - 3.0	Monitoring Wells
3.5 - 4.0	2.0 - 2.5	1.5 - 2.0	Simulation Locations
3.0 - 3.5	1.0 - 1.5	RCPA	
	0.5 - 1.0	Model Boundary	



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)

- 1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
- 2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

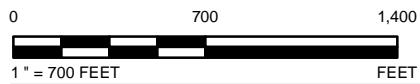
TITLE
**SIMULATED ATTENUATED ARSENIC AT CAP INSTALLATION
SHALLOW (375FT AMSL) DEPTH**

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	33



LEGEND

Arsenic (mg/kg)	2.5 - 3.0	● Monitoring Wells
4.0 - 4.5	2.0 - 2.5	● Simulation Locations
3.5 - 4.0	1.5 - 2.0	▨ RCPA
3.0 - 3.5	1.0 - 1.5	▭ Model Boundary
	0.5 - 1.0	



NOTE(S)
1. CONSTANT SOURCE CONCENTRATION OF 0.1 MG/L.

REFERENCE(S)
1.) AMEREN MISSOURI RUSH ISLAND ENERGY CENTER, RUSH ISLAND PROPERTY CONTROL MAP, JANUARY 2012.
2.) COORDINATE SYSTEM: NAD 1983 STATEPLANE MISSOURI EAST FIPS 2401 FEET

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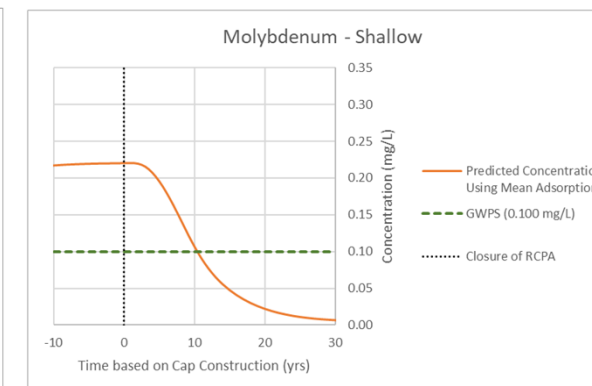
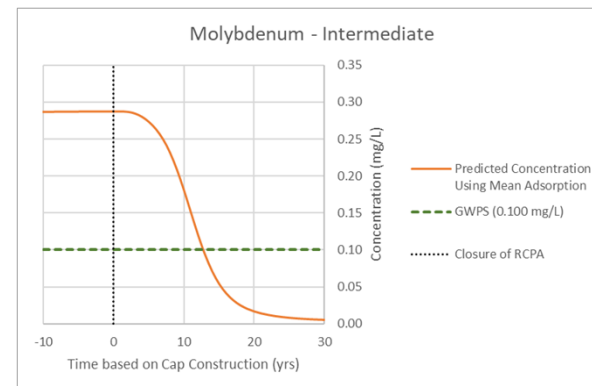
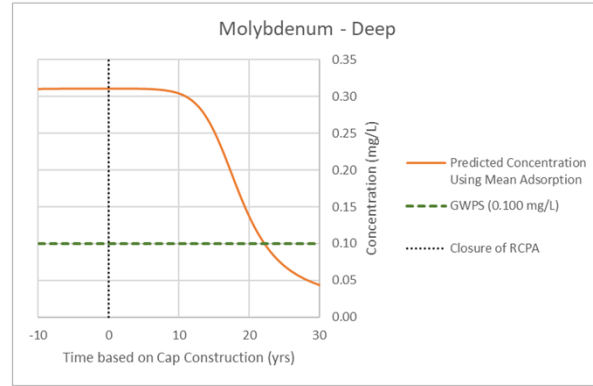
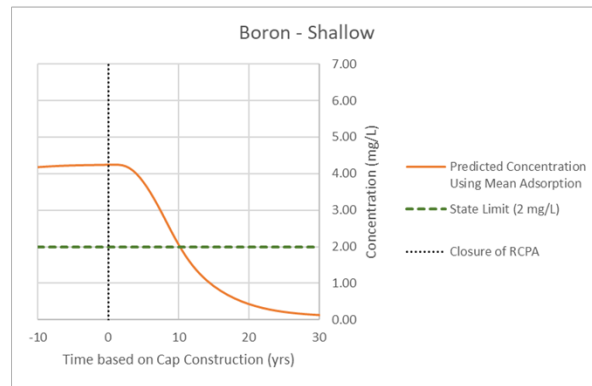
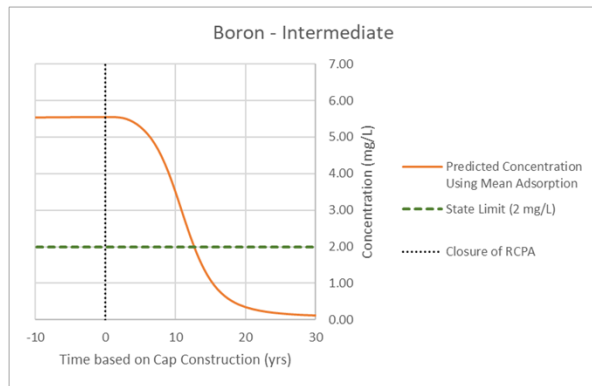
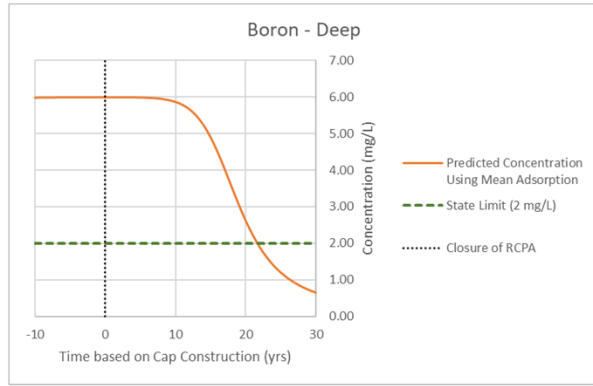
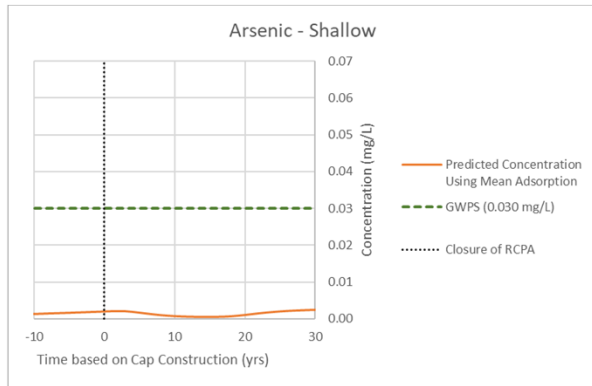
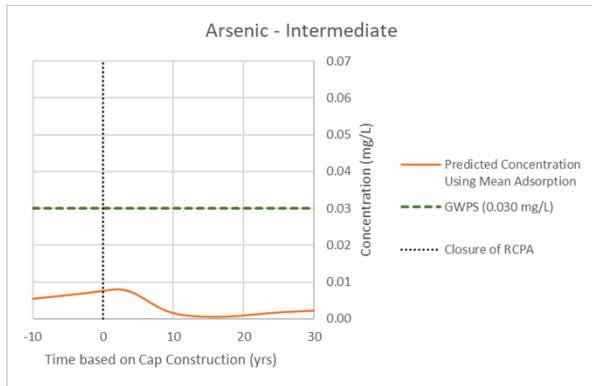
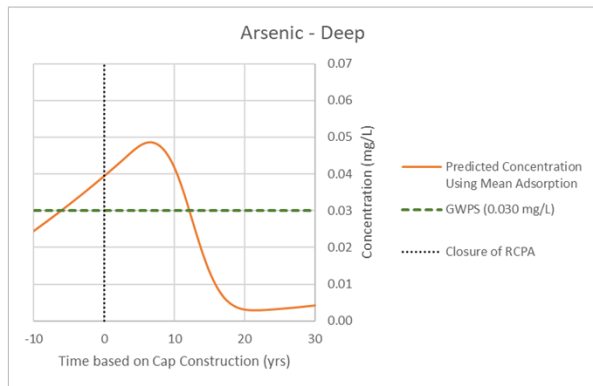
PROJECT
GROUNDWATER MODELING PROGRAM
GEOCHEMICAL SIMULATIONS



YYYY-MM-DD	2019-01-21
DESIGNED	PJN
PREPARED	PJN
REVIEWED	JSI
APPROVED	MNH

TITLE
SIMULATED ATTENUATED ARSENIC AT CAP INSTALLATION INTERMEDIATE (330FT AMSL) DEPTH

PROJECT NO.	PHASE	REV.	FIGURE
1531406	0002	1	34



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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PREPARED MSG

DESIGN MSG

REVIEW JAP

APPROVED MNH

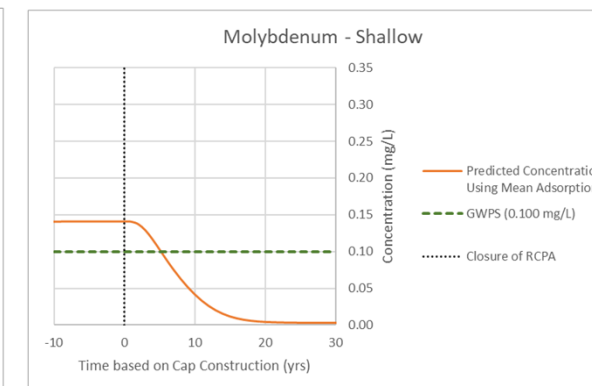
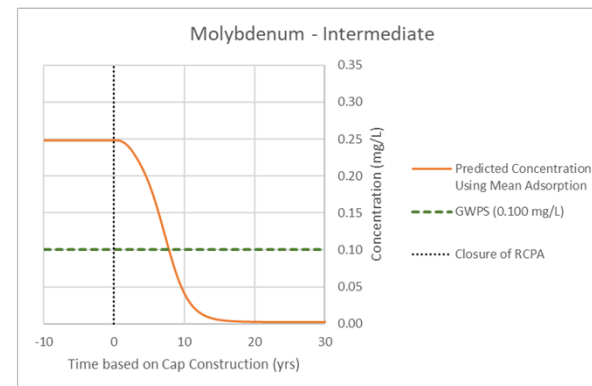
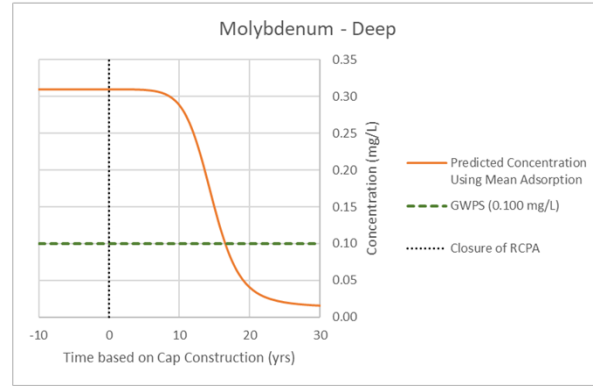
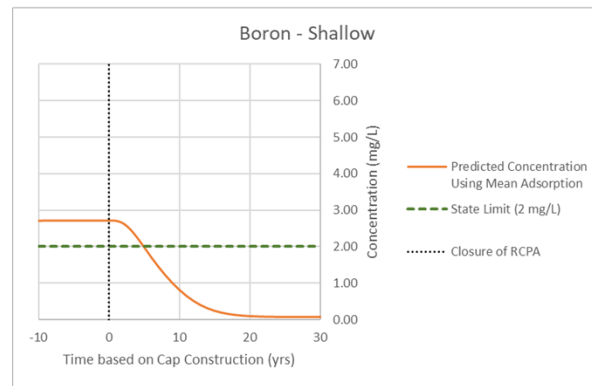
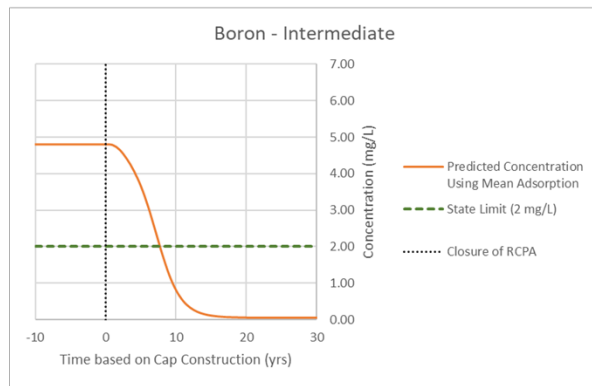
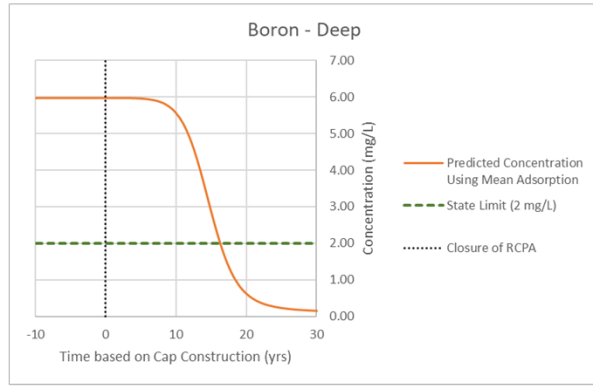
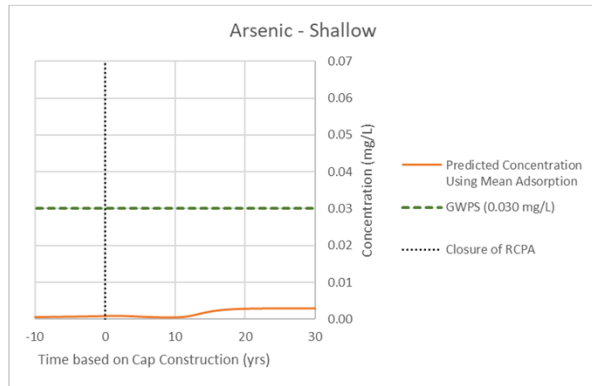
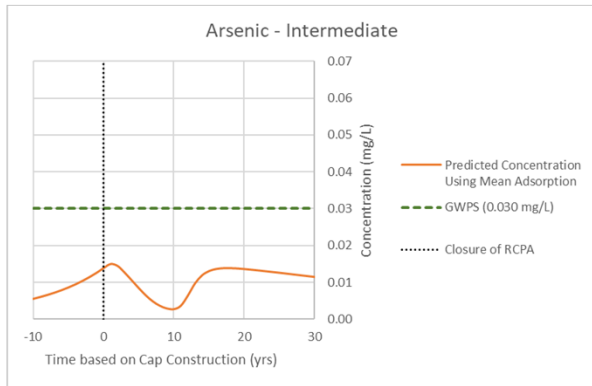
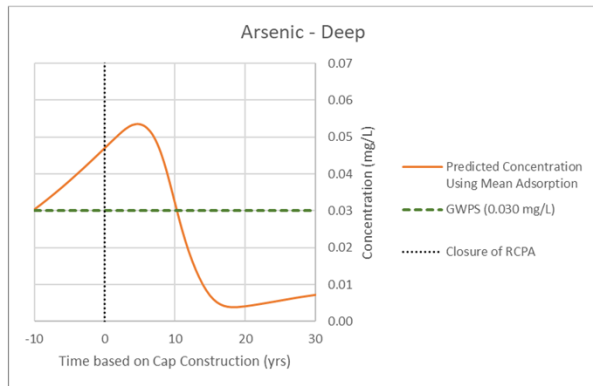
TITLE

**Time Series Plot
Average Concentrations at Location 1**

PROJECT No.
1531406

REV
A

Figure
35



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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YYYY-MM-DD	2019-01-21
PREPARED	MSG
DESIGN	MSG
REVIEW	JAP
APPROVED	MNH

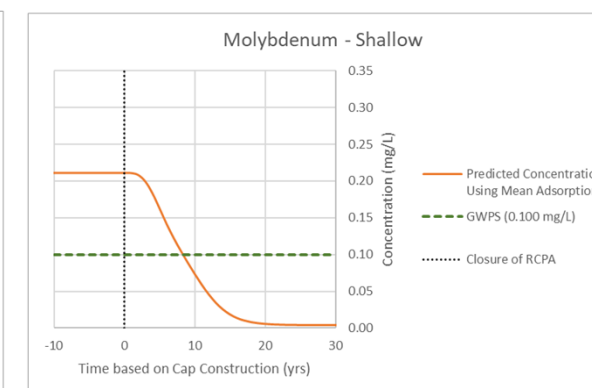
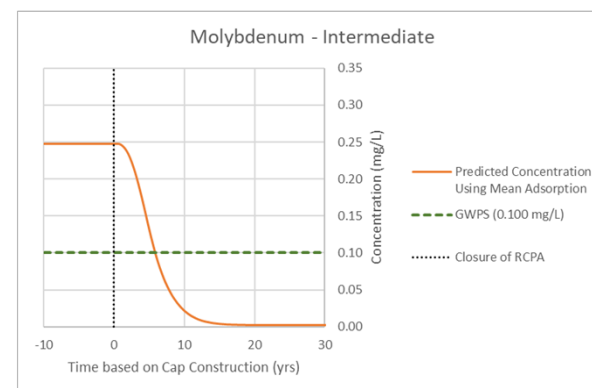
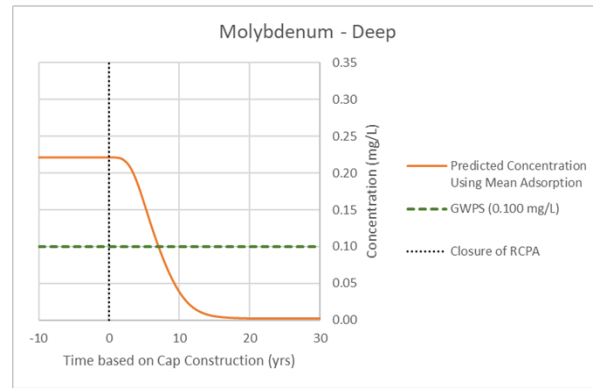
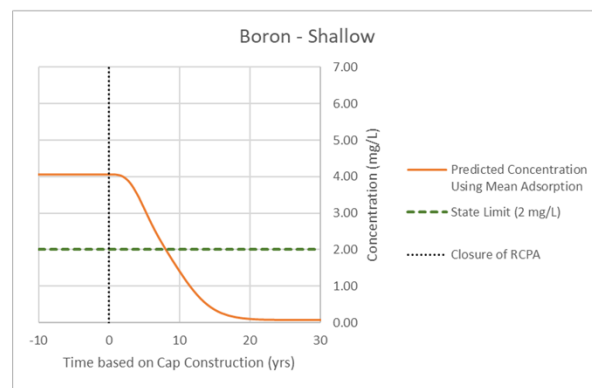
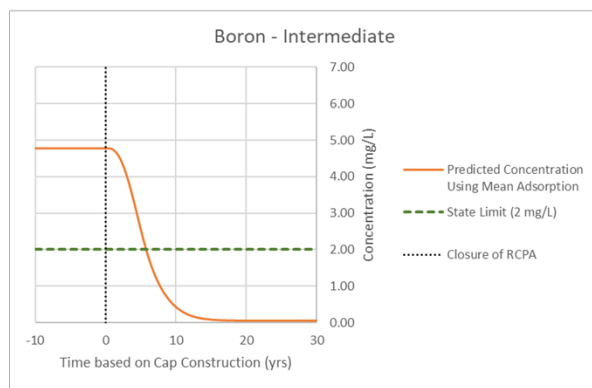
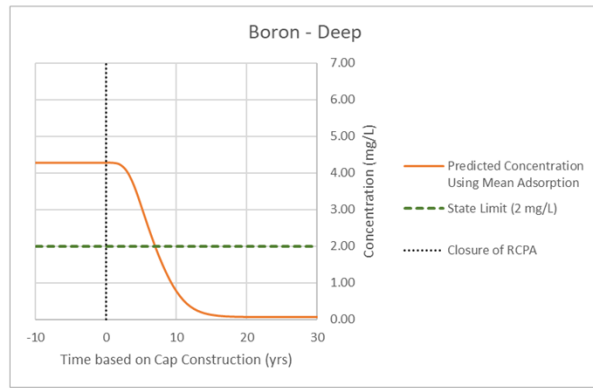
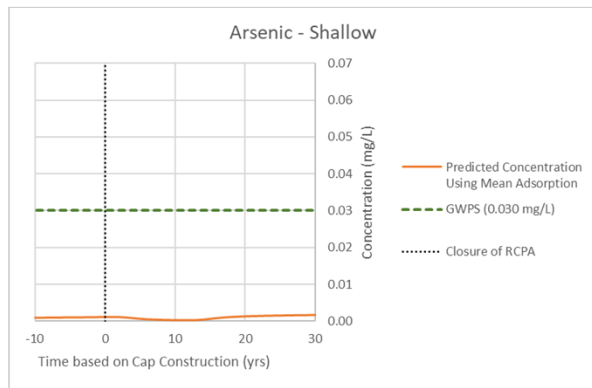
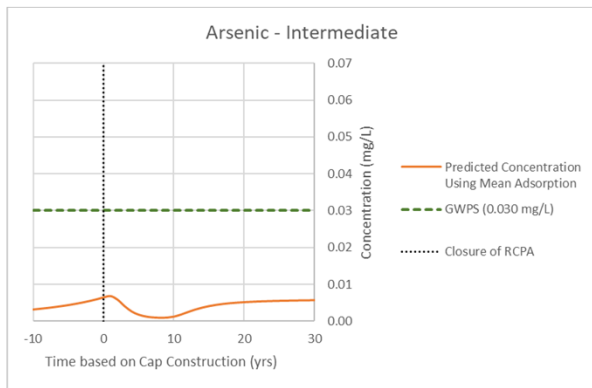
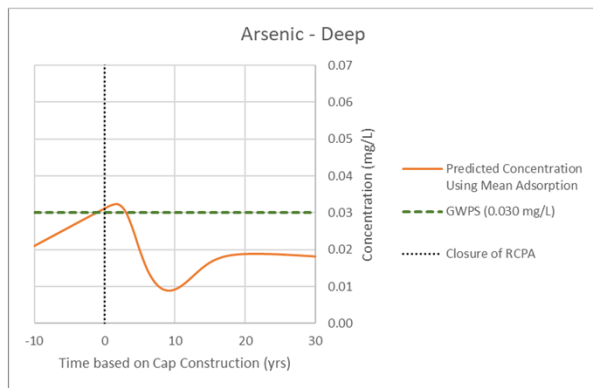
TITLE

**Time Series Plot
Average Concentrations at Location 2**

PROJECT No.
1531406

REV
A

Figure
36



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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PREPARED MSG

DESIGN MSG

REVIEW JAP

APPROVED MNH

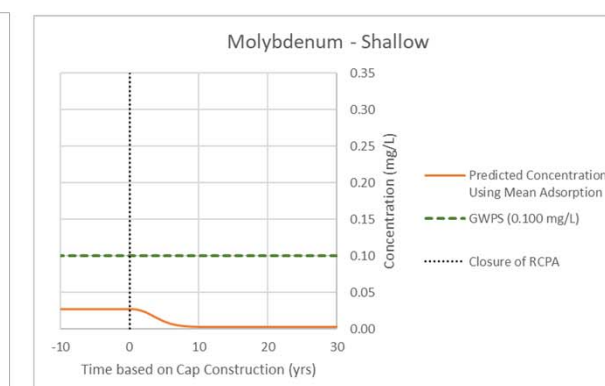
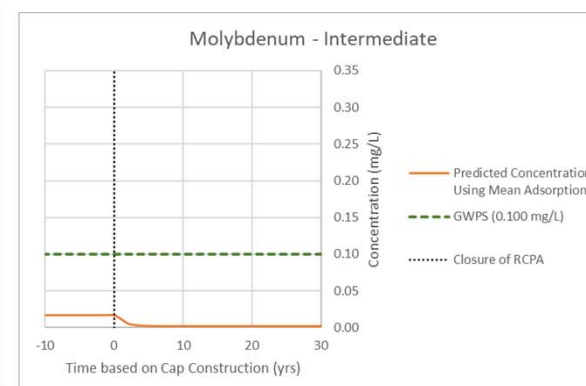
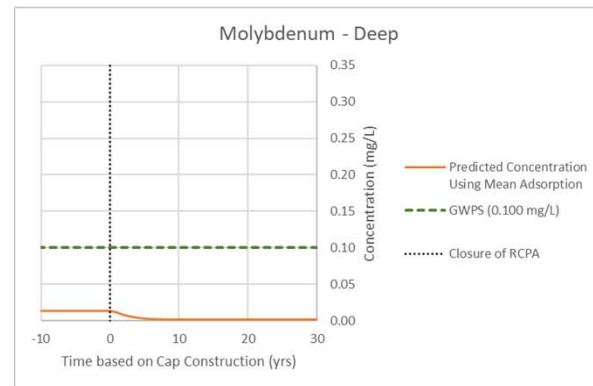
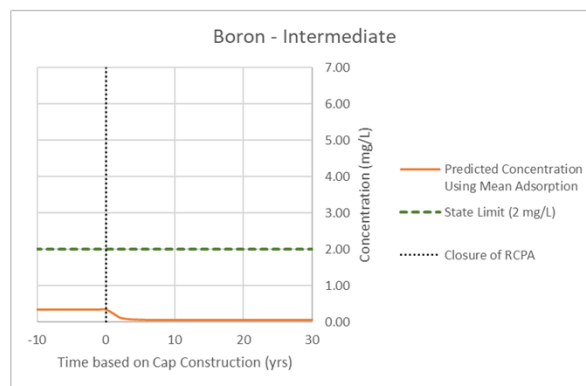
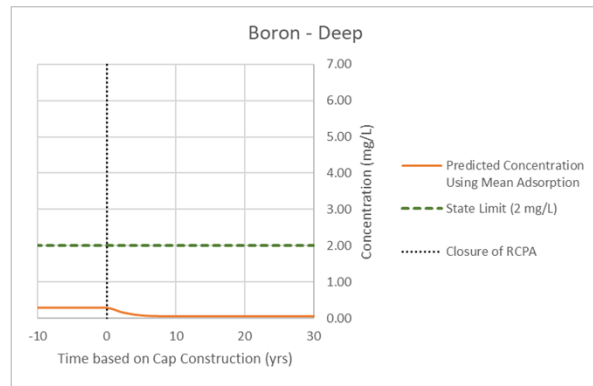
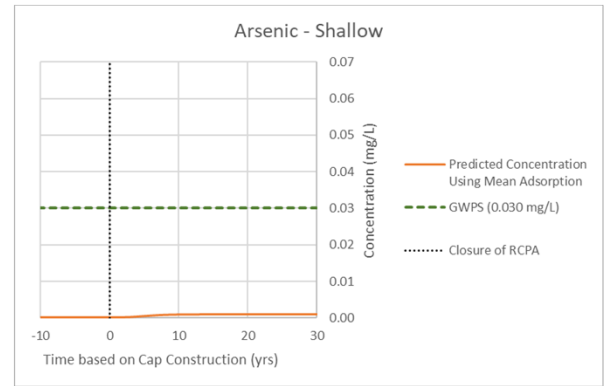
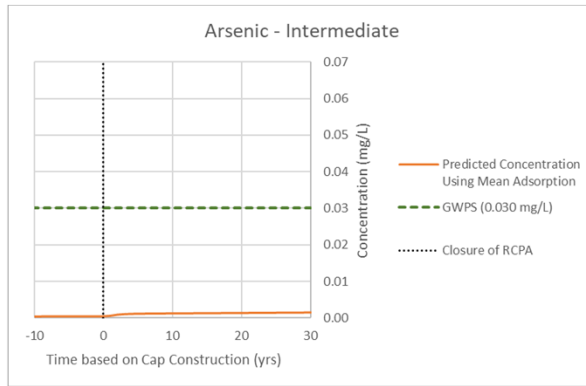
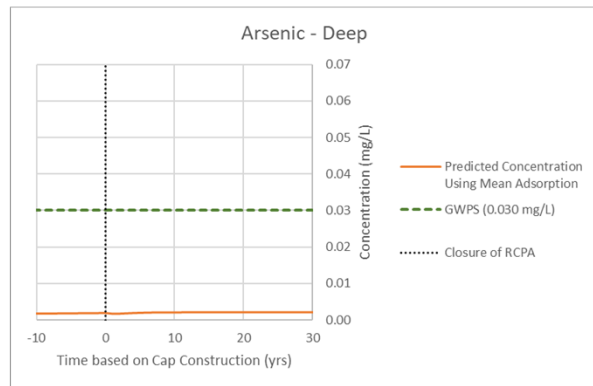
TITLE

**Time Series Plot
Average Concentrations at Location 3**

PROJECT No.
1531406

REV
A

Figure
37



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

CLIENT

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GROUNDWATER MONITORING PROGRAM

CONSULTANT



YYYY-MM-DD 2019-01-21

PREPARED MSG

DESIGN MSG

REVIEW JAP

APPROVED MNH

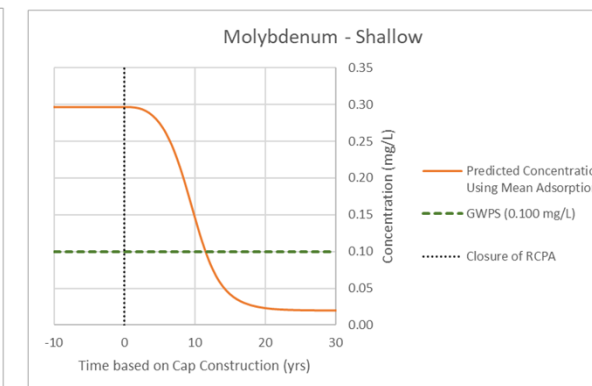
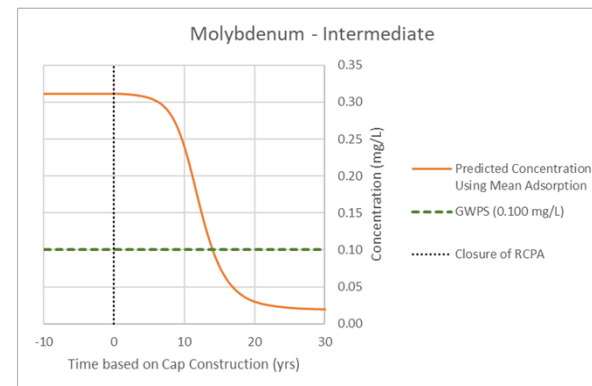
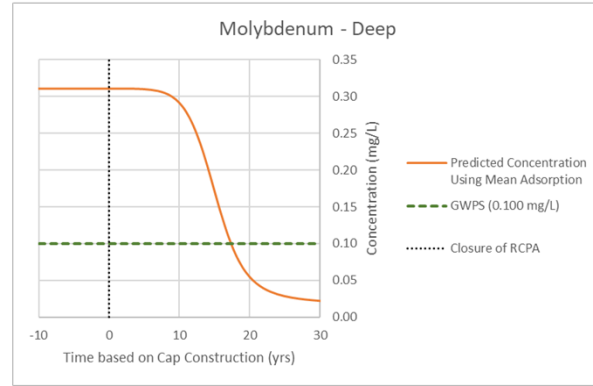
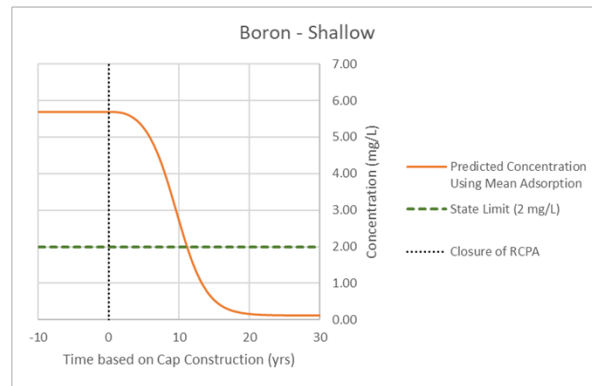
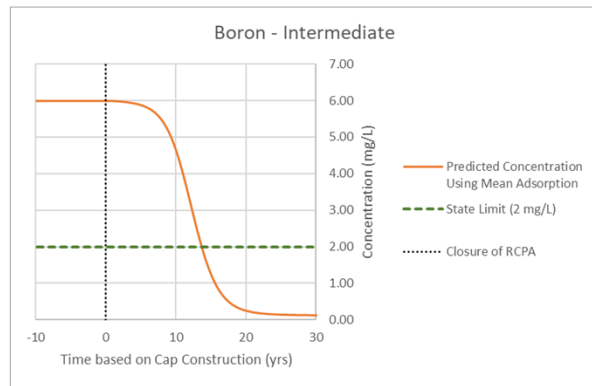
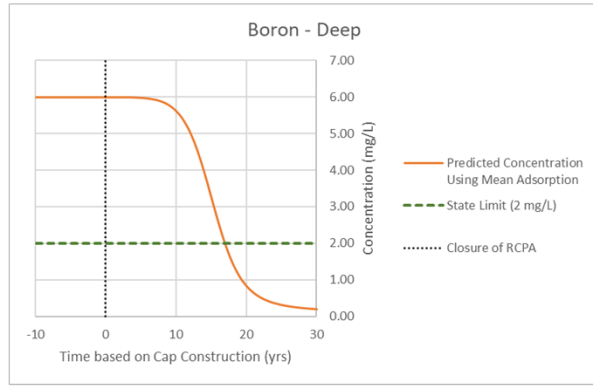
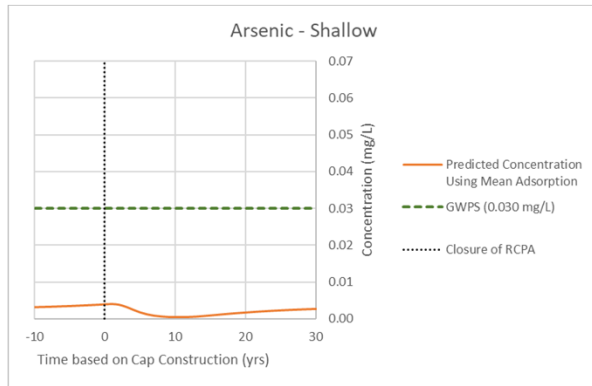
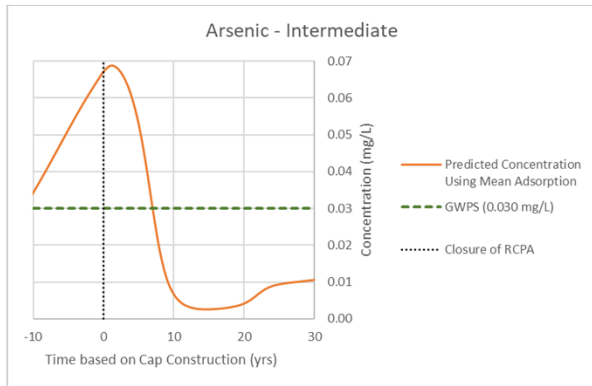
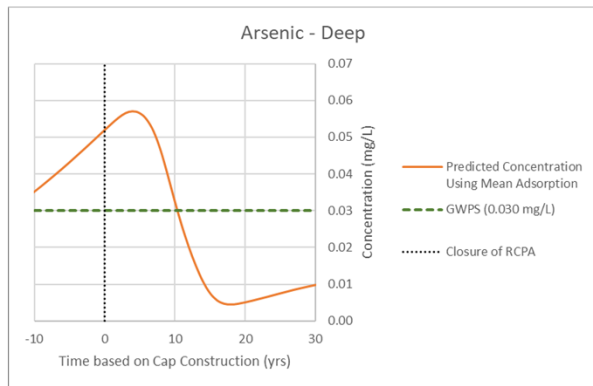
TITLE

**Time Series Plot
Average Concentrations at Location 4**

PROJECT No.
1531406

REV
A

Figure
38



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

CLIENT

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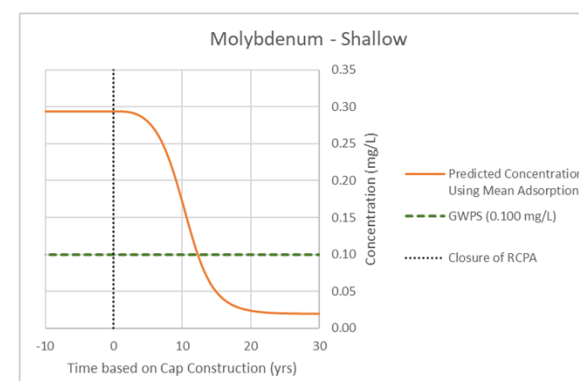
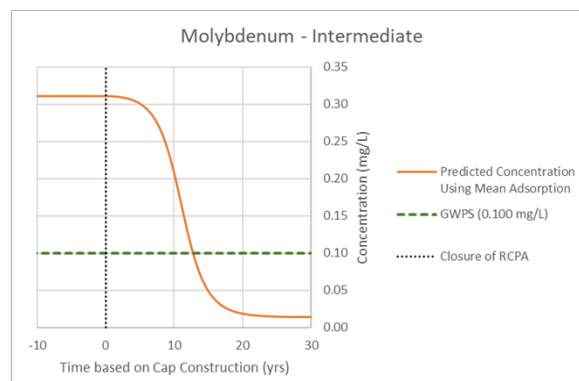
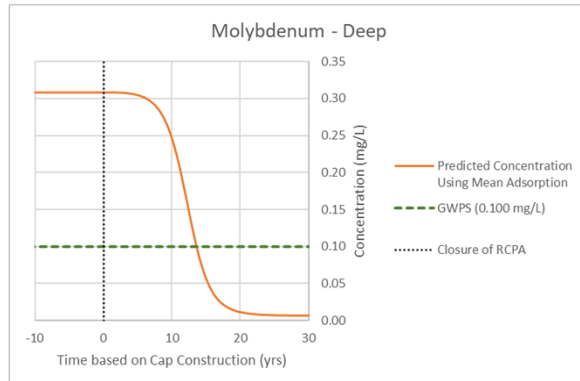
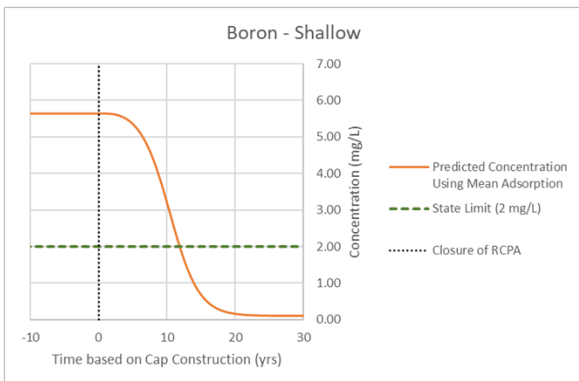
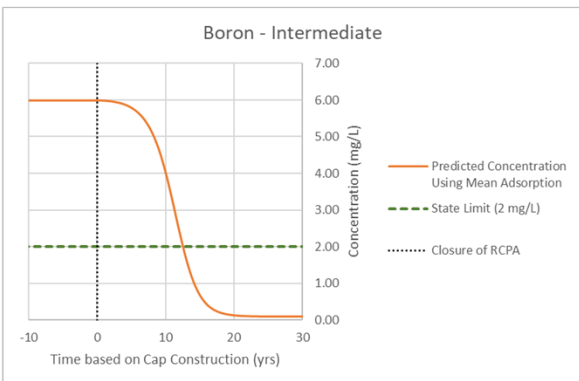
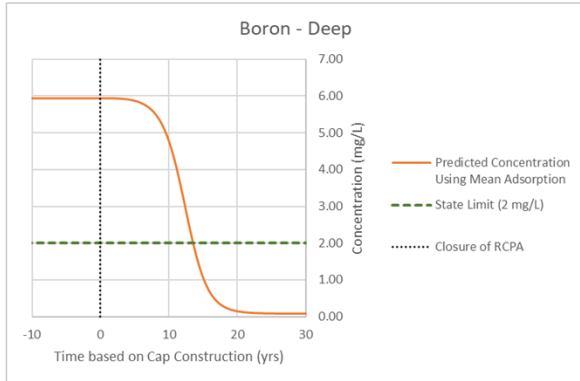
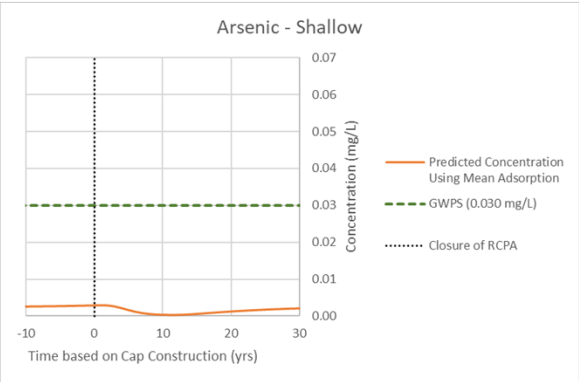
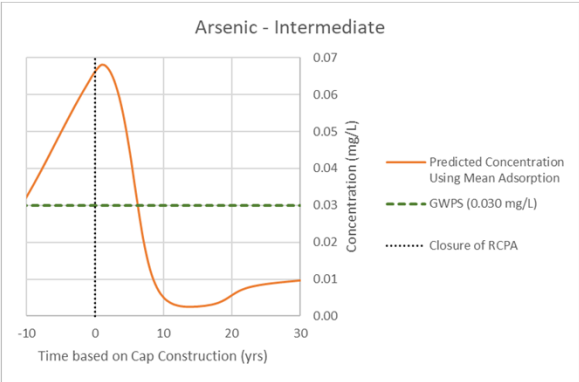
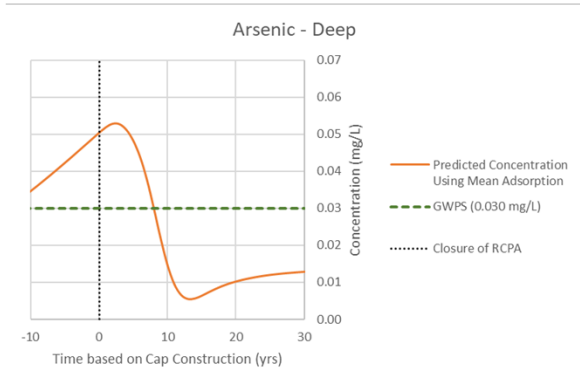
TITLE

Time Series Plot
Average Concentrations at Location 5

PROJECT No.
1531406

REV
A

Figure
39



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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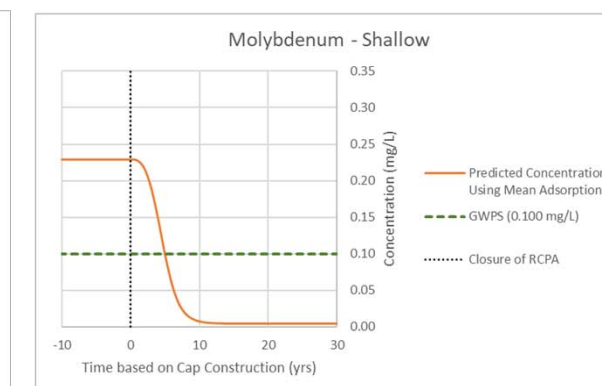
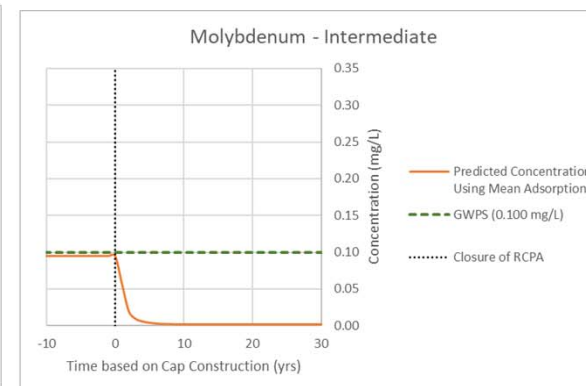
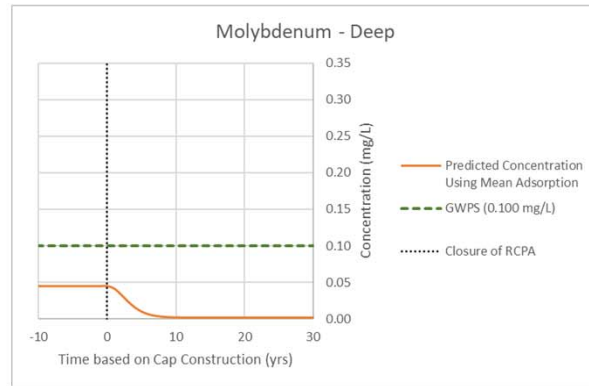
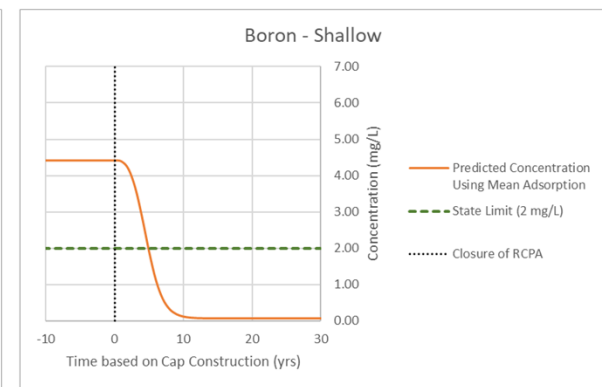
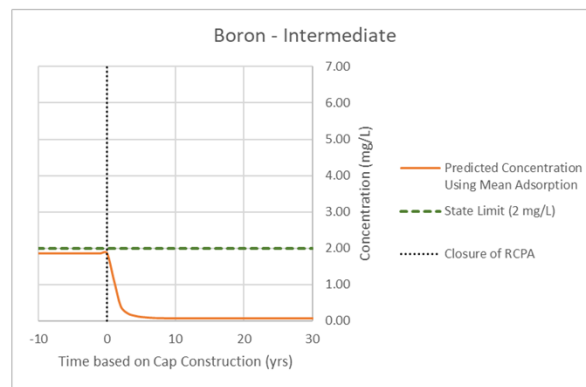
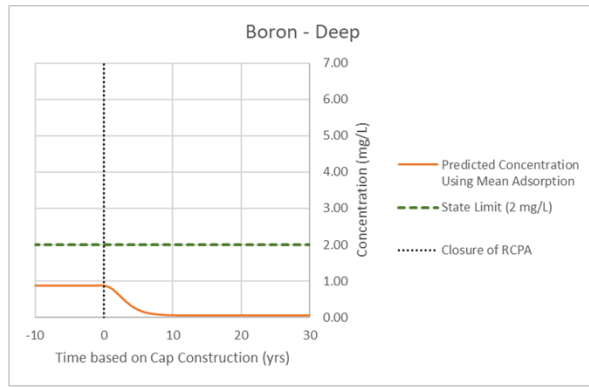
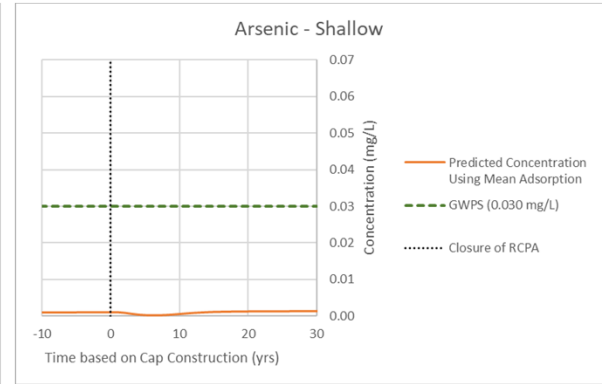
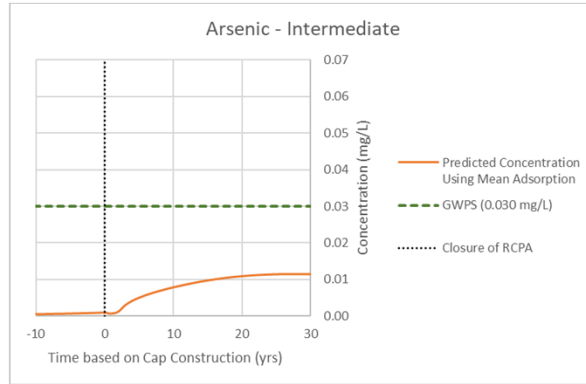
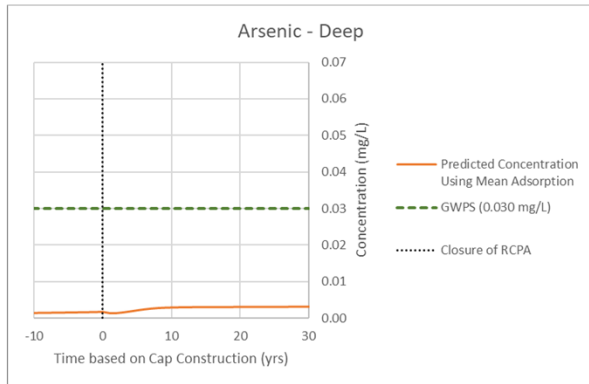
TITLE

Time Series Plot
Average Concentrations at Location 6

PROJECT No.
1531406

REV
A

Figure
40



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

CLIENT

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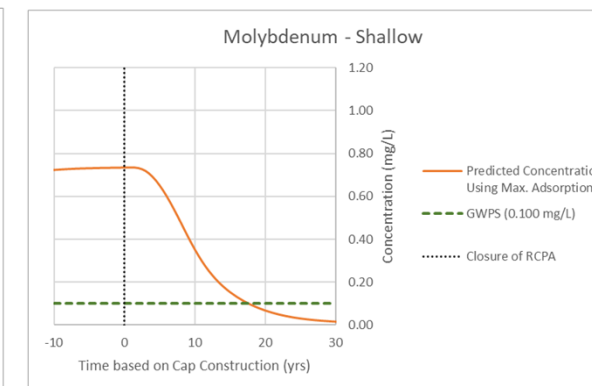
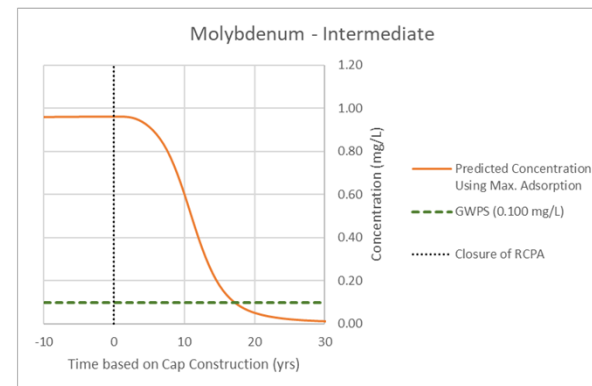
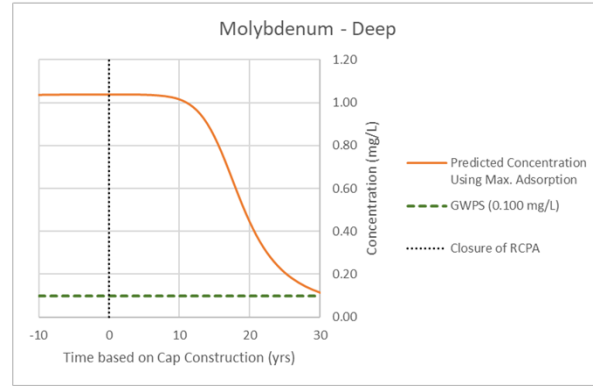
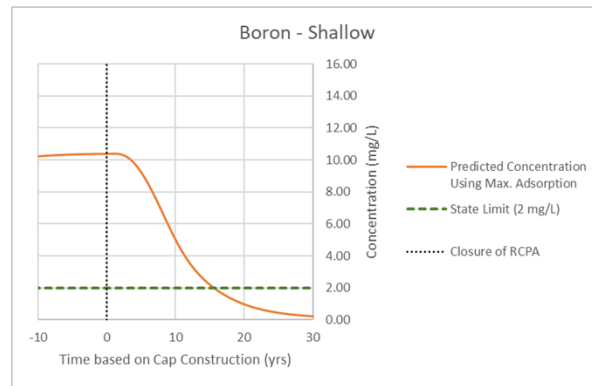
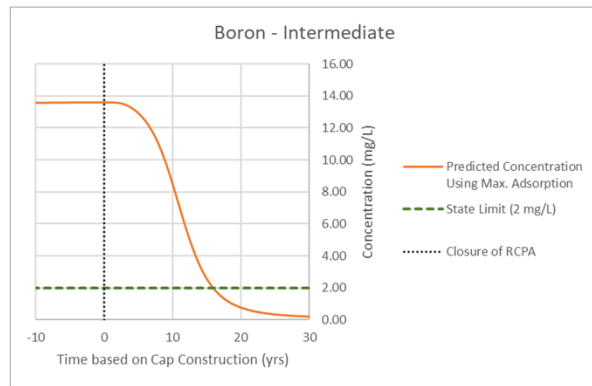
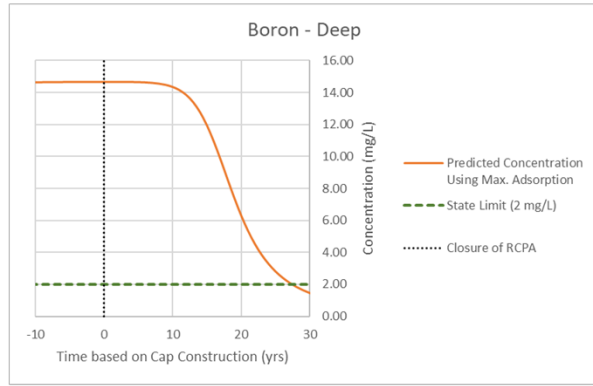
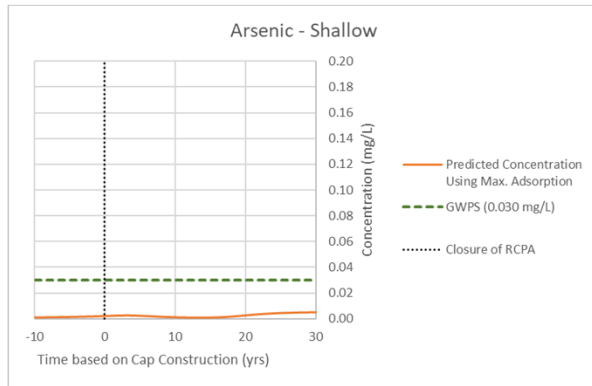
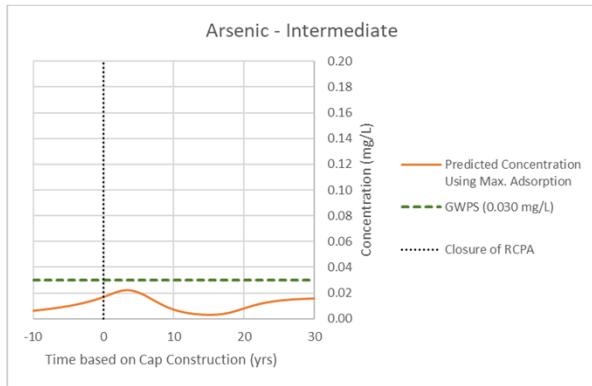
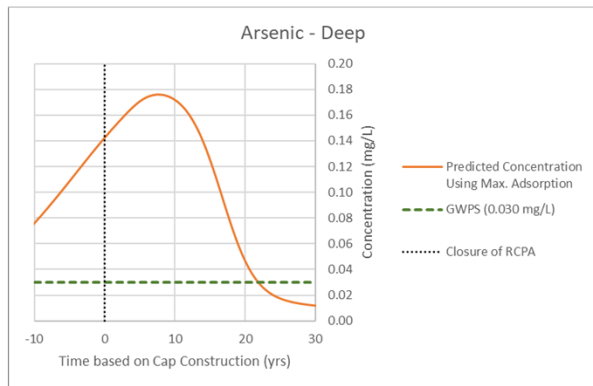
TITLE

**Time Series Plot
Average Concentrations at Location 7**

PROJECT No.
1531406

REV
A

Figure
41



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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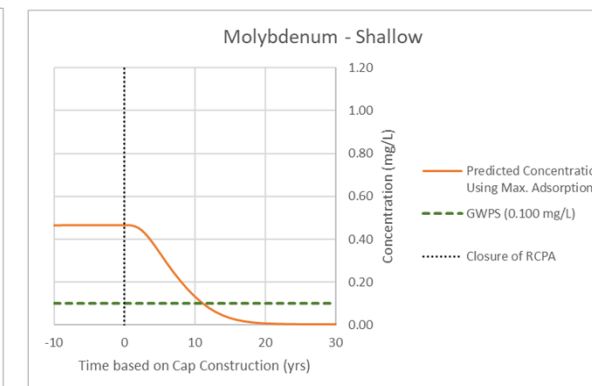
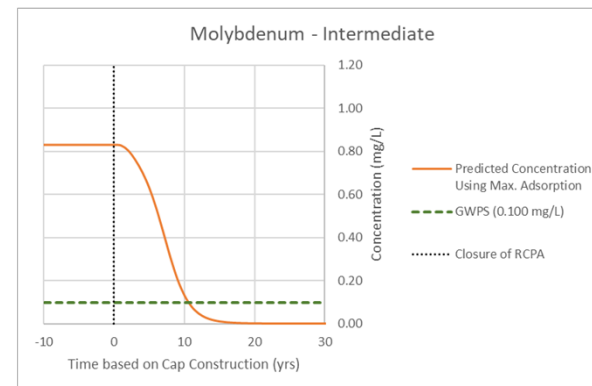
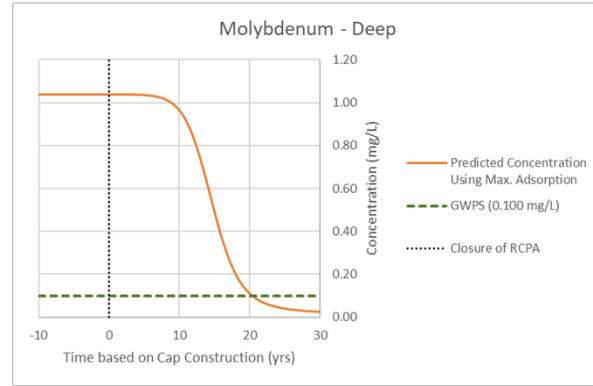
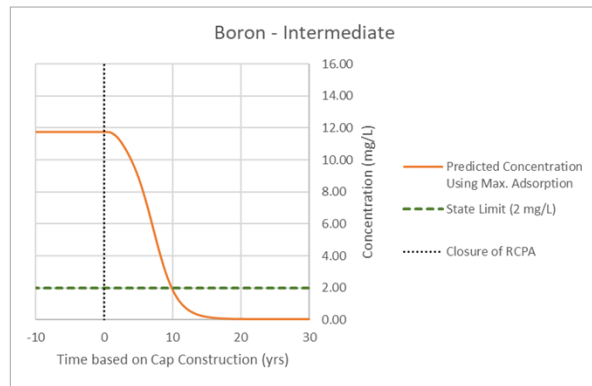
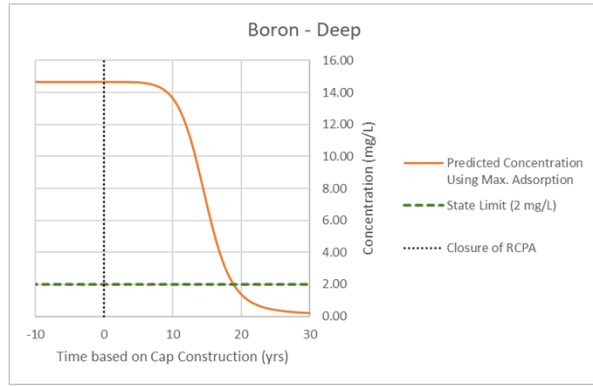
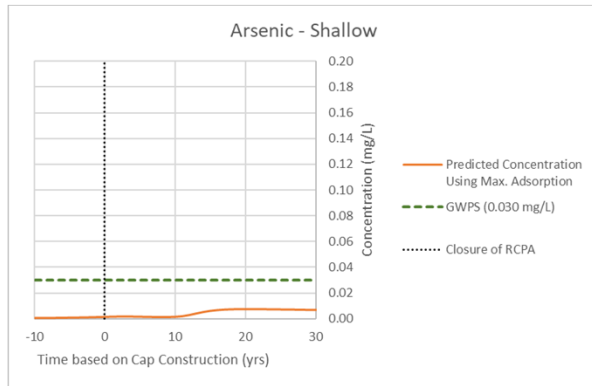
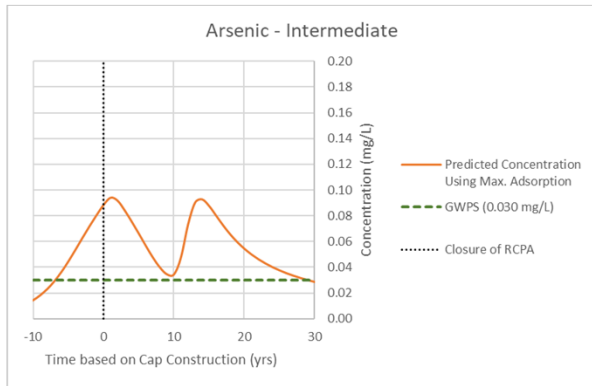
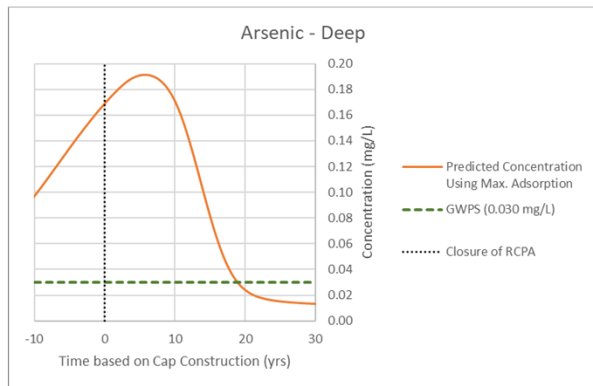
TITLE

**Time Series Plot
Maximum Concentrations at Location 1**

PROJECT No.
1531406

REV
A

Figure
42



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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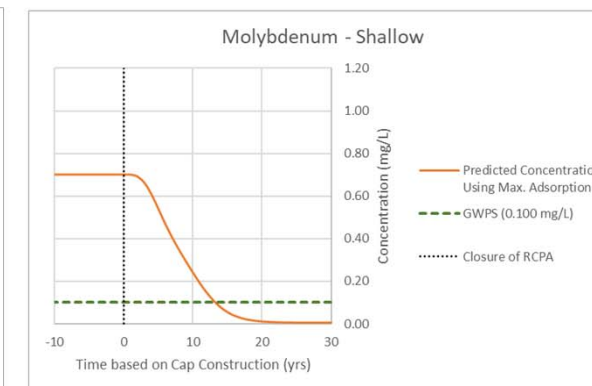
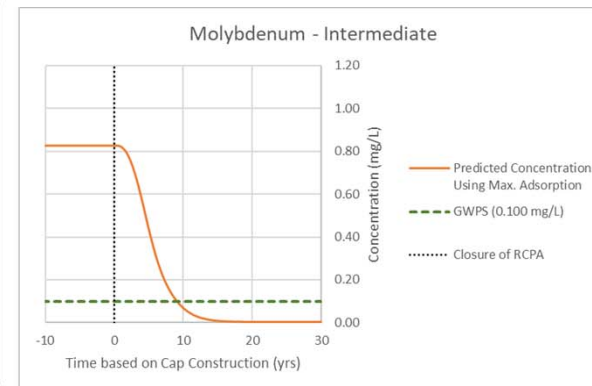
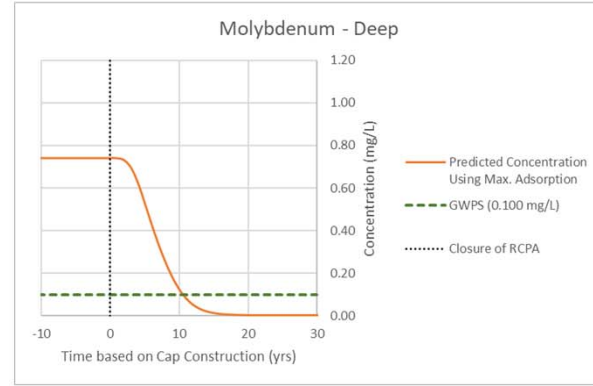
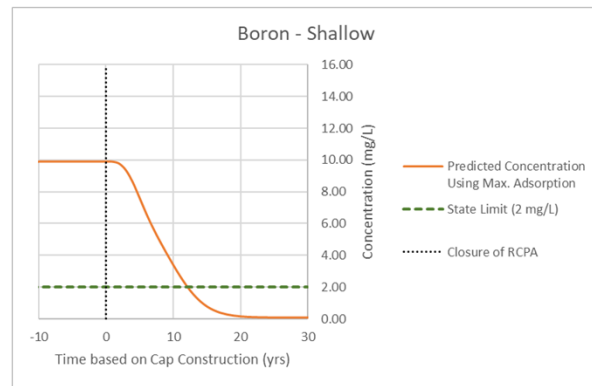
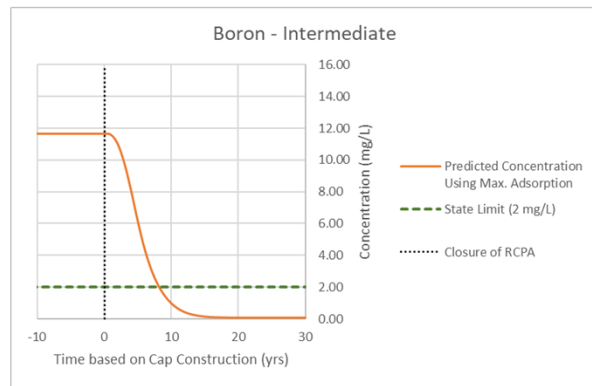
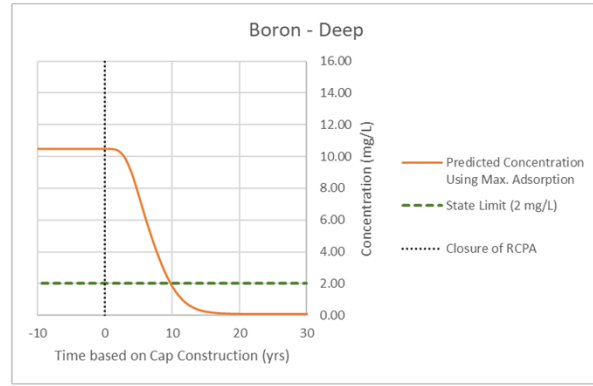
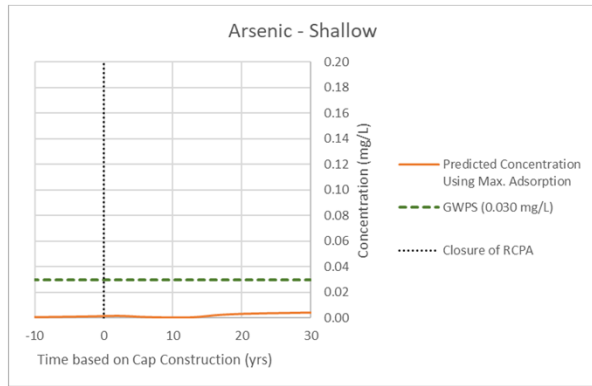
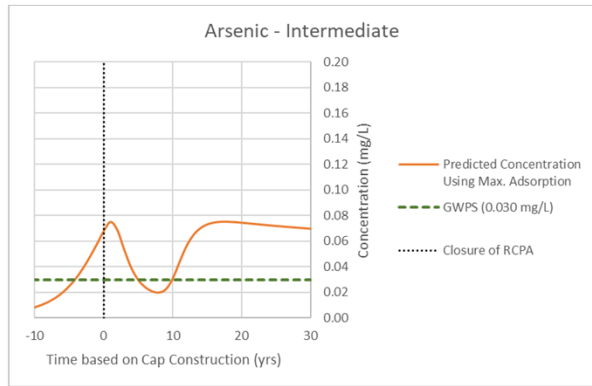
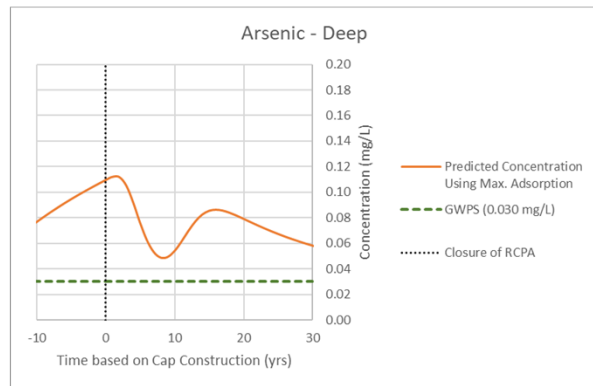
TITLE

**Time Series Plot
Maximum Concentrations at Location 2**

PROJECT No.
1531406

REV
A

Figure
43



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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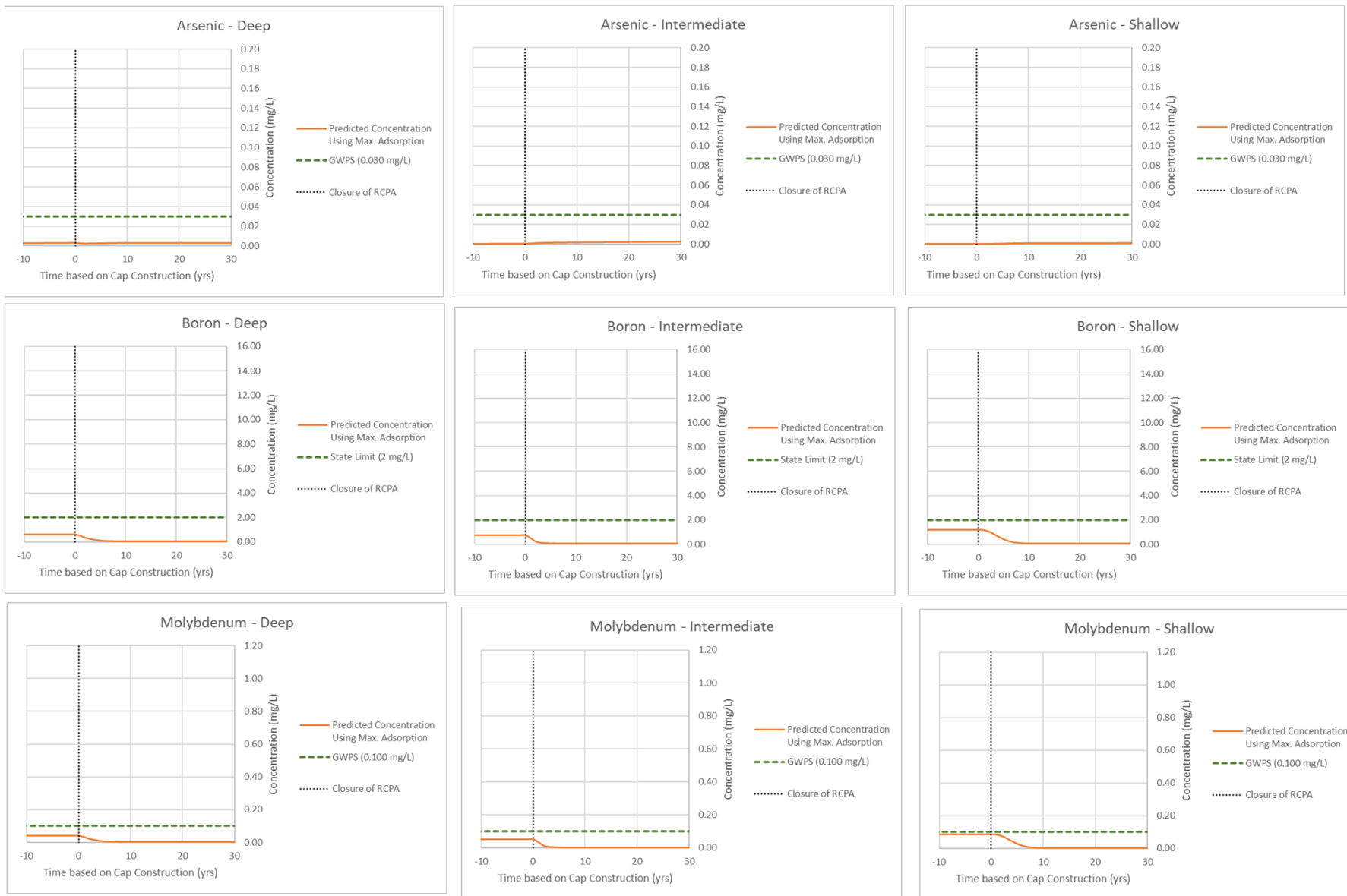
TITLE

**Time Series Plot
Maximum Concentrations at Location 3**

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1531406

REV
A

Figure
44



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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DESIGN	MSG
REVIEW	JAP
APPROVED	MNH

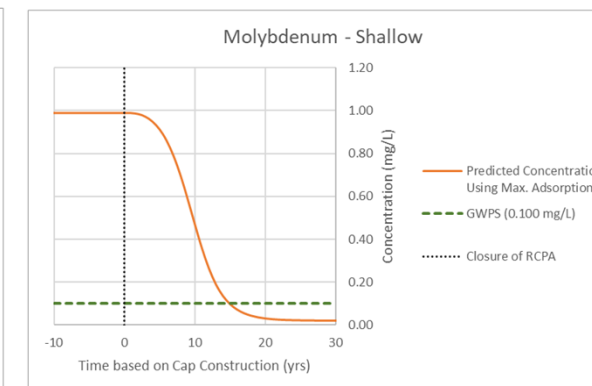
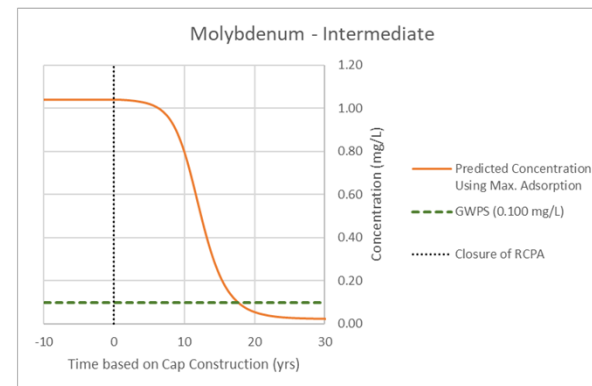
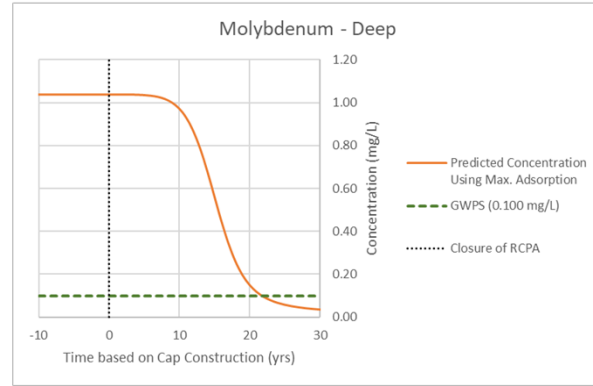
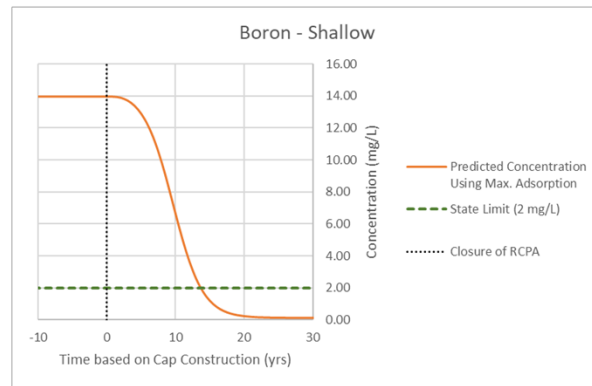
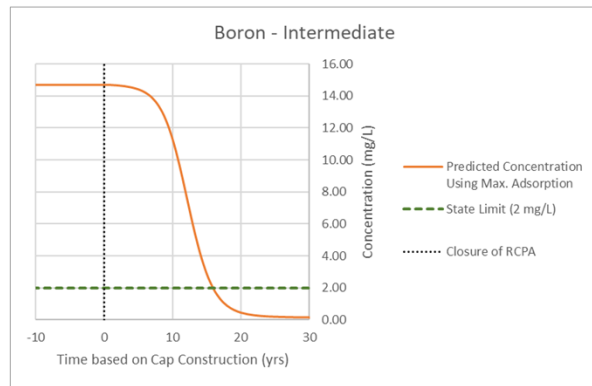
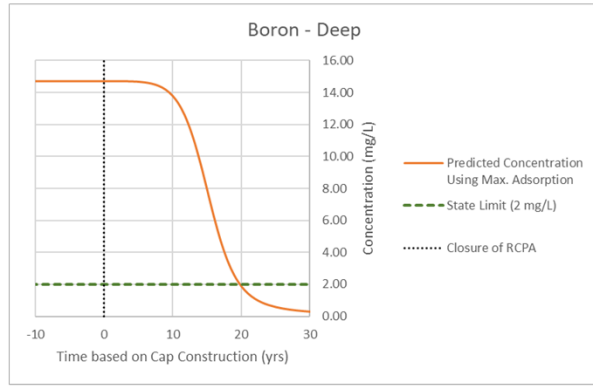
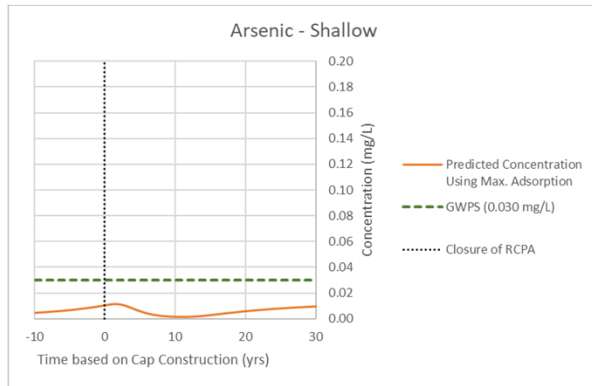
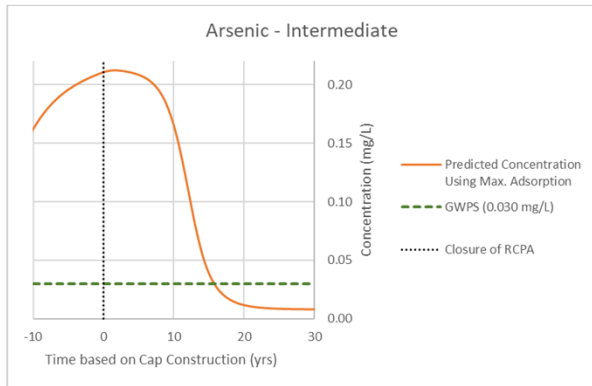
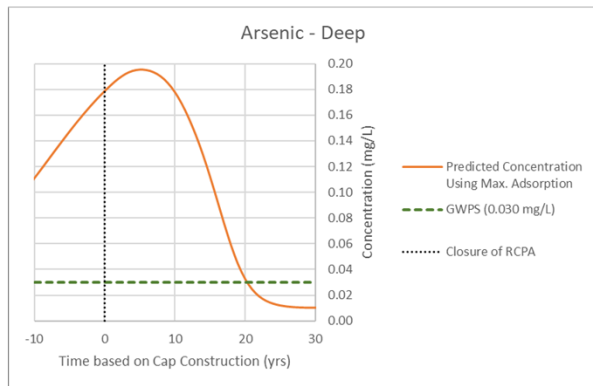
TITLE

**Time Series Plot
Maximum Concentrations at Location 4**

PROJECT No.
1531406

REV
A

Figure
45



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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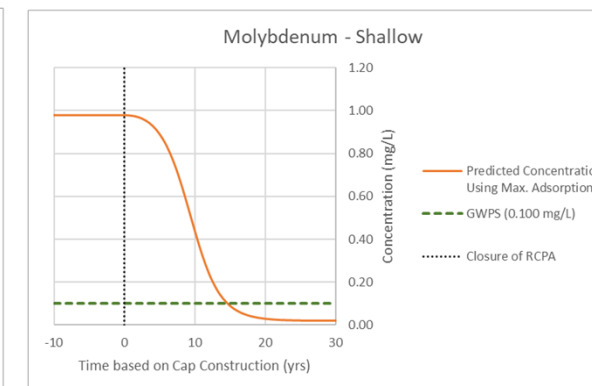
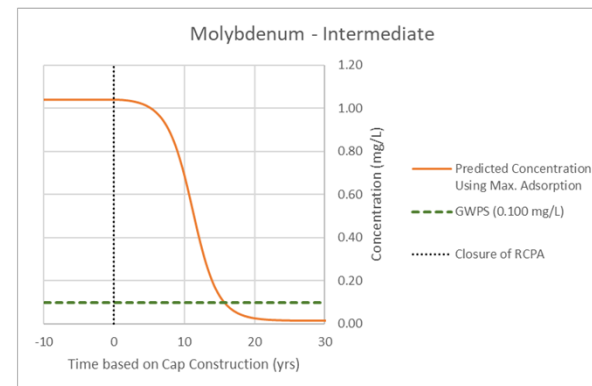
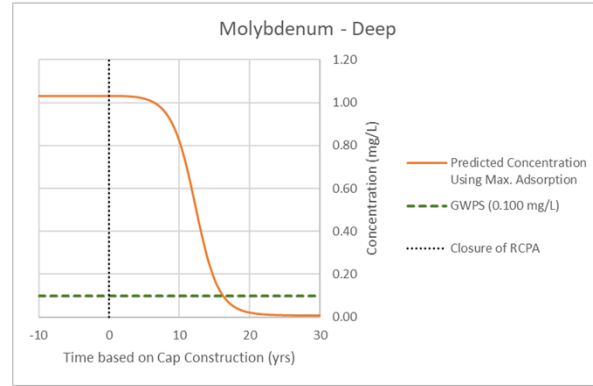
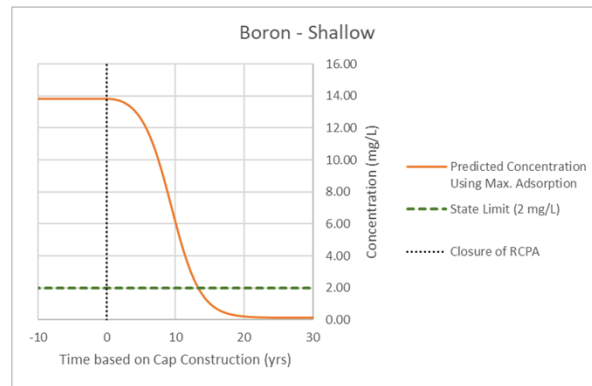
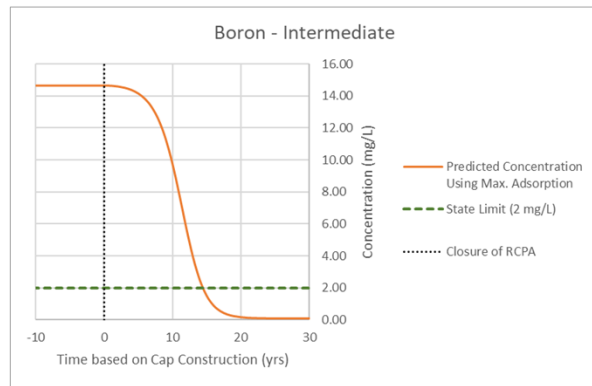
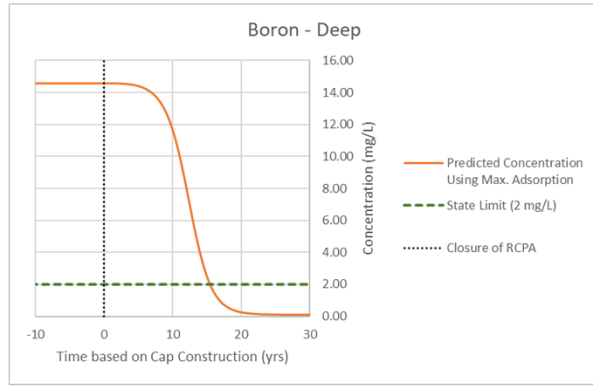
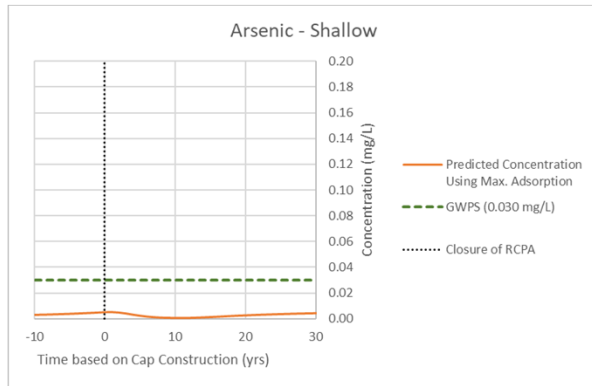
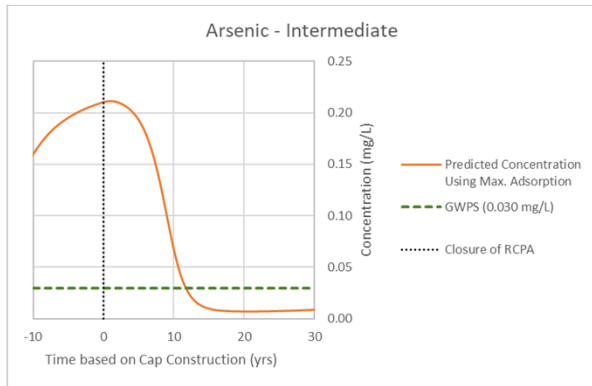
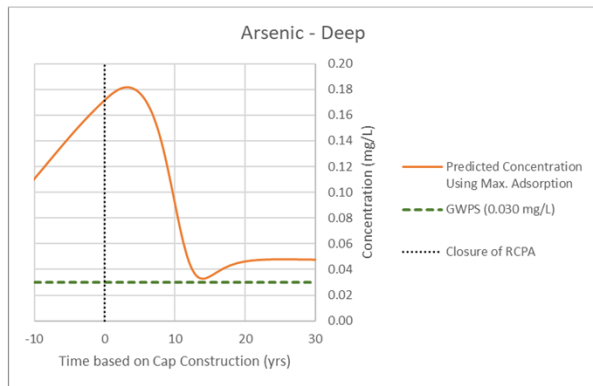
TITLE

**Time Series Plot
Maximum Concentrations at Location 5**

PROJECT No.
1531406

REV
A

Figure
46



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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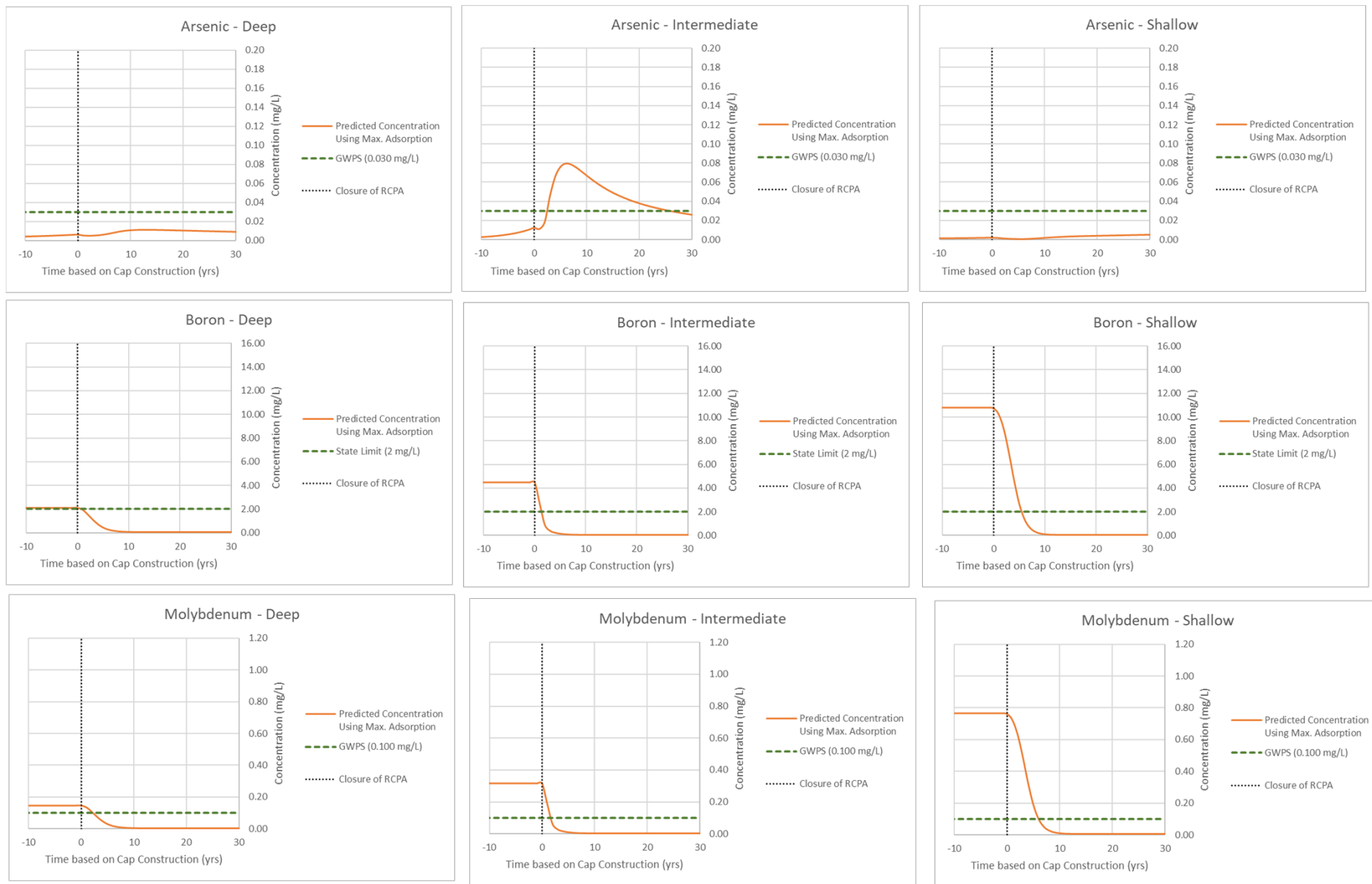
TITLE

**Time Series Plot
Maximum Concentrations at Location 6**

PROJECT No.
1531406

REV
A

Figure
47



NOTE(S)

- 1) GWPS – Groundwater Protection Standard. This is a site specific value.
- 2) mg/L – milligrams per liter

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TITLE

**Time Series Plot
Maximum Concentrations at Location 7**

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1531406

REV
A

Figure
48

APPENDIX A

Boring Logs

RECORD OF BOREHOLE BH-01

SHEET 1 of 5
ELEVATION: 388.00
INCLINATION: -90
COORDINATES: N: 835,170.20 E: 890,199.60

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/30/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 835,170.20 E: 890,199.60

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
0	6" Sonic	(0.0-6.0) (CL) SILTY CLAY, medium plasticity fines, some fine sand; dark yellowish brown (10YR 4/2); non-cohesive, wet, compact.	CL	[Diagonal Hatching]	382.0	1	SO	3.7 5.0	∇ Water Level 10.09 ft bgs 10/30/2018 (10.0-15.0) No recovery, material pushed away while drilling. Material assumed to be same as above due to drilling action.
5		(6.0-6.5) (GM) sandy SILTY GRAVEL, fine to coarse sub-angular to sub-rounded gravel, fine to coarse sand, non-plastic fines; very pale orange (10YR 8/2); non-cohesive, wet, compact.	GM	[Small Circles]	6.0 381.5 6.5	2	SO	3.4 5.0	
10		(6.5-15.0) (CL) SILTY CLAY, medium plasticity fines, some fine sand; dark yellowish brown (10 YR 4/2); non-cohesive, wet, compact.	CL	[Diagonal Hatching]	373.0	3	SO	3.6 10.0	
15		(15.0-20.0) (CL) SILTY CLAY, medium plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); non-cohesive, wet, compact.	CL	[Diagonal Hatching]	368.0	4	SO	3.8 5.0	
20		(20.0-24.5) (CL) SILTY CLAY, medium plasticity fines, some fine sand; dusky brown (5YR 2/2); non-cohesive, wet, compact.	CL	[Diagonal Hatching]	363.5	5	SO	4.6 5.0	
25		(24.5-25.0) (SW-SM) SAND, fine to coarse well graded sub-rounded to sub-angular sand, some non-plastic fines, trace gravel; (moderate brown 5YR 3/4); non-cohesive, wet, compact.	SW-SM	[Small Circles]	24.5 363.0 25.0	5	SO	4.6 5.0	
25		(25.0-28.5) (SP-SM) SAND, fine poorly graded sub-rounded sand, some non-plastic fines, trace gravel; moderate yellowish brown (10YR 5/4); non-cohesive, wet, compact.	SP-SM	[Small Circles]	359.5				
30		(28.5-31.0) (SW-SM) SAND, fine to medium well graded sub-rounded sand, some non-plastic fines, trace gravel; moderate yellowish brown (10YR 5/4); non-cohesive, wet, compact.	SW-SM	[Small Circles]	28.5				

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-01

SHEET 2 of 5
ELEVATION: 388.00
INCLINATION: -90
COORDINATES: N: 835,170.20 E: 890,199.60

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/30/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 835,170.20 E: 890,199.60

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
30	6" Sonic		SW-SM		357.0	6	SO	4.3 5.0	(35.0-50.0) 7.8ft of recovery on 15ft run, catcher malfunction caused loss of soil.
		(31.0-33.4) (CL) SILTY CLAY, high plasticity fines, some fine sand; light olive gray (5YR 5/2); non-cohesive, wet, compact.	CL		31.0				
		(33.4-36.5) (SW) SAND, fine to medium sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SW		354.6				
35			(36.0-36.5) SAME AS ABOVE (SAA), except, more gravelly.		352.0	7	SO	7.8 15.0	
		(36.5- 55.0) (SP) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace sub-rounded to sub-angular gravel; medium dark gray (N4); non-cohesive, wet, compact.	SP		36.0				
					351.7	8	SO	4.3 5.0	
					36.3				
40						9	SO	4.0 5.0	
					333.0				
		(55.0-65.0) (SP-SM) SAND, fine to coarse well graded sub-rounded sand, some non-plastic fines, trace sub-rounded to sub-angular gravel; medium dark gray (N4); non-cohesive, wet, compact.	SP-SM		55.0				

Log continued on next page

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-01

SHEET 3 of 5
ELEVATION: 388.00
INCLINATION: -90
COORDINATES: N: 835,170.20 E: 890,199.60

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/30/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 835,170.20 E: 890,199.60

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
60	6" Sonic	(55.0-65.0) (SP-SM) SAND, fine to coarse well graded sub-rounded sand, some non-plastic fines, trace sub-rounded to sub-angular gravel; medium dark gray (N4); non-cohesive, wet, compact. <i>(Continued)</i>	SP-SM		323.0	10	SO	4.4 5.0	
65		(65.0-75.0) (SP-SM) SAND, fine poorly graded sub-rounded sand, some non-plastic fines, medium dark gray (N4); non-cohesive, wet, compact.			65.0				
70		(75.0-80.0) (SP-SM) SAND, fine to medium poorly graded sub-rounded sand, some non-plastic fines, trace gravel; medium dark gray (N4); non-cohesive, wet, compact.	313.0	12	SO	4.2 5.0			
75		(80.0-85.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact.	75.0				13	SO	
80		(85.0-90.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact.	308.0	14	SO	8.0 15.0			
85	(90.0-95.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact.	80.0							
90		Log continued on next page							

Soil sample BH-01 (75.0-80.0) collected at 10:50 on 10/30/2018.
Groundwater sample BH-01 (75.0-80.0) collected at 12:25 on 10/30/2018.

(80.0-95.0) 8.0ft of recovery on 15.0ft run, catcher malfunction caused loss of soil.

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI




RECORD OF BOREHOLE BH-01

SHEET 4 of 5
ELEVATION: 388.00
INCLINATION: -90
COORDINATES: N: 835,170.20 E: 890,199.60

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/30/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 835,170.20 E: 890,199.60

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE			SAMPLES			REMARKS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE		REC ATT
					DEPTH (ft)				
90	6" Sonic	(80.0-93.5) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact. <i>(Continued)</i>	SW		294.5	14	SO	8.0 15.0	
		93.5							
95		(93.5-134.0) (SW) SAND, fine to coarse well graded sub-rounded sand, some sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact.	SW		293.0	15	SO	6.0 15.0	
		(95.0-110.0) (SAA), except, trace gravel.			95.0				
100									
105									
110							(110.0-125.0) No recovery during first attempt at 15.0ft run. The driller washed the casing and re-attempted to recover lost soil. The driller was able to recover 4.0ft of 15.0ft.		
115					16	SO	4.0 15.0		
120		Log continued on next page							

GOLDER ST.L RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI





RECORD OF BOREHOLE BH-01

SHEET 5 of 5
ELEVATION: 388.00
INCLINATION: -90
COORDINATES: N: 835,170.20 E: 890,199.60

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/30/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 835,170.20 E: 890,199.60

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE			SAMPLES			REMARKS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE		REC ATT
					DEPTH (ft)				
120	6" Sonic	(93.5-134.0) (SW) SAND, fine to coarse well graded sub-rounded sand, some sub-angular to sub-rounded gravel; medium dark gray (N4); non-cohesive, wet, compact. <i>(Continued)</i>	SW						
					16	SO	4.0 15.0		
125					17	SO	4.4 5.0		
130					18	SO	4.0 5.0		
		(134.0-135.0) (BEDROCK) LIMESTONE, weathered limestone.	LS		254.0 134.0				
135		BORING TERMINATED AT 135.0 FT BELOW GROUND SURFACE. BEDROCK ENCOUNTERED AT 134.0 FT BELOW GROUND SURFACE.			253.0 135.0				Soil sample BH-01 (130.0-135.0) collected at 16:50 on 10/30/2018. Groundwater sample BH-01 (130.0-135.0) collected at 18:15 on 10/30/2018.
140									
145									
150									

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-02

SHEET 1 of 5
ELEVATION: 390.0
INCLINATION: -90
COORDINATES: N: 834,397.40 E: 890,595.00

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/28/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 834,397.40 E: 890,595.00

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
0	6" Sonic	(0.0-5.0) (CL) SILTY CLAY, medium plasticity fines, trace fine sand, trace organics (1" root); brownish gray (5YR 4/1); cohesive, moist, dense.	CL	[Hatched Box]	385.0	1	SO	1.8 5.0	∇ Water Level 7.81 ft bgs 10/28/2018
5					(5.0-15.0) (ML) SILT, low plasticity fines, trace fine sand; light brownish gray (5YR 6/1); cohesive, w-PL, soft.				
10		(15.0-27.5) (ML) CLAYEY SILT, low to medium plasticity fines, trace fine sand; medium light gray (N6) to light brownish gray (5YR 6/1); cohesive w-PL, soft.	ML	[Vertical Lines Box]		375.0	3	SO	
15					(27.5-32.5) (SC) CLAYEY SAND, fine to medium sub-rounded sand, medium plasticity fines, medium gray (N5); non-cohesive, wet, compact.	SC			
20		(27.5-32.5) (SC) CLAYEY SAND, fine to medium sub-rounded sand, medium plasticity fines, medium gray (N5); non-cohesive, wet, compact.	SC	[Hatched Box]			362.5	5	
25					(27.5-32.5) (SC) CLAYEY SAND, fine to medium sub-rounded sand, medium plasticity fines, medium gray (N5); non-cohesive, wet, compact.	SC	[Hatched Box]		
30	Log continued on next page								

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-02

SHEET 2 of 5
ELEVATION: 390.0
INCLINATION: -90
COORDINATES: N: 834,397.40 E: 890,595.00

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/28/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 834,397.40 E: 890,595.00

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
30	6" Sonic	(27.5-32.5) (SC) CLAYEY SAND, fine to medium sub-rounded sand, medium plasticity fines, medium gray (N5); non-cohesive, wet, compact. <i>(Continued)</i>	SC		357.5 32.5	7	SO	3.5 5.0	<p>(30.0-35.0). Driller notes sample fell out during retrieval due to catcher malfunction. The driller notes that the re-collected sample is mixture of material from (30.0-35.0).</p> <p>Soil sample BH-02 (35.0-40.0) collected at 1300 hrs on 10/28/2018. The driller notes that due to catcher malfunction he was unable to have complete recovery, and notes that the sample is mixed up. Groundwater sample BH-02 (35.0-40.0) collected at 15:00 hrs on 10/28/2018.</p>
35		(32.5-40.0) (SP-SC) SAND, fine to medium sub-rounded sand, some low plasticity fines, trace sub-angular gravel; medium dark gray (N4); non-cohesive, wet, compact.	SP-SC		350.0 40.0	8	SO	1.4 5.0	
40		(40.0-45.0) (SP-SM) SAND, fine sand, some non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SP-SM		345.0 45.0	9	SO	3.3 5.0	
45		(45.0-68.0) (SP) SAND, fine to medium poorly graded sub-rounded sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SP		335.0 55.0	10	SO	3.5 10.0	
55		Same As Above (SAA), except, trace gravel.			335.0 55.0	11	SO	5.0 5.0	
60		Log continued on next page							

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI




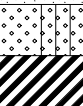
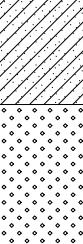
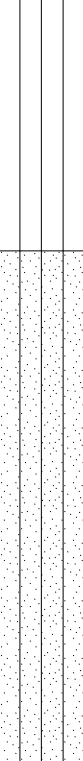
RECORD OF BOREHOLE BH-02

SHEET 3 of 5
ELEVATION: 390.0
INCLINATION: -90
COORDINATES: N: 834,397.40 E: 890,595.00

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/28/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 834,397.40 E: 890,595.00

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
60	6" Sonic	(45.0-68.0) (SP) SAND, fine to medium poorly graded sub-rounded sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact. <i>(Continued)</i>	SP		322.0	12	SO	5.0 5.0	
65		68.0							
70		(68.0-69.0) (SW-SM) gravelly SAND, fine to coarse sub-rounded sand, fine to coarse sub-angular gravel, some low plasticity fines; medium gray (N5); non-cohesive, wet, compact.	SW-SM		321.0	13	SO	4.3 5.0	
		(69.0-70.0) (CH) CLAY, high plasticity clay, trace fine sand; medium dark gray (N4); non-cohesive, wet, compact.	CH		69.0				
		(70.0-72.2) (SC) CLAYEY SAND, fine to coarse well graded sub-rounded sand, high-plasticity fines, trace gravel; medium dark gray (N4); non-cohesive, wet, compact.	SC		320.0				
75		(72.2-75.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SW		317.8	14	SO	4.4 5.0	
80		(75.0-80.0) (ML) SANDY SILT, low plasticity fines, fine sand; medium dark gray (N4); non-cohesive, wet, compact.	ML		72.2				
85		(80.0-92.5) (SM) SILTY SAND, fine sand, non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SM		315.0	15	SO	4.0 5.0	
					80.0				
90					310.0	80.0	16	SO	
						17	SO	4.2 5.0	

Soil sample BH-02 (70.0- 72.0) collected at 17:00 on 10/28/2018.
Groundwater sample BH-02 (70.0-75.0) collected at 07:45 on 10/29/2018.
Soil sample BH-02 (72.0-75.0) collected at 16:50 on 10/28/2018.

Log continued on next page

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-02

SHEET 4 of 5
ELEVATION: 390.0
INCLINATION: -90
COORDINATES: N: 834,397.40 E: 890,595.00

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/28/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 834,397.40 E: 890,595.00

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
90	6" Sonic	(80.0-92.5) (SM) SILTY SAND, fine sand, non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact. <i>(Continued)</i>	SM	[Dotted Pattern]	297.5 92.5	18	SO	4.5 5.0	
		(92.5-95.0) (SC) CLAYEY SAND, fine to coarse sub-rounded sand, medium plasticity fines; medium dark gray (N4); non-cohesive, wet, compact.	SC	[Diagonal Hatching]	295.0 95.0				
95		(95.0-115.0) (MH) sandy CLAYEY SILT, medium plasticity fines, fine sand, trace gravel; medium dark gray (N4); non-cohesive, wet, compact.	MH	[Vertical Lines]	275.0 115.0	19	SO	4.6 5.0	
100		(110.0-115.0) No recovery due to catcher malfunction. Driller replaced catcher and attempted to retrieve the sample, but was unsuccessful due to the replacement catcher breaking.							
105		(115.0-130.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace gravels; medium dark gray (N4); non-cohesive, wet, compact.	SW	[Dotted Pattern]	275.0 115.0	20	SO	0.0 15.0	
110									
115									
120									

Log continued on next page

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



GOLDER ST.L RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19




RECORD OF BOREHOLE BH-02

SHEET 5 of 5
ELEVATION: 390.0
INCLINATION: -90
COORDINATES: N: 834,397.40 E: 890,595.00

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/28/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 834,397.40 E: 890,595.00

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE			SAMPLES			REMARKS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE		REC ATT
					DEPTH (ft)				
120	6" Sonic	(115.0-130.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace non-plastic fines, trace gravels; medium dark gray (N4); non-cohesive, wet, compact. (Continued)	SW		260.0	22	SO	4.6 5.0	
125					130.0				23
130		(130.0-133.0) (SW) gravelly SAND, fine to coarse well graded sub-rounded sand, sub-rounded to sub-angular gravel, trace non-plastic fines; medium light gray (N6); non-cohesive, wet, compact.	SW		257.0	24	SO	4.0 4.0	
135		(133.0-134.0) BEDROCK, weathered Limestone.	LS		256.0 134.0				BORING TERMINATED AT 134 FT BELOW GROUND SURFACE. BEDROCK ENCOUNTERED AT 133.0 FT BELOW GROUND SURFACE.

Soil sample BH-02 (125.0-130.0) collected at 12:05 on 10/29/2018.
Groundwater sample BH-02 (125.0-130.0) collected at 16:10 on 10/29/2018.

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI






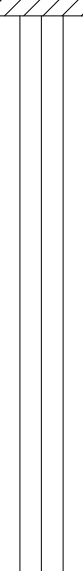


RECORD OF BOREHOLE BH-03

SHEET 1 of 4
ELEVATION: 391.00
INCLINATION: -90
COORDINATES: N: 832,493.50 E: 891,012.30

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/27/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 832,493.50 E: 891,012.30

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT	
					DEPTH (ft)				
0	6" Sonic	(0.0-1.4) (CL) SILTY CLAY, medium plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); cohesive, w-PL, stiff.	CL		389.6				▽ Water Level 13.95 ft bgs 10/27/2018
		(1.4-5.0) (GW) GRAVEL, fine to coarse sub-rounded gravel, some fine to coarse sub-rounded sand; pale yellowish brown (10YR 6/2); non-cohesive, dry, compact.	GW		1.4	1	SO	2.7 5.0	
5		(5.0-15.0) (CL) SILTY CLAY, medium plasticity fines, trace fine sand; dark yellowish brown (10YR 4/2); cohesive, w-PL, soft.	CL		386.0	2	SO	3.2 5.0	
					5.0	3	SO	2.4 5.0	
15		(15.0-25.9) (ML) SILT, low plasticity fines, trace fine sand; moderate yellowish brown (10YR 5/4); cohesive, w-PL, soft.	ML		376.0	4	SO	4.3 5.0	
					15.0	5	SO	3.8 5.0	
25		(25.9-28.7) (CL) SILTY CLAY, medium plasticity fines, trace fine sand; medium gray (N5); cohesive, w>PL, soft.	CL		365.1	6	SO	5.0 5.0	
		(28.7-29.8) Wood Debris, large log.	WOOD		362.3				
30	Log continued on next page			361.2					

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-03

SHEET 2 of 4
ELEVATION: 391.00
INCLINATION: -90

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/27/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 832,493.50 E: 891,012.30

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE				SAMPLES			REMARKS					
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE	REC ATT						
					DEPTH (ft)									
30	6" Sonic	(29.8-32.0) (SP) SAND, fine to medium sub-rounded sand, trace non-plastic fines; pale yellowish brown (10YR 6/2); non-cohesive, wet, compact. <i>(Continued)</i>	SP		29.8	7	SO	4.0 5.0	Soil sample BH-03 (30.0-32.0) collected at 08:30 on 10/27/2018. Groundwater sample BH-03 (30.0-32.0) collected at 10:55 on 10/27/2018.					
					359.0									
		(32.0-32.4) (SC) SILTY CLAY, medium plasticity fines, trace fine sand; medium light gray (N6); non-cohesive, wet, compact.	SC		32.0									
		(32.4-35.5) (SP) SAND, fine to medium sub-rounded sand, trace non-plastic fines; medium light gray (N6); non-cohesive, wet, compact.	SP		358.6									
					32.4									
35		(35.5-40.0) (SP) SAND, fine sub-rounded sand, trace non-plastic fines; medium light gray (N6) with medium dark gray (N4) mottling; non-cohesive, wet, compact.	SP		355.5					8	SO	3.8 5.0	(35.5-37.0) (N4) Mottling present.	
					35.5									
40		(40.0-50.0) (SP-SM) SAND, fine poorly graded sub-rounded sand, non-plastic fines; medium dark gray (N4); non-cohesive, wet, compact.	SP-SM		351.0					9	SO	3.2 5.0		
					40.0									
45														
50		(50.0-60.0) (SP) SAND, fine rounded sand, trace fine to coarse sub-angular gravel, trace non-plastic fines; medium gray (N5); non-cohesive, wet, compact.	SP		341.0					10	SO	3.2 5.0		
			50.0											
55								(50.0-60.0) Driller notes material very soft and fell out during sample retrieval.						
60														
		Log continued on next page												

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI




RECORD OF BOREHOLE BH-03

SHEET 3 of 4
ELEVATION: 391.00
INCLINATION: -90
COORDINATES: N: 832,493.50 E: 891,012.30

PROJECT: Ameren CCR GW Monitoring
PROJECT NUMBER: 153-1406.0002G
LOCATION: Rush Island Energy Center

DRILLING METHOD: 6" Sonic
DRILLING DATE: 10/27/2018
DRILL RIG: Geoprobe MS 200LS

DATUM: NAVD88
AZIMUTH: N/A
COORDINATES: N: 832,493.50 E: 891,012.30

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE			SAMPLES			REMARKS		
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE		REC ATT	
					DEPTH (ft)					
60	6" Sonic	(60.0-105.0) (SP) SAND, fine to medium poorly graded sub-rounded sand, trace fine to coarse sub-rounded gravel, trace non-plastic fines; medium gray (N5); non-cohesive, wet, compact.	SP		60.0	12	SO	10.0 10.0	Soil sample BH-03 (70.0-75.0) collected at 12:15 on 10/27/2018. Groundwater sample BH-03 (70.0-75.0) collected at 14:20 on 10/27/2018. (74.0-75.0) One foot section of grayish black (N2) burnt wood.	
65					309.0 82.0			13		4.2 5.0
70					8.1 10.0			14		8.1 10.0
75					3.2 5.0			15		3.2 5.0
80					Log continued on next page			85		90

GOLDER ST.L RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning



LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



RECORD OF BOREHOLE BH-03

SHEET 4 of 4
ELEVATION: 391.00
INCLINATION: -90
COORDINATES: N: 832,493.50 E: 891,012.30

PROJECT: Ameren CCR GW Monitoring DRILLING METHOD: 6" Sonic DATUM: NAVD88
PROJECT NUMBER: 153-1406.0002G DRILLING DATE: 10/27/2018 AZIMUTH: N/A
LOCATION: Rush Island Energy Center DRILL RIG: Geoprobe MS 200LS COORDINATES: N: 832,493.50 E: 891,012.30

DEPTH (feet)	BORING METHOD	SOIL/ROCK PROFILE			SAMPLES			REMARKS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEVATION	NUMBER	TYPE		REC ATT
					DEPTH (ft)				
90	6" Sonic	(60.0-105.0) (SP) SAND, fine to medium poorly graded sub-rounded sand, trace fine to coarse sub-rounded gravel, trace non-plastic fines; medium gray (N5); non-cohesive, wet, compact. <i>(Continued)</i>	SP		286.0	16	SO	0.0 15.0	(90.0-105.0) Soft sands, fall out occurs while retrieving samples, no recovery. Driller notes drilling action was same as above.
95					105.0				
100		(105.0-115.0) (SW) SAND, fine to coarse well graded sub-rounded sand, trace fine to coarse sub-angular gravel; medium gray (N5); non-cohesive, wet, compact.	SW		276.0	17	SO	5.0 5.0	
105	115.0	18	SO		4.6 5.0	Soil sample BH-03 (110.0-115.0) collected at 16:20 on 10/27/2018. Groundwater sample BH-03 (110.0-115.0) collected at 09:20 on 10/28/2018.			
110	BORING TERMINATED AT 115 FT BELOW GROUND SURFACE. BEDROCK ENCOUNTERED AT 115.0 FT BELOW GROUND SURFACE.			276.0 115.0				Broken Limestone pieces at 115.0 ft bgs.	
115									
120									

GOLDER STL RECORD OF BOREHOLE MWD RIEC LOGS.GPJ GLDR_CO.GDT 1/21/19

SCALE: 1 in = 3.8 ft
DRILLING CONTRACTOR: Cascade
DRILLER: B. Beuning

LOGGED: JSI/EMS
CHECKED: JAP
REVIEWED: JSI



APPENDIX B

Laboratory Analytical Data

November 13, 2018

Mark Haddock
Golder Associates
820 S. Main St
Suite 100
Saint Charles, MO 63301

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285082

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on October 30, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
John Suozzi, Golder Associates



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Arkansas Drinking Water

Missouri Certification Number: 10090

WY STR Certification #: 2456.01

Arkansas Certification #: 18-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-18-11

Utah Certification #: KS000212018-8

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285082001	BH-03 (30-32)	Water	10/27/18 10:55	10/30/18 03:55
60285082002	BH-03 (70-75)	Water	10/27/18 14:20	10/30/18 03:55
60285082003	BH-03 (110-115)	Water	10/28/18 09:10	10/30/18 03:55
60285082004	BH-03 (110-115) FILTERED	Water	10/28/18 09:10	10/30/18 03:55
60285082005	BH-02 (35-40)	Water	10/28/18 15:00	10/30/18 03:55
60285082006	RB-1	Water	10/28/18 15:45	10/30/18 03:55
60285082007	BH-02 (70-75)	Water	10/29/18 07:45	10/30/18 03:55
60285082008	DUP-1	Water	10/29/18 07:45	10/30/18 03:55
60285082009	BH-02 (125-130)	Water	10/29/18 16:10	10/30/18 03:55
60285082010	BH-02 (125-130) FILTERED	Water	10/29/18 16:10	10/30/18 03:55

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285082001	BH-03 (30-32)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082002	BH-03 (70-75)	EPA 200.7	SMW	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082003	BH-03 (110-115)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082004	BH-03 (110-115) FILTERED	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082005	BH-02 (35-40)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082006	RB-1	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285082007	BH-02 (70-75)	EPA 200.7	EMR	6	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285082008	DUP-1	SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
60285082009	BH-02 (125-130)	EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
60285082010	BH-02 (125-130) FILTERED	EPA 365.4	BLA	1	PASI-K
		EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-03 (30-32) **Lab ID: 60285082001** Collected: 10/27/18 10:55 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	184000	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 18:09	7440-70-2	
Iron	19100	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 18:09	7439-89-6	
Magnesium	47000	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 18:09	7439-95-4	
Manganese	934	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 18:09	7439-96-5	
Potassium	8360	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 18:09	7440-09-7	
Sodium	38600	ug/L	500	157	1	11/02/18 09:12	11/02/18 18:09	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	564	mg/L	20.0		1		11/05/18 13:56		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	15.3	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	3.8	mg/L	0.20	0.012	1		10/31/18 16:22		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	44.7	mg/L	20.0	5.8	20		11/08/18 17:19	16887-00-6	M1
Sulfate	126	mg/L	20.0	4.8	20		11/08/18 17:19	14808-79-8	M1
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.44	mg/L	0.10	0.050	1		11/02/18 17:01	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-03 (70-75) **Lab ID: 60285082002** Collected: 10/27/18 14:20 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	58000	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 15:43	7440-70-2	
Iron	565	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 15:43	7439-89-6	
Magnesium	10400	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 15:43	7439-95-4	
Manganese	138	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 15:43	7439-96-5	
Potassium	8020	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 16:58	7440-09-7	
Sodium	67600	ug/L	500	157	1	11/02/18 09:12	11/02/18 16:58	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	137	mg/L	20.0		1		11/05/18 14:00		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.47	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.092J	mg/L	0.20	0.012	1		10/31/18 16:22		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	85.0	mg/L	20.0	5.8	20		11/12/18 14:13	16887-00-6	
Sulfate	126	mg/L	20.0	4.8	20		11/12/18 14:13	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.20	mg/L	0.10	0.050	1		11/06/18 15:17	7723-14-0	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-03 (110-115) **Lab ID: 60285082003** Collected: 10/28/18 09:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	18100	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 18:11	7440-70-2	
Iron	3580	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 18:11	7439-89-6	
Magnesium	3860	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 18:11	7439-95-4	
Manganese	101	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 18:11	7439-96-5	
Potassium	5210	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 18:11	7440-09-7	
Sodium	183000	ug/L	500	157	1	11/02/18 09:12	11/02/18 18:11	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	367	mg/L	20.0	4.9	1		11/05/18 17:44		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	1.9	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.7	mg/L	0.20	0.012	1		10/31/18 16:40		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	48.5	mg/L	20.0	5.8	20		11/08/18 18:16	16887-00-6	
Sulfate	55.8	mg/L	20.0	4.8	20		11/08/18 18:16	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	4.6	mg/L	0.10	0.050	1		11/02/18 17:04	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-03 (110-115) FILTERED **Lab ID: 60285082004** Collected: 10/28/18 09:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	17600	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 18:14	7440-70-2	
Iron	939	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 18:14	7439-89-6	
Magnesium	3760	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 18:14	7439-95-4	
Manganese	48.5	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 18:14	7439-96-5	
Potassium	5150	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 18:14	7440-09-7	
Sodium	185000	ug/L	500	157	1	11/02/18 09:12	11/02/18 18:14	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	351	mg/L	20.0	4.9	1		11/05/18 17:48		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.99	mg/L	0.20	0.012	1		10/31/18 16:40		1e,H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	48.5	mg/L	20.0	5.8	20		11/08/18 18:30	16887-00-6	
Sulfate	56.1	mg/L	20.0	4.8	20		11/08/18 18:30	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	4.5	mg/L	0.10	0.050	1		11/02/18 17:08	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-02 (35-40) **Lab ID: 60285082005** Collected: 10/28/18 15:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	121000	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 18:16	7440-70-2	
Iron	6830	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 18:16	7439-89-6	
Magnesium	24800	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 18:16	7439-95-4	
Manganese	695	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 18:16	7439-96-5	
Potassium	7080	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 18:16	7440-09-7	
Sodium	128000	ug/L	500	157	1	11/02/18 09:12	11/02/18 18:16	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	445	mg/L	20.0		1		11/05/18 14:19		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	5.5	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.3	mg/L	0.20	0.012	1		10/31/18 16:26		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	54.3	mg/L	20.0	5.8	20		11/08/18 18:44	16887-00-6	
Sulfate	193	mg/L	20.0	4.8	20		11/08/18 18:44	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.26	mg/L	0.10	0.050	1		11/02/18 17:09	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: RB-1 **Lab ID: 60285082006** Collected: 10/28/18 15:45 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	66.0J	ug/L	200	53.5	1	11/02/18 09:12	11/02/18 18:18	7440-70-2	B
Iron	44.8J	ug/L	50.0	6.1	1	11/02/18 09:12	11/02/18 18:18	7439-89-6	B
Magnesium	18.2J	ug/L	50.0	14.0	1	11/02/18 09:12	11/02/18 18:18	7439-95-4	B
Manganese	0.89J	ug/L	5.0	0.73	1	11/02/18 09:12	11/02/18 18:18	7439-96-5	B
Potassium	<79.3	ug/L	500	79.3	1	11/02/18 09:12	11/02/18 18:18	7440-09-7	
Sodium	<157	ug/L	500	157	1	11/02/18 09:12	11/02/18 18:18	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/05/18 16:31		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.045J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		10/31/18 16:26		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	0.44J	mg/L	1.0	0.29	1		11/12/18 14:45	16887-00-6	
Sulfate	<0.24	mg/L	1.0	0.24	1		11/12/18 14:45	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.065J	mg/L	0.10	0.050	1		11/02/18 17:10	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-02 (70-75) **Lab ID: 60285082007** Collected: 10/29/18 07:45 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	53900	ug/L	200	53.5	1	11/02/18 09:39	11/02/18 19:29	7440-70-2	
Iron	2810	ug/L	50.0	6.1	1	11/02/18 09:39	11/02/18 19:29	7439-89-6	
Magnesium	13900	ug/L	50.0	14.0	1	11/02/18 09:39	11/02/18 19:29	7439-95-4	
Manganese	267	ug/L	5.0	0.73	1	11/02/18 09:39	11/02/18 19:29	7439-96-5	
Potassium	5170	ug/L	500	79.3	1	11/02/18 09:39	11/02/18 19:29	7440-09-7	
Sodium	103000	ug/L	500	157	1	11/02/18 09:39	11/02/18 19:29	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	124	mg/L	20.0	4.9	1		11/05/18 17:12		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	2.4	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.38	mg/L	0.20	0.012	1		10/31/18 16:26		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	52.0	mg/L	20.0	5.8	20		11/08/18 19:13	16887-00-6	
Sulfate	249	mg/L	20.0	4.8	20		11/08/18 19:13	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.98	mg/L	0.10	0.050	1		11/02/18 17:11	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: DUP-1 **Lab ID: 60285082008** Collected: 10/29/18 07:45 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	53700	ug/L	200	53.5	1	11/02/18 09:39	11/02/18 19:36	7440-70-2	
Iron	2880	ug/L	50.0	6.1	1	11/02/18 09:39	11/02/18 19:36	7439-89-6	
Magnesium	13800	ug/L	50.0	14.0	1	11/02/18 09:39	11/02/18 19:36	7439-95-4	
Manganese	271	ug/L	5.0	0.73	1	11/02/18 09:39	11/02/18 19:36	7439-96-5	
Potassium	5160	ug/L	500	79.3	1	11/02/18 09:39	11/02/18 19:36	7440-09-7	
Sodium	102000	ug/L	500	157	1	11/02/18 09:39	11/02/18 19:36	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	127	mg/L	20.0	4.9	1		11/05/18 17:26		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	2.4	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.45	mg/L	0.20	0.012	1		10/31/18 16:27		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	57.7	mg/L	20.0	5.8	20		11/08/18 19:27	16887-00-6	
Sulfate	248	mg/L	20.0	4.8	20		11/08/18 19:27	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.95	mg/L	0.10	0.050	1		11/02/18 17:15	7723-14-0	M1

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-02 (125-130) **Lab ID: 6028508209** Collected: 10/29/18 16:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	33800	ug/L	200	53.5	1	11/02/18 09:39	11/02/18 19:38	7440-70-2	
Iron	1800	ug/L	50.0	6.1	1	11/02/18 09:39	11/02/18 19:38	7439-89-6	
Magnesium	6980	ug/L	50.0	14.0	1	11/02/18 09:39	11/02/18 19:38	7439-95-4	
Manganese	148	ug/L	5.0	0.73	1	11/02/18 09:39	11/02/18 19:38	7439-96-5	
Potassium	5690	ug/L	500	79.3	1	11/02/18 09:39	11/02/18 19:38	7440-09-7	
Sodium	182000	ug/L	500	157	1	11/02/18 09:39	11/02/18 19:38	7440-23-5	M1
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	206	mg/L	20.0	4.9	1		11/05/18 17:30		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.40	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.4	mg/L	0.20	0.012	1		10/31/18 16:32		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	63.4	mg/L	20.0	5.8	20		11/08/18 20:10	16887-00-6	
Sulfate	219	mg/L	20.0	4.8	20		11/08/18 20:10	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	3.4	mg/L	0.10	0.050	1		11/02/18 17:17	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Sample: BH-02 (125-130) FILTERED **Lab ID: 60285082010** Collected: 10/29/18 16:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	23300	ug/L	200	53.5	1	11/02/18 09:39	11/02/18 19:45	7440-70-2	
Iron	1140	ug/L	50.0	6.1	1	11/02/18 09:39	11/02/18 19:45	7439-89-6	
Magnesium	5900	ug/L	50.0	14.0	1	11/02/18 09:39	11/02/18 19:45	7439-95-4	
Manganese	115	ug/L	5.0	0.73	1	11/02/18 09:39	11/02/18 19:45	7439-96-5	
Potassium	5640	ug/L	500	79.3	1	11/02/18 09:39	11/02/18 19:45	7440-09-7	
Sodium	179000	ug/L	500	157	1	11/02/18 09:39	11/02/18 19:45	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	195	mg/L	20.0	4.9	1		11/05/18 17:34		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.040J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.1	mg/L	0.20	0.012	1		10/31/18 16:33		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	63.4	mg/L	20.0	5.8	20		11/08/18 20:24	16887-00-6	M1
Sulfate	220	mg/L	20.0	4.8	20		11/08/18 20:24	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	3.3	mg/L	0.10	0.050	1		11/02/18 17:18	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 553011 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006

METHOD BLANK: 2267839 Matrix: Water
 Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	65.0J	200	53.5	11/02/18 15:29	
Iron	ug/L	17.9J	50.0	6.1	11/02/18 15:29	
Magnesium	ug/L	14.8J	50.0	14.0	11/02/18 15:29	
Manganese	ug/L	0.95J	5.0	0.73	11/02/18 15:29	
Potassium	ug/L	<79.3	500	79.3	11/02/18 16:51	
Sodium	ug/L	<157	500	157	11/02/18 16:51	

LABORATORY CONTROL SAMPLE: 2267840

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10400	104	85-115	
Iron	ug/L	10000	10500	105	85-115	
Magnesium	ug/L	10000	10700	107	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10900	109	85-115	
Sodium	ug/L	10000	10500	105	85-115	

MATRIX SPIKE SAMPLE: 2267841

Parameter	Units	60285126001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	54000	10000	67000	129	70-130	
Iron	ug/L	534	10000	10600	101	70-130	
Magnesium	ug/L	11500	10000	21700	101	70-130	
Manganese	ug/L	6.0	1000	992	99	70-130	
Potassium	ug/L	1340	10000	11600	102	70-130	
Sodium	ug/L	19200	10000	29900	107	70-130	

MATRIX SPIKE SAMPLE: 2267842

Parameter	Units	60285082002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	58000	10000	68900	109	70-130	
Iron	ug/L	565	10000	10400	98	70-130	
Magnesium	ug/L	10400	10000	20000	96	70-130	
Manganese	ug/L	138	1000	1080	95	70-130	
Potassium	ug/L	8020	10000	18400	104	70-130	
Sodium	ug/L	67600	10000	78100	104	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285082

QC Batch: 553032 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60285082007, 60285082008, 60285082009, 60285082010

METHOD BLANK: 2267908 Matrix: Water
Associated Lab Samples: 60285082007, 60285082008, 60285082009, 60285082010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<53.5	200	53.5	11/02/18 19:23	
Iron	ug/L	<6.1	50.0	6.1	11/02/18 19:23	
Magnesium	ug/L	16.5J	50.0	14.0	11/02/18 19:23	
Manganese	ug/L	<0.73	5.0	0.73	11/02/18 19:23	
Potassium	ug/L	<79.3	500	79.3	11/02/18 19:23	
Sodium	ug/L	<157	500	157	11/02/18 19:23	

LABORATORY CONTROL SAMPLE: 2267909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9730	97	85-115	
Iron	ug/L	10000	9730	97	85-115	
Magnesium	ug/L	10000	9830	98	85-115	
Manganese	ug/L	1000	948	95	85-115	
Potassium	ug/L	10000	9860	99	85-115	
Sodium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2267910 2267911

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		60285082009 Result	Spike Conc.	Spike Conc.	Result						
Calcium	ug/L	33800	10000	10000	43000	44000	92	102	70-130	2	20
Iron	ug/L	1800	10000	10000	11700	12100	99	103	70-130	3	20
Magnesium	ug/L	6980	10000	10000	16400	16800	95	99	70-130	2	20
Manganese	ug/L	148	1000	1000	1080	1090	93	94	70-130	1	20
Potassium	ug/L	5690	10000	10000	15500	15800	98	101	70-130	2	20
Sodium	ug/L	182000	10000	10000	188000	192000	67	99	70-130	2	20 M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 553401 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007, 60285082008, 60285082009, 60285082010

METHOD BLANK: 2269411 Matrix: Water
 Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007, 60285082008, 60285082009, 60285082010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	1.4J	20.0		11/05/18 13:36	

LABORATORY CONTROL SAMPLE: 2269412

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	505	101	90-110	

SAMPLE DUPLICATE: 2269413

Parameter	Units	60285082002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	137	144	5	10	

SAMPLE DUPLICATE: 2269414

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	180	191	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 552548

Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4

Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007, 60285082008, 60285082009, 60285082010

METHOD BLANK: 2265964

Matrix: Water

Associated Lab Samples: 60285082001, 60285082002, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007, 60285082008, 60285082009, 60285082010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	10/31/18 16:09	H6

LABORATORY CONTROL SAMPLE: 2265965

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	105	90-110	H6

SAMPLE DUPLICATE: 2265966

Parameter	Units	60285082002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.092J	0.056J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 554207

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60285082001, 60285082003, 60285082004, 60285082005, 60285082007, 60285082008, 60285082009, 60285082010

METHOD BLANK: 2273026

Matrix: Water

Associated Lab Samples: 60285082001, 60285082003, 60285082004, 60285082005, 60285082007, 60285082008, 60285082009, 60285082010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/08/18 16:22	
Sulfate	mg/L	<0.24	1.0	0.24	11/08/18 16:22	

LABORATORY CONTROL SAMPLE: 2273027

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2273028 2273029

Parameter	Units	60285082001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	44.7	100	100	160	158	115	113	90-110	1	15	M1
Sulfate	mg/L	126	100	100	260	242	135	117	90-110	7	15	M1

MATRIX SPIKE SAMPLE: 2273030

Parameter	Units	60285082010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	63.4	100	177	114	90-110	M1
Sulfate	mg/L	220	100	330	110	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 554692 Analysis Method: EPA 300.0
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
 Associated Lab Samples: 60285082002, 60285082006

METHOD BLANK: 2275367 Matrix: Water

Associated Lab Samples: 60285082002, 60285082006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/12/18 12:21	
Sulfate	mg/L	<0.24	1.0	0.24	11/12/18 12:21	

LABORATORY CONTROL SAMPLE: 2275368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2275369 2275370

Parameter	Units	60285081007 Result	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec						
Sulfate	mg/L	95.2	50	50	174	146	157	102	90-110	17	15	M1,R1		

MATRIX SPIKE SAMPLE: 2275371

Parameter	Units	60285082002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	85.0	100	190	105	90-110	
Sulfate	mg/L	126	100	229	102	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 552716 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285082001, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007

METHOD BLANK: 2266612 Matrix: Water
 Associated Lab Samples: 60285082001, 60285082003, 60285082004, 60285082005, 60285082006, 60285082007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/02/18 16:34	

LABORATORY CONTROL SAMPLE: 2266613

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	99	90-110	

MATRIX SPIKE SAMPLE: 2266614

Parameter	Units	60285028001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	9.7	2	12.2	125	90-110	M1

SAMPLE DUPLICATE: 2266615

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.23	0.18	25	10	D6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 552718 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285082008, 60285082009, 60285082010

METHOD BLANK: 2266617 Matrix: Water

Associated Lab Samples: 60285082008, 60285082009, 60285082010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/02/18 17:21	

LABORATORY CONTROL SAMPLE: 2266618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	99	90-110	

MATRIX SPIKE SAMPLE: 2266619

Parameter	Units	60285082008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.95	2	2.6	84	90-110	M1

MATRIX SPIKE SAMPLE: 2266621

Parameter	Units	60285094004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	4.0	2	5.6	79	90-110	M1

SAMPLE DUPLICATE: 2266620

Parameter	Units	60285083001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	ND	0.11		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

QC Batch: 553392 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285082002

METHOD BLANK: 2269378 Matrix: Water
 Associated Lab Samples: 60285082002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/06/18 14:59	

LABORATORY CONTROL SAMPLE: 2269379

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	102	90-110	

MATRIX SPIKE SAMPLE: 2269380

Parameter	Units	60284667003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.75	2	2.5	88	90-110	M1

MATRIX SPIKE SAMPLE: 2269382

Parameter	Units	60285082002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.20	2	1.9	87	90-110	M1

SAMPLE DUPLICATE: 2269381

Parameter	Units	60285300002 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	<0.050	<0.050		10	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

1e Ferrous Iron result is greater than the Iron. Data is within laboratory control limits.

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285082001	BH-03 (30-32)	EPA 200.7	553011	EPA 200.7	553125
60285082002	BH-03 (70-75)	EPA 200.7	553011	EPA 200.7	553125
60285082003	BH-03 (110-115)	EPA 200.7	553011	EPA 200.7	553125
60285082004	BH-03 (110-115) FILTERED	EPA 200.7	553011	EPA 200.7	553125
60285082005	BH-02 (35-40)	EPA 200.7	553011	EPA 200.7	553125
60285082006	RB-1	EPA 200.7	553011	EPA 200.7	553125
60285082007	BH-02 (70-75)	EPA 200.7	553032	EPA 200.7	553112
60285082008	DUP-1	EPA 200.7	553032	EPA 200.7	553112
60285082009	BH-02 (125-130)	EPA 200.7	553032	EPA 200.7	553112
60285082010	BH-02 (125-130) FILTERED	EPA 200.7	553032	EPA 200.7	553112
60285082001	BH-03 (30-32)	SM 2320B	553401		
60285082002	BH-03 (70-75)	SM 2320B	553401		
60285082003	BH-03 (110-115)	SM 2320B	553401		
60285082004	BH-03 (110-115) FILTERED	SM 2320B	553401		
60285082005	BH-02 (35-40)	SM 2320B	553401		
60285082006	RB-1	SM 2320B	553401		
60285082007	BH-02 (70-75)	SM 2320B	553401		
60285082008	DUP-1	SM 2320B	553401		
60285082009	BH-02 (125-130)	SM 2320B	553401		
60285082010	BH-02 (125-130) FILTERED	SM 2320B	553401		
60285082001	BH-03 (30-32)	SM 3500-Fe B#4	554281		
60285082002	BH-03 (70-75)	SM 3500-Fe B#4	554281		
60285082003	BH-03 (110-115)	SM 3500-Fe B#4	554281		
60285082004	BH-03 (110-115) FILTERED	SM 3500-Fe B#4	554281		
60285082005	BH-02 (35-40)	SM 3500-Fe B#4	554281		
60285082006	RB-1	SM 3500-Fe B#4	554281		
60285082007	BH-02 (70-75)	SM 3500-Fe B#4	554281		
60285082008	DUP-1	SM 3500-Fe B#4	554281		
60285082009	BH-02 (125-130)	SM 3500-Fe B#4	554281		
60285082010	BH-02 (125-130) FILTERED	SM 3500-Fe B#4	554281		
60285082001	BH-03 (30-32)	SM 3500-Fe B#4	552548		
60285082002	BH-03 (70-75)	SM 3500-Fe B#4	552548		
60285082003	BH-03 (110-115)	SM 3500-Fe B#4	552548		
60285082004	BH-03 (110-115) FILTERED	SM 3500-Fe B#4	552548		
60285082005	BH-02 (35-40)	SM 3500-Fe B#4	552548		
60285082006	RB-1	SM 3500-Fe B#4	552548		
60285082007	BH-02 (70-75)	SM 3500-Fe B#4	552548		
60285082008	DUP-1	SM 3500-Fe B#4	552548		
60285082009	BH-02 (125-130)	SM 3500-Fe B#4	552548		
60285082010	BH-02 (125-130) FILTERED	SM 3500-Fe B#4	552548		
60285082001	BH-03 (30-32)	EPA 300.0	554207		
60285082002	BH-03 (70-75)	EPA 300.0	554692		
60285082003	BH-03 (110-115)	EPA 300.0	554207		
60285082004	BH-03 (110-115) FILTERED	EPA 300.0	554207		
60285082005	BH-02 (35-40)	EPA 300.0	554207		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285082

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285082006	RB-1	EPA 300.0	554692		
60285082007	BH-02 (70-75)	EPA 300.0	554207		
60285082008	DUP-1	EPA 300.0	554207		
60285082009	BH-02 (125-130)	EPA 300.0	554207		
60285082010	BH-02 (125-130) FILTERED	EPA 300.0	554207		
60285082001	BH-03 (30-32)	EPA 365.4	552716		
60285082002	BH-03 (70-75)	EPA 365.4	553392		
60285082003	BH-03 (110-115)	EPA 365.4	552716		
60285082004	BH-03 (110-115) FILTERED	EPA 365.4	552716		
60285082005	BH-02 (35-40)	EPA 365.4	552716		
60285082006	RB-1	EPA 365.4	552716		
60285082007	BH-02 (70-75)	EPA 365.4	552716		
60285082008	DUP-1	EPA 365.4	552718		
60285082009	BH-02 (125-130)	EPA 365.4	552718		
60285082010	BH-02 (125-130) FILTERED	EPA 365.4	552718		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285082



Client Name: Golder Associates

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other zpic

Thermometer Used: T100 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.4 Corr. Factor +0.2 Corrected 0.6

Date and initials of person examining contents: 10/30/18 JLS

Temperature should be above freezing to 6°C 2.8 3.0

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>Fe + 2</u>
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Filtered volume received for dissolved tests?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>10/30/18</u>
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jana Chubb Date: 10/30/18



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: _____ of _____

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Mark Haddock (mhaddock@golder.com)	Attention:	
Address:	820 South Main Street, Suite 100 St Charles, MO 63301	Copy To:	Jeffrey Ingram	Company Name:	
Email To:	maddock@golder.com	Purchase Order No.:		Address:	
Phone:	636-724-9191	Project Name:	Ameren Rush Island Engery Center	Pace Quote Reference:	
Requested Due Date/TAT:	Standard	Project Number:		Pace Project Manager:	Jamie Church
				Pace Profile #:	9285
			REGULATORY AGENCY		
			<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER		
			Site Location: _____ MO STATE: _____		

ITEM #	Valid Matrix Codes	Matrix Code	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test ↑	Requested Analysis Filtered (Y/N)												Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB					Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	
1	BH-03(30-32)	WT	G	10/27 1255	10/27 1420		4	H2SO4	Metals*	Chloride	Sulfate	Alkalinity	Ferrous Iron	Ferric Iron	Total Phosphorus	HOLD Metals**	HOLD Dissolved Metals**	Residual Chlorine (Y/N)	00251982			
2	BH-03(70-75)	WT	G				4	HCl	Unpreserved	HNO3	H2SO4	NaOH	Na2S2O8	Methanol	Other	Y	Y		001			
3	BH-03(70-75) MS	WT	G				4									Y	Y		002			
4	BH-03(70-75) MSP	WT	G				4									Y	Y		003			
5	BH-08(10-15)	WT	G	10/28 0910	10/28 0910		3									Y	Y		004			
6	BH-08(10-15) FUEL OIL	WT	G	10/28 1500	10/28 1545		4									Y	Y		005			
7	BH-02(35-40)	WT	G	10/29 0745	10/29 0745		4									Y	Y		006			
8	BH-01	WT	G				4									Y	Y		007			
9	BH-02(70-75)	WT	G	10/29 1410	10/29 1610		4									Y	Y		008			
10	DUP-1	WT	G				4									Y	Y		009			
11	BH-02(125-130)	WT	G				4									Y	Y		010			
12	BH-02(125-130) FUEL	WT	G				4									Y	Y		011			

RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS	
SUN INGRAMSON		10/29		1815		W.C. PT / PEST		10/30		10555		Y Y Y Y	
ADDITIONAL COMMENTS		RECEIVED ON		ICE (Y/N)		CUSTODY SEALED		COOLER (Y/N)		SAMPLES INTACT			
HOLD FOR POSSIBLE ADDITIONAL OOR METALS													
SAMPLER NAME AND SIGNATURE													
PRINT Name of SAMPLER: J.F. Ingram													
SIGNATURE of SAMPLER: J.F. Ingram													
DATE SIGNED (MM/DD/YYYY):													
10/29/08													

MEMORANDUM**DATE** January 17, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – BORE HOLE SAMPLING
– DATA PACKAGE 60285082**

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC - BHS - Oct 2018
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/17/19

Laboratory: Pace Analytical SDG #: 60285082
 Analytical Method (type and no.): Metals (200.78200.0), Hg (7420), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe²⁺), Anions (300.0), P (365.4), Ra (903.12004.0)
 Matrix: Air Soil/Sed. Water Waste Fe (SM 3500-Fe²⁺)
 Sample Names BH-03(30-32), BH-03(70-75), BH-03(110-115), BH-03(110-115) Filtered, BH-02(35-40), RB-1, BH-02(70-75), DUP-1, BH-02(125-130), BH-02(125-130) Filtered

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/26/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Q, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	See Notes
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	RB-1: Ca(66.0), Fe(44.8), Mg(18.2), Mn(0.89), Fe ³⁺ (0.045)
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Cl ⁻ (0.44), P(0.065)

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dup-1@ BH-02(70-75) RB-1@ RB-1@ BH-02(35-40)
b) Were field dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ca, Cl ⁻ , SO ₄ ²⁻ , P
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cl ⁻ , SO ₄ ²⁻
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SO ₄ ²⁻

Comments/Notes:

MB:

[2001-06]: Ca(65.0), Fe(17.9), Mg(14.8), Mn(0.95), Alk(1.4)

[2007-10]: Mg(16.5), Alk(1.4)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
All Samples	Ferrous Ion (Fe^{2+})	-	J/U	Analyzed outside EPA hold time
RB-1	Calcium (Ca)	200	U	Detected in Method Blank ; PAL > Result > MDL
I	Iron (Fe)	50.0	U	I
I	Magnesium (Mg)	50.0	U	I
I	Manganese (Mn)	5.0	U	I

Signature: *Tommy J. Good*

Date: 1/17/2019

November 14, 2018

Mark Haddock
Golder Associates
820 S. Main St
Suite 100
Saint Charles, MO 63301

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285228

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on October 31, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
John Suozzi, Golder Associates



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Arkansas Drinking Water

Missouri Certification Number: 10090

WY STR Certification #: 2456.01

Arkansas Certification #: 18-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-18-11

Utah Certification #: KS000212018-8

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285228001	BH-01 (26-31)	Water	10/30/18 09:30	10/31/18 03:30
60285228002	BH-01-FB-1	Water	10/30/18 12:30	10/31/18 03:30
60285228003	BH-01 (75.0-80.0)	Water	10/30/18 12:25	10/31/18 03:30

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285228001	BH-01 (26-31)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285228002	BH-01-FB-1	EPA 200.7	EMR	6	PASI-K
		SM 2320B	RMT	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K
60285228003	BH-01 (75.0-80.0)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	RMT	1	PASI-K
		EPA 300.0	WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Sample: BH-01 (26-31) **Lab ID: 60285228001** Collected: 10/30/18 09:30 Received: 10/31/18 03:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	197000	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 12:49	7440-70-2	M1
Iron	1360	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 12:49	7439-89-6	
Magnesium	48600	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 12:49	7439-95-4	
Manganese	707	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 12:49	7439-96-5	
Potassium	7830	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 12:49	7440-09-7	
Sodium	47200	ug/L	500	157	1	11/05/18 17:55	11/07/18 12:49	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	472	mg/L	20.0	4.9	1		11/07/18 14:51		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.36	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	1.0	mg/L	0.20	0.012	1		10/31/18 16:36		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	50.6	mg/L	20.0	5.8	20		11/12/18 22:36	16887-00-6	B
Sulfate	312	mg/L	20.0	4.8	20		11/12/18 22:36	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/02/18 17:43	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Sample: BH-01-FB-1 **Lab ID: 60285228002** Collected: 10/30/18 12:30 Received: 10/31/18 03:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	<53.5	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 12:51	7440-70-2	
Iron	<6.1	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 12:51	7439-89-6	
Magnesium	<14.0	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 12:51	7439-95-4	
Manganese	<0.73	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 12:51	7439-96-5	
Potassium	<79.3	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 12:51	7440-09-7	
Sodium	<157	ug/L	500	157	1	11/05/18 17:55	11/07/18 12:51	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/07/18 14:54		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.0030J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		10/31/18 16:37		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	0.34J	mg/L	1.0	0.29	1		11/12/18 23:40	16887-00-6	B
Sulfate	<0.24	mg/L	1.0	0.24	1		11/12/18 23:40	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/02/18 17:44	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Sample: BH-01 (75.0-80.0) **Lab ID: 60285228003** Collected: 10/30/18 12:25 Received: 10/31/18 03:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	45500	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 12:53	7440-70-2	
Iron	788	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 12:53	7439-89-6	
Magnesium	5200	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 12:53	7439-95-4	
Manganese	241	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 12:53	7439-96-5	
Potassium	5540	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 12:53	7440-09-7	
Sodium	123000	ug/L	500	157	1	11/05/18 17:55	11/07/18 12:53	7440-23-5	M1
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	74.3	mg/L	20.0	4.9	1		11/08/18 16:31		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.43	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.36	mg/L	0.20	0.012	1		10/31/18 16:37		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	52.8	mg/L	20.0	5.8	20		11/13/18 00:12	16887-00-6	B
Sulfate	287	mg/L	20.0	4.8	20		11/13/18 00:12	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.96	mg/L	0.10	0.050	1		11/02/18 17:45	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 553513 Analysis Method: EPA 200.7
 QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
 Associated Lab Samples: 60285228001, 60285228002, 60285228003

METHOD BLANK: 2269848 Matrix: Water

Associated Lab Samples: 60285228001, 60285228002, 60285228003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	55.2J	200	53.5	11/07/18 12:36	
Iron	ug/L	<6.1	50.0	6.1	11/07/18 12:36	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 12:36	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 12:36	
Potassium	ug/L	185J	500	79.3	11/07/18 12:36	
Sodium	ug/L	<157	500	157	11/07/18 12:36	

LABORATORY CONTROL SAMPLE: 2269849

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9540	95	85-115	
Iron	ug/L	10000	9660	97	85-115	
Magnesium	ug/L	10000	9710	97	85-115	
Manganese	ug/L	1000	948	95	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2269850 2269851

Parameter	Units	60285228001		60285228003		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Result	MSD Spike Conc.	MS Spike Conc.	MSD Result								
Calcium	ug/L	197000	10000	10000	199000	203000	13	53	70-130	2	20	M1	
Iron	ug/L	1360	10000	10000	10700	10600	94	93	70-130	1	20		
Magnesium	ug/L	48600	10000	10000	56200	57600	76	90	70-130	2	20		
Manganese	ug/L	707	1000	1000	1590	1600	89	89	70-130	1	20		
Potassium	ug/L	7830	10000	10000	17600	17700	97	99	70-130	1	20		
Sodium	ug/L	47200	10000	10000	55900	57200	86	100	70-130	2	20		

MATRIX SPIKE SAMPLE: 2269852

Parameter	Units	60285228003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	45500	10000	52800	72	70-130	
Iron	ug/L	788	10000	9560	88	70-130	
Magnesium	ug/L	5200	10000	13700	85	70-130	
Manganese	ug/L	241	1000	1090	85	70-130	
Potassium	ug/L	5540	10000	14600	91	70-130	
Sodium	ug/L	123000	10000	129000	59	70-130	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 553880

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285228001, 60285228002

METHOD BLANK: 2271165

Matrix: Water

Associated Lab Samples: 60285228001, 60285228002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/07/18 12:02	

LABORATORY CONTROL SAMPLE: 2271166

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	498	100	90-110	

SAMPLE DUPLICATE: 2271169

Parameter	Units	60285613001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	1060	1130	6	10	

SAMPLE DUPLICATE: 2271170

Parameter	Units	60285719007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	325	326	0	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 554214

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285228003

METHOD BLANK: 2273052

Matrix: Water

Associated Lab Samples: 60285228003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/08/18 16:12	

LABORATORY CONTROL SAMPLE: 2273053

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	500	100	90-110	

SAMPLE DUPLICATE: 2273054

Parameter	Units	60285228003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	74.3	76.3	3	10	

SAMPLE DUPLICATE: 2273055

Parameter	Units	60285434003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	226	230	2	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 552549 Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285228001, 60285228002, 60285228003

METHOD BLANK: 2265971 Matrix: Water

Associated Lab Samples: 60285228001, 60285228002, 60285228003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	10/31/18 16:33	H6

LABORATORY CONTROL SAMPLE: 2265972

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	106	90-110	H6

SAMPLE DUPLICATE: 2265973

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.068J	0.066J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 554420

Analysis Method: EPA 300.0

QC Batch Method: EPA 300.0

Analysis Description: 300.0 IC Anions

Associated Lab Samples: 60285228001, 60285228002, 60285228003

METHOD BLANK: 2273800

Matrix: Water

Associated Lab Samples: 60285228001, 60285228002, 60285228003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.36J	1.0	0.29	11/12/18 18:52	
Sulfate	mg/L	<0.24	1.0	0.24	11/12/18 18:52	

LABORATORY CONTROL SAMPLE: 2273801

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2273802 2273803

Parameter	Units	60285434009		2273802		2273803		% Rec Limits	RPD	Max RPD	Qual	
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Sulfate	mg/L	4160	5000	5000	9480	9590	106	109	90-110	1	15	

MATRIX SPIKE SAMPLE: 2273804

Parameter	Units	60285228002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	0.34J	5	5.4	101	90-110	
Sulfate	mg/L	<0.24	5	5.4	109	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

QC Batch: 552718

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 60285228001, 60285228002, 60285228003

METHOD BLANK: 2266617

Matrix: Water

Associated Lab Samples: 60285228001, 60285228002, 60285228003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/02/18 17:21	

LABORATORY CONTROL SAMPLE: 2266618

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	99	90-110	

MATRIX SPIKE SAMPLE: 2266619

Parameter	Units	60285082008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.95	2	2.6	84	90-110	M1

MATRIX SPIKE SAMPLE: 2266621

Parameter	Units	60285094004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	4.0	2	5.6	79	90-110	M1

SAMPLE DUPLICATE: 2266620

Parameter	Units	60285083001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	ND	0.11		10	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285228

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285228001	BH-01 (26-31)	EPA 200.7	553513	EPA 200.7	553588
60285228002	BH-01-FB-1	EPA 200.7	553513	EPA 200.7	553588
60285228003	BH-01 (75.0-80.0)	EPA 200.7	553513	EPA 200.7	553588
60285228001	BH-01 (26-31)	SM 2320B	553880		
60285228002	BH-01-FB-1	SM 2320B	553880		
60285228003	BH-01 (75.0-80.0)	SM 2320B	554214		
60285228001	BH-01 (26-31)	SM 3500-Fe B#4	554281		
60285228002	BH-01-FB-1	SM 3500-Fe B#4	554281		
60285228003	BH-01 (75.0-80.0)	SM 3500-Fe B#4	554281		
60285228001	BH-01 (26-31)	SM 3500-Fe B#4	552549		
60285228002	BH-01-FB-1	SM 3500-Fe B#4	552549		
60285228003	BH-01 (75.0-80.0)	SM 3500-Fe B#4	552549		
60285228001	BH-01 (26-31)	EPA 300.0	554420		
60285228002	BH-01-FB-1	EPA 300.0	554420		
60285228003	BH-01 (75.0-80.0)	EPA 300.0	554420		
60285228001	BH-01 (26-31)	EPA 365.4	552718		
60285228002	BH-01-FB-1	EPA 365.4	552718		
60285228003	BH-01 (75.0-80.0)	EPA 365.4	552718		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285228
Barcode: 60285228

Client Name: Golder Assoc.

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other

Thermometer Used: T300 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read -0.1 Corr. Factor +0.2 Corrected 0.1

Date and initials of person examining contents: 10/31/18 JLS

Temperature should be above freezing to 6°C

Table with 3 columns: Description, Yes/No/N/A checkboxes, and Notes. Rows include Chain of Custody, Samples arrived, Short Hold Time, Rush Turn Around Time, Sufficient volume, Containers used, Containers intact, Unpreserved soils, Filtered volume, Sample labels match, Samples contain multiple phases, Containers requiring pH preservation, Cyanide water sample checks, Trip Blank present, Headspace in VOA vials, Samples from USDA Regulated Area, Additional labels attached.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: [Signature] Date: 10/31/18



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Client Information: Company: Golder Associates
 Address: 820 South Main Street, Suite 100
 St Charles, MO 63301
 Email To: mhaddock@golder.com
 Phone: 636-724-3191 Fax: 636-724-9323
 Requested Due Date/TAT: Standard

Section B Required Project Information: Report To: Mark Haddock (mhaddock@golder.com)
 Copy To: Jeffrey Ingram
 Purchase Order No.:
 Project Name: Ameren Rush Island Engery Center
 Project Number: 1531406.00026

Section C Invoice Information: Attention:
 Company Name:
 Address:
 Pace Quote Reference:
 Pace Project Manager: Jamie Church
 Pace Profile #: 9285

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Site Location: MO STATE: MO

ITEM #	Section D Required Client Information		COLLECTED				SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives										Requested Analysis Filtered (Y/N)							Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.	
	Valid Matrix Codes	Matrix Code	COMPOSITE START	DATE	TIME	COMPOSITE ENDGRAB				DATE	TIME	UNPRESERVED	H2SO4	HNO3	HCl	NaOH	Na2S2O8	Methanol	Other	Analysis Test	Metals*	Chloride	Sulfate	Alkalinity	Ferrous Iron	Ferric Iron			Total Phosphorus
1	BH-01(26-31)	WT G		10/30	1730			4																		Y			AP20, 8P35, 20P30 M
2	BH-01-FB-1	WT G		10/30	1220			3																					8P30 M
3	BH-01(26-31) (750-800)	WT G		10/30	1725			4																					20P30 M3
4		WT G																											
5		WT G																											
6		WT G																											
7		WT G																											
8		WT G																											
9		WT G																											
10		WT G																											
11		WT G																											
12		WT G																											

ADDITIONAL COMMENTS

EPA 200.7: Ca, Fe, Mg, Mn, K, Na

*HOLD FOR POSSIBLE ADDITIONAL CCR METALS

RELINQUISHED BY / AFFILIATION DATE TIME
 Jeffrey Ingram 10/30/18 1700

ACCEPTED BY / AFFILIATION DATE TIME
 Richard [Signature] 10/30/18 1700

SAMPLER NAME AND SIGNATURE DATE SIGNED (MM/DD/YYYY)
 Richard [Signature] 10/30/18 1700

PRINT Name of SAMPLER: KZ: pf [Signature]

SIGNATURE of SAMPLER:

Temp in °C Received on Ice (Y/N) Custody Sealed (Y/N) Samples Intact (Y/N)

10/30/18 0.1 Y Y Y

MEMORANDUM**DATE** January 15, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – BORE HOLE SAMPLING
– DATA PACKAGE 60285228**

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC-BHS - Oct 2018
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/15/19

Laboratory: Pace Analytical (12) SDG #: 60285228 (12)
 Analytical Method (type and no.): Metals (200.7 & 200.9), Hg (7478), Alk (SM 2320B), TSS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903-1804.0)
 Matrix: Air Soil/Sed. Water Waste
 Sample Names: BH-01 (26-31), BH-01-F8-1, BH-01 (75.0-80.0)

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/30/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Q, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Ca(55.2), K(185), Cl⁻(0.36)</u>
b) Were analytes detected in the field blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Fe³⁺(0.0030), Cl⁻(0.34)</u>
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Dup-1@ NA</u>
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>FB-1@ All Samples</u>
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Ca, Na, P</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Ca</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
All Samples	Ferrous Iron	—	J/UJ	Analyzed outside EPA hold time
BH-01 (26-31)	Chloride (Cl ⁻)	50.6	J	Detected in Method Blank (MB) ; 10xMB > Result > PQL ; PQL > Result > MDL ; 10xMB Result > PQL
BH-01-FB-1	┆	1.0	U	
BH-01 (75.0-80.0)	┆	52.8	J	

Signature: *Tommy [Signature]*

Date: 1/15/19

November 14, 2018

Mark Haddock
Golder Associates
820 S. Main St
Suite 100
Saint Charles, MO 63301

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285289

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on November 01, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
John Suozzi, Golder Associates



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Arkansas Drinking Water

Missouri Certification Number: 10090

WY STR Certification #: 2456.01

Arkansas Certification #: 18-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-18-11

Utah Certification #: KS000212018-8

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285289001	BH-01 (130-135)	Water	10/30/18 18:15	11/01/18 03:30

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60285289001	BH-01 (130-135)	EPA 200.7	EMR	6	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 3500-Fe B#4	LDB	1	PASI-K
		SM 3500-Fe B#4	MJK	1	PASI-K
		EPA 300.0	LDB, WNM	2	PASI-K
		EPA 365.4	BLA	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

Sample: BH-01 (130-135) **Lab ID: 60285289001** Collected: 10/30/18 18:15 Received: 11/01/18 03:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total		Analytical Method: EPA 200.7 Preparation Method: EPA 200.7							
Calcium	40700	ug/L	200	53.5	1	11/05/18 17:55	11/07/18 13:05	7440-70-2	
Iron	502	ug/L	50.0	6.1	1	11/05/18 17:55	11/07/18 13:05	7439-89-6	
Magnesium	10200	ug/L	50.0	14.0	1	11/05/18 17:55	11/07/18 13:05	7439-95-4	
Manganese	208	ug/L	5.0	0.73	1	11/05/18 17:55	11/07/18 13:05	7439-96-5	
Potassium	5360	ug/L	500	79.3	1	11/05/18 17:55	11/07/18 13:05	7440-09-7	
Sodium	133000	ug/L	500	157	1	11/05/18 17:55	11/07/18 13:05	7440-23-5	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	135	mg/L	20.0	4.9	1		11/09/18 12:30		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.34	mg/L	0.050		1		11/13/18 16:34	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.16J	mg/L	0.20	0.012	1		11/01/18 10:12		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	86.3	mg/L	10.0	2.9	10		11/11/18 01:34	16887-00-6	
Sulfate	264	mg/L	20.0	4.8	20		11/13/18 18:57	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	1.1	mg/L	0.10	0.050	1		11/07/18 10:05	7723-14-0	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch:	553513	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
Associated Lab Samples:	60285289001		

METHOD BLANK: 2269848 Matrix: Water
Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	55.2J	200	53.5	11/07/18 12:36	
Iron	ug/L	<6.1	50.0	6.1	11/07/18 12:36	
Magnesium	ug/L	<14.0	50.0	14.0	11/07/18 12:36	
Manganese	ug/L	<0.73	5.0	0.73	11/07/18 12:36	
Potassium	ug/L	185J	500	79.3	11/07/18 12:36	
Sodium	ug/L	<157	500	157	11/07/18 12:36	

LABORATORY CONTROL SAMPLE: 2269849

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	9540	95	85-115	
Iron	ug/L	10000	9660	97	85-115	
Magnesium	ug/L	10000	9710	97	85-115	
Manganese	ug/L	1000	948	95	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2269850 2269851

Parameter	Units	60285228001		60285228003		60285228003		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS Result	MSD Result							
Calcium	ug/L	197000	10000	10000	199000	203000	13	53	70-130	2	20	M1		
Iron	ug/L	1360	10000	10000	10700	10600	94	93	70-130	1	20			
Magnesium	ug/L	48600	10000	10000	56200	57600	76	90	70-130	2	20			
Manganese	ug/L	707	1000	1000	1590	1600	89	89	70-130	1	20			
Potassium	ug/L	7830	10000	10000	17600	17700	97	99	70-130	1	20			
Sodium	ug/L	47200	10000	10000	55900	57200	86	100	70-130	2	20			

MATRIX SPIKE SAMPLE: 2269852

Parameter	Units	60285228003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	45500	10000	52800	72	70-130	
Iron	ug/L	788	10000	9560	88	70-130	
Magnesium	ug/L	5200	10000	13700	85	70-130	
Manganese	ug/L	241	1000	1090	85	70-130	
Potassium	ug/L	5540	10000	14600	91	70-130	
Sodium	ug/L	123000	10000	129000	59	70-130	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch: 554304

Analysis Method: SM 2320B

QC Batch Method: SM 2320B

Analysis Description: 2320B Alkalinity

Associated Lab Samples: 60285289001

METHOD BLANK: 2273460

Matrix: Water

Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	<4.9	20.0	4.9	11/09/18 11:47	

LABORATORY CONTROL SAMPLE: 2273461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	500	513	103	90-110	

SAMPLE DUPLICATE: 2273463

Parameter	Units	60285458009 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	186	188	1	10	

SAMPLE DUPLICATE: 2273464

Parameter	Units	60285463002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO ₃	mg/L	385	399	4	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch: 552819 Analysis Method: SM 3500-Fe B#4
 QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous
 Associated Lab Samples: 60285289001

METHOD BLANK: 2266937 Matrix: Water
 Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	11/01/18 10:11	H6

LABORATORY CONTROL SAMPLE: 2266938

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.2	108	90-110	H6

SAMPLE DUPLICATE: 2266939

Parameter	Units	60285289001 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.16J	0.16J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch: 554524	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60285289001	

METHOD BLANK: 2274417 Matrix: Water

Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	0.52J	1.0	0.29	11/10/18 23:39	

LABORATORY CONTROL SAMPLE: 2274418

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	103	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch: 554918	Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0	Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60285289001	

METHOD BLANK: 2276472 Matrix: Water

Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	11/13/18 10:01	

LABORATORY CONTROL SAMPLE: 2276473

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.8	97	90-110	

MATRIX SPIKE SAMPLE: 2276476

Parameter	Units	60285452003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	4930	5000	13800	178	90-110	M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

QC Batch: 553548

Analysis Method: EPA 365.4

QC Batch Method: EPA 365.4

Analysis Description: 365.4 Phosphorus

Associated Lab Samples: 60285289001

METHOD BLANK: 2269929

Matrix: Water

Associated Lab Samples: 60285289001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/07/18 09:52	

LABORATORY CONTROL SAMPLE: 2269930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	1.9	95	90-110	

MATRIX SPIKE SAMPLE: 2269931

Parameter	Units	60285448002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	0.73	2	2.5	89	90-110	M1

MATRIX SPIKE SAMPLE: 2269933

Parameter	Units	60285354001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	7.6	2	10.1	127	90-110	M1

SAMPLE DUPLICATE: 2269932

Parameter	Units	6028554001 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	55.1	110	67	10	

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285289

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285289001	BH-01 (130-135)	EPA 200.7	553513	EPA 200.7	553588
60285289001	BH-01 (130-135)	SM 2320B	554304		
60285289001	BH-01 (130-135)	SM 3500-Fe B#4	554999		
60285289001	BH-01 (130-135)	SM 3500-Fe B#4	552819		
60285289001	BH-01 (130-135)	EPA 300.0	554524		
60285289001	BH-01 (130-135)	EPA 300.0	554918		
60285289001	BH-01 (130-135)	EPA 365.4	553548		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285289
Barcode
60285289

Client Name: Golder Assoc.

Courier: FedEx [] UPS [] VIA [] Clay [] PEX [] ECI [] Pace [] Xroads [x] Client [] Other []

Tracking #: _____ Pace Shipping Label Used? Yes [] No [x]

Custody Seal on Cooler/Box Present: Yes [x] No [] Seals intact: Yes [x] No []

Packing Material: Bubble Wrap [] Bubble Bags [] Foam [] None [] Other [x] Ziploc

Thermometer Used: T300 Type of Ice: Wet [] Blue [] None []

Cooler Temperature (°C): As-read 0.5 Corr. Factor +0.2 Corrected 0.7

Date and initials of person examining contents: 11-1-18 JLS

Temperature should be above freezing to 6°C

Table with 3 columns: Question, Yes/No/N/A checkboxes, and Notes. Rows include Chain of Custody, Short Hold Time analyses (Fe+2), Containers requiring pH preservation, etc.

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [Signature] Date: 11/1/18

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:

Company: Golder Associates
Address: 820 South Main Street, Suite 100
St Charles, MO 63301
Email To: maddock@golder.com
Phone: 636-724-9191 Fax: 636-724-9323
Requested Due Date/TAT: Standard

Section B
Required Project Information:

Report To: Mark Haddock (mhaddock@golder.com)
Copy To: Jeffrey Ingram
Project Name: Ameren Rush Island Engery Center
Project Number: KS3106-00026

Section C
Invoice Information:

Attention:
Company Name:
Address:
Site Location: MO
Pace Order No. / Purchase Order No.:
Pace Project Reference:
Pace Profile #: 9285

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / - / -)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes
MATRIX CODE
DRINKING WATER DW
WASTE WATER WW
WATER WWT
PRODUCT F
SOIL/SOLID SL
OIL OL
WIP WWP
AR AR
OT OT
TS TS

ITEM #	Valid Matrix Codes	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		DATE	TIME	DATE	TIME	SAMPLE CONDITIONS
		COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME	DATE	TIME					
1	BH-01 (130-135)			G	WT					10/31/18	1815			
2				G	WT									
3				G	WT									
4				G	WT									
5				G	WT									
6				G	WT									
7				G	WT									
8				G	WT									
9				G	WT									
10				G	WT									
11				G	WT									
12				G	WT									

ADDITIONAL COMMENTS

EPA 200.7: Ca, Fe, Mg, Mn, K, Na

HOLD FOR POSSIBLE ADDITIONAL COB METALS

W. Schnieder Golder
Rush Island Engery Center

10/31/18 1815
10/31/18 1700

1325
1700

10/31/18 1325
10/31/18 0730

10/31/18

DATE SIGNED (MM/DD/YY): 10/31/18

PRINT Name of SAMPLER: Eric Schnieder

SIGNATURE of SAMPLER: [Signature]

SAMPLER NAME AND SIGNATURE

Temp in °C _____

Received on Ice (Y/N) _____

Cooler Sealed (Y/N) _____

Samples Intact (Y/N) _____

MEMORANDUM**DATE** January 15, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – BORE HOLE SAMPLING
– DATA PACKAGE 60285289**

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEL BHS - Oct 2018
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/15/19

Laboratory: Pace Analytical SDG #: 60285289
 Analytical Method (type and no.): Metals (200.78-200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903-18904.0) (17)
 Matrix: Air Soil/Sed. Water Waste
 Sample Names: BH-01 (130-135)

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/30/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Q, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Ca(55.2), K(185)</u>
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Dup-1@ N/A</u>
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>FB-1@ N/A</u>
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Ca, Na, SO₄²⁻, P</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Ca</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
BH-01(130-135)	Ferrous Iron (Fe^{2+})	0.16	J	Analyzed outside EPA hold time

Signature: Tommy J. [Signature]

Date: 1/15/19

January 18, 2019

Mark Haddock
Golder Associates
820 S. Main St
Suite 100
Saint Charles, MO 63301

RE: Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285081

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on October 30, 2018. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

REV-1, 11/30/18: 200.7 Dissolved Metals and 200.8 Total Metals added per client request.

REV-2, 1/18/19: SW-FB-1 reanalysis reported.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
Eric Schneider, Golder Associates



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

Arkansas Drinking Water

Missouri Certification Number: 10090

WY STR Certification #: 2456.01

Arkansas Certification #: 18-016-0

Arkansas Drinking Water

Illinois Certification #: 004455

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116 / E10426

Louisiana Certification #: 03055

Nevada Certification #: KS000212018-1

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-18-11

Utah Certification #: KS000212018-8

Kansas Field Laboratory Accreditation: # E-92587

Missouri Certification: 10070

Missouri Certification Number: 10090

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60285081001	SW-2	Water	10/29/18 11:00	10/30/18 03:55
60285081002	SW-DUP-1	Water	10/29/18 11:00	10/30/18 03:55
60285081003	SW-1	Water	10/29/18 11:50	10/30/18 03:55
60285081004	SW-3	Water	10/29/18 12:30	10/30/18 03:55
60285081005	SW-4	Water	10/29/18 13:00	10/30/18 03:55
60285081006	SW-FB-1	Water	10/29/18 13:10	10/30/18 03:55
60285081007	SW-5	Water	10/29/18 13:50	10/30/18 03:55

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
60285081001	SW-2	EPA 200.7	EMR	18	PASI-K		
		EPA 200.7	JGP	18	PASI-K		
		EPA 200.8	JDH	6	PASI-K		
		EPA 200.8	JGP	6	PASI-K		
		EPA 7470	JDE	1	PASI-K		
		SM 2320B	MJK	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	RMT	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
		EPA 365.4	BLA	1	PASI-K		
		60285081002	SW-DUP-1	EPA 200.7	EMR	18	PASI-K
				EPA 200.7	JGP	18	PASI-K
				EPA 200.8	JDH	6	PASI-K
EPA 200.8	JGP			6	PASI-K		
EPA 7470	JDE			1	PASI-K		
SM 2320B	MJK			1	PASI-K		
SM 2540C	RLG			1	PASI-K		
SM 3500-Fe B#4	LDB			1	PASI-K		
SM 3500-Fe B#4	RMT			1	PASI-K		
EPA 300.0	WNM			3	PASI-K		
EPA 365.4	BLA			1	PASI-K		
60285081003	SW-1			EPA 200.7	EMR	18	PASI-K
				EPA 200.7	JGP	18	PASI-K
				EPA 200.8	JDH	6	PASI-K
		EPA 200.8	JGP	6	PASI-K		
		EPA 7470	JDE	1	PASI-K		
		SM 2320B	MJK	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	RMT	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
		EPA 365.4	BLA	1	PASI-K		
		60285081004	SW-3	EPA 200.7	EMR	18	PASI-K
				EPA 200.7	JGP	18	PASI-K
				EPA 200.8	JDH	6	PASI-K
EPA 200.8	JGP			6	PASI-K		

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
60285081005	SW-4	EPA 7470	JDE	1	PASI-K		
		SM 2320B	MJK	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	RMT	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		
		EPA 365.4	BLA	1	PASI-K		
		EPA 200.7	EMR	18	PASI-K		
		EPA 200.7	JGP	18	PASI-K		
		EPA 200.8	JDH	6	PASI-K		
		EPA 200.8	JGP	6	PASI-K		
		EPA 7470	JDE	1	PASI-K		
		SM 2320B	MJK	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		60285081006	SW-FB-1	SM 3500-Fe B#4	LDB	1	PASI-K
SM 3500-Fe B#4	RMT			1	PASI-K		
EPA 300.0	WNM			3	PASI-K		
EPA 365.4	BLA			1	PASI-K		
EPA 200.7	EMR			18	PASI-K		
EPA 200.8	JDH			6	PASI-K		
EPA 7470	JDE			1	PASI-K		
SM 2320B	MJK			1	PASI-K		
SM 2540C	RLG			1	PASI-K		
SM 3500-Fe B#4	LDB			1	PASI-K		
SM 3500-Fe B#4	RMT			1	PASI-K		
EPA 300.0	WNM			3	PASI-K		
EPA 365.4	BLA			1	PASI-K		
60285081007	SW-5			EPA 200.7	EMR	18	PASI-K
				EPA 200.7	EMR	18	PASI-K
		EPA 200.8	JDH	6	PASI-K		
		EPA 200.8	JGP	6	PASI-K		
		EPA 7470	JDE	1	PASI-K		
		SM 2320B	MJK	1	PASI-K		
		SM 2540C	RLG	1	PASI-K		
		SM 3500-Fe B#4	LDB	1	PASI-K		
		SM 3500-Fe B#4	RMT	1	PASI-K		
		EPA 300.0	WNM	3	PASI-K		

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SAMPLE ANALYTE COUNT

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 365.4	BLA	1	PASI-K

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-2 **Lab ID: 60285081001** Collected: 10/29/18 11:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	216	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:35	7429-90-5	
Barium	104	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:35	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:35	7440-41-7	
Boron	63.2J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:35	7440-42-8	
Calcium	66300	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:35	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:35	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:35	7440-50-8	
Iron	292	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:35	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:35	7439-92-1	
Lithium	12.7	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:35	7439-93-2	
Magnesium	24000	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:35	7439-95-4	
Manganese	86.2	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:35	7439-96-5	
Molybdenum	1.4J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:35	7439-98-7	
Nickel	1.9J	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:35	7440-02-0	
Potassium	6050	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:35	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:35	7440-22-4	
Sodium	24700	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:35	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:35	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 13:25	11/20/18 18:41	7429-90-5	
Barium, Dissolved	96.6	ug/L	5.0	1.5	1	11/16/18 13:25	11/20/18 18:41	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 13:25	11/20/18 18:41	7440-41-7	
Boron, Dissolved	57.4J	ug/L	100	12.5	1	11/16/18 13:25	11/20/18 18:41	7440-42-8	
Calcium, Dissolved	63400	ug/L	200	53.5	1	11/16/18 13:25	11/20/18 18:41	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 13:25	11/20/18 18:41	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 13:25	11/20/18 18:41	7440-50-8	
Iron, Dissolved	10.2J	ug/L	50.0	6.1	1	11/16/18 13:25	11/20/18 18:41	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 13:25	11/20/18 18:41	7439-92-1	
Lithium, Dissolved	5.8J	ug/L	10.0	4.6	1	11/16/18 13:25	11/20/18 18:41	7439-93-2	
Magnesium, Dissolved	23000	ug/L	50.0	14.0	1	11/16/18 13:25	11/20/18 18:41	7439-95-4	
Manganese, Dissolved	21.2	ug/L	5.0	0.73	1	11/16/18 13:25	11/20/18 18:41	7439-96-5	
Molybdenum, Dissolved	1.9J	ug/L	20.0	0.90	1	11/16/18 13:25	11/20/18 18:41	7439-98-7	
Nickel, Dissolved	1.5J	ug/L	5.0	1.4	1	11/16/18 13:25	11/20/18 18:41	7440-02-0	
Potassium, Dissolved	5940	ug/L	500	79.3	1	11/16/18 13:25	11/20/18 18:41	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 13:25	11/20/18 18:41	7440-22-4	
Sodium, Dissolved	24600	ug/L	500	157	1	11/16/18 13:25	11/20/18 18:41	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 13:25	11/20/18 18:41	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.33J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:12	7440-36-0	B
Arsenic	2.6	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:12	7440-38-2	
Cadmium	0.056J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:12	7440-43-9	B
Chromium	1.0	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:12	7440-47-3	
Selenium	0.84J	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:12	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:12	7440-28-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-2 **Lab ID: 60285081001** Collected: 10/29/18 11:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	0.24J	ug/L	1.0	0.15	1	10/31/18 12:26	11/02/18 15:14	7440-36-0	
Arsenic, Dissolved	2.1	ug/L	1.0	0.15	1	10/31/18 12:26	11/02/18 15:14	7440-38-2	
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	10/31/18 12:26	11/02/18 15:14	7440-43-9	
Chromium, Dissolved	<0.19	ug/L	1.0	0.19	1	10/31/18 12:26	11/02/18 15:14	7440-47-3	
Selenium, Dissolved	0.71J	ug/L	1.0	0.16	1	10/31/18 12:26	11/02/18 15:14	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	10/31/18 12:26	11/02/18 15:14	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:15	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO ₃	209	mg/L	20.0	4.9	1		11/05/18 16:35		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	334	mg/L	5.0	5.0	1		11/02/18 00:20		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	0.042J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.25	mg/L	0.20	0.012	1		10/31/18 16:27		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	18.3	mg/L	1.0	0.29	1		11/08/18 21:07	16887-00-6	
Fluoride	0.26	mg/L	0.20	0.19	1		11/08/18 21:07	16984-48-8	
Sulfate	79.7	mg/L	10.0	2.4	10		11/08/18 21:23	14808-79-8	
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.19	mg/L	0.10	0.050	1		11/02/18 16:50	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-DUP-1 Lab ID: 60285081002 Collected: 10/29/18 11:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	495	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:40	7429-90-5	
Barium	105	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:40	7440-39-3	
Beryllium	0.36J	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:40	7440-41-7	
Boron	64.4J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:40	7440-42-8	
Calcium	66800	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:40	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:40	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:40	7440-50-8	
Iron	558	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:40	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:40	7439-92-1	
Lithium	14.7	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:40	7439-93-2	
Magnesium	24300	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:40	7439-95-4	
Manganese	84.3	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:40	7439-96-5	
Molybdenum	1.6J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:40	7439-98-7	
Nickel	3.1J	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:40	7440-02-0	
Potassium	6140	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:40	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:40	7440-22-4	
Sodium	24800	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:40	7440-23-5	
Zinc	4.4J	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:40	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	39.3J	ug/L	75.0	21.1	1	11/16/18 13:25	11/20/18 18:43	7429-90-5	
Barium, Dissolved	97.5	ug/L	5.0	1.5	1	11/16/18 13:25	11/20/18 18:43	7440-39-3	
Beryllium, Dissolved	0.16J	ug/L	1.0	0.16	1	11/16/18 13:25	11/20/18 18:43	7440-41-7	B
Boron, Dissolved	52.4J	ug/L	100	12.5	1	11/16/18 13:25	11/20/18 18:43	7440-42-8	
Calcium, Dissolved	63500	ug/L	200	53.5	1	11/16/18 13:25	11/20/18 18:43	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 13:25	11/20/18 18:43	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 13:25	11/20/18 18:43	7440-50-8	
Iron, Dissolved	6.2J	ug/L	50.0	6.1	1	11/16/18 13:25	11/20/18 18:43	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 13:25	11/20/18 18:43	7439-92-1	
Lithium, Dissolved	15.8	ug/L	10.0	4.6	1	11/16/18 13:25	11/20/18 18:43	7439-93-2	D9
Magnesium, Dissolved	22900	ug/L	50.0	14.0	1	11/16/18 13:25	11/20/18 18:43	7439-95-4	
Manganese, Dissolved	21.8	ug/L	5.0	0.73	1	11/16/18 13:25	11/20/18 18:43	7439-96-5	
Molybdenum, Dissolved	1.7J	ug/L	20.0	0.90	1	11/16/18 13:25	11/20/18 18:43	7439-98-7	
Nickel, Dissolved	1.5J	ug/L	5.0	1.4	1	11/16/18 13:25	11/20/18 18:43	7440-02-0	
Potassium, Dissolved	5940	ug/L	500	79.3	1	11/16/18 13:25	11/20/18 18:43	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 13:25	11/20/18 18:43	7440-22-4	
Sodium, Dissolved	24600	ug/L	500	157	1	11/16/18 13:25	11/20/18 18:43	7440-23-5	
Zinc, Dissolved	3.9J	ug/L	50.0	3.5	1	11/16/18 13:25	11/20/18 18:43	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.29J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:14	7440-36-0	B
Arsenic	2.5	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:14	7440-38-2	
Cadmium	0.049J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:14	7440-43-9	B
Chromium	0.73J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:14	7440-47-3	
Selenium	0.79J	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:14	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:14	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-DUP-1 **Lab ID: 60285081002** Collected: 10/29/18 11:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony, Dissolved	0.25J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:21	7440-36-0	
Arsenic, Dissolved	2.2	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:21	7440-38-2	
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 19:21	7440-43-9	
Chromium, Dissolved	0.24J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 19:21	7440-47-3	
Selenium, Dissolved	0.67J	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 19:21	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 19:21	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:18	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	204	mg/L	20.0	4.9	1		11/05/18 16:41		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	358	mg/L	5.0	5.0	1		11/02/18 00:20		
Iron, Ferric (Calculation)									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.29	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.27	mg/L	0.20	0.012	1		10/31/18 16:27		H6
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	18.3	mg/L	1.0	0.29	1		11/08/18 21:55	16887-00-6	
Fluoride	0.26	mg/L	0.20	0.19	1		11/08/18 21:55	16984-48-8	
Sulfate	80.3	mg/L	10.0	2.4	10		11/08/18 22:11	14808-79-8	
365.4 Total Phosphorus									
Analytical Method: EPA 365.4									
Phosphorus	0.27	mg/L	0.10	0.050	1		11/02/18 16:51	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-1 **Lab ID: 60285081003** Collected: 10/29/18 11:50 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	204	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:46	7429-90-5	
Barium	102	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:46	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:46	7440-41-7	
Boron	57.4J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:46	7440-42-8	
Calcium	68700	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:46	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:46	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:46	7440-50-8	
Iron	237	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:46	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:46	7439-92-1	
Lithium	13.8	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:46	7439-93-2	
Magnesium	25200	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:46	7439-95-4	
Manganese	64.3	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:46	7439-96-5	
Molybdenum	1.6J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:46	7439-98-7	
Nickel	1.8J	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:46	7440-02-0	
Potassium	5610	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:46	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:46	7440-22-4	
Sodium	22700	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:46	7440-23-5	
Zinc	26.0J	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:46	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 13:25	11/20/18 17:52	7429-90-5	
Barium, Dissolved	98.3	ug/L	5.0	1.5	1	11/16/18 13:25	11/20/18 17:52	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 13:25	11/20/18 17:52	7440-41-7	
Boron, Dissolved	49.6J	ug/L	100	12.5	1	11/16/18 13:25	11/20/18 17:52	7440-42-8	
Calcium, Dissolved	64800	ug/L	200	53.5	1	11/16/18 13:25	11/20/18 17:52	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 13:25	11/20/18 17:52	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 13:25	11/20/18 17:52	7440-50-8	
Iron, Dissolved	12.8J	ug/L	50.0	6.1	1	11/16/18 13:25	11/20/18 17:52	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 13:25	11/20/18 17:52	7439-92-1	
Lithium, Dissolved	11.9	ug/L	10.0	4.6	1	11/16/18 13:25	11/20/18 17:52	7439-93-2	D9
Magnesium, Dissolved	24200	ug/L	50.0	14.0	1	11/16/18 13:25	11/20/18 17:52	7439-95-4	
Manganese, Dissolved	19.0	ug/L	5.0	0.73	1	11/16/18 13:25	11/20/18 17:52	7439-96-5	
Molybdenum, Dissolved	1.6J	ug/L	20.0	0.90	1	11/16/18 13:25	11/20/18 17:52	7439-98-7	
Nickel, Dissolved	<1.4	ug/L	5.0	1.4	1	11/16/18 13:25	11/20/18 17:52	7440-02-0	
Potassium, Dissolved	5760	ug/L	500	79.3	1	11/16/18 13:25	11/20/18 17:52	7440-09-7	D9
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 13:25	11/20/18 17:52	7440-22-4	
Sodium, Dissolved	23200	ug/L	500	157	1	11/16/18 13:25	11/20/18 17:52	7440-23-5	D9
Zinc, Dissolved	6.4J	ug/L	50.0	3.5	1	11/16/18 13:25	11/20/18 17:52	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.25J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:16	7440-36-0	B
Arsenic	2.0	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:16	7440-38-2	
Cadmium	0.060J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:16	7440-43-9	B
Chromium	0.31J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:16	7440-47-3	
Selenium	0.62J	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:16	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:16	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-1 **Lab ID: 60285081003** Collected: 10/29/18 11:50 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony, Dissolved	0.39J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:23	7440-36-0	
Arsenic, Dissolved	2.1	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:23	7440-38-2	
Cadmium, Dissolved	0.15J	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 19:23	7440-43-9	
Chromium, Dissolved	0.44J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 19:23	7440-47-3	
Selenium, Dissolved	0.68J	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 19:23	7782-49-2	
Thallium, Dissolved	0.19J	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 19:23	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:20	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	211	mg/L	20.0	4.9	1		11/05/18 16:45		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	325	mg/L	5.0	5.0	1		11/02/18 00:20		
Iron, Ferric (Calculation)									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	1.1	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.13J	mg/L	0.20	0.012	1		10/31/18 16:27		H6
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	19.6	mg/L	1.0	0.29	1		11/08/18 22:43	16887-00-6	
Fluoride	0.24	mg/L	0.20	0.19	1		11/08/18 22:43	16984-48-8	
Sulfate	73.7	mg/L	10.0	2.4	10		11/08/18 22:59	14808-79-8	
365.4 Total Phosphorus									
Analytical Method: EPA 365.4									
Phosphorus	0.14	mg/L	0.10	0.050	1		11/02/18 16:54	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-3 **Lab ID: 60285081004** Collected: 10/29/18 12:30 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	1850	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:48	7429-90-5	
Barium	138	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:48	7440-39-3	
Beryllium	0.29J	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:48	7440-41-7	
Boron	59.0J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:48	7440-42-8	
Calcium	66600	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:48	7440-70-2	
Cobalt	2.1J	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:48	7440-48-4	
Copper	5.8J	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:48	7440-50-8	
Iron	2730	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:48	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:48	7439-92-1	
Lithium	20.3	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:48	7439-93-2	
Magnesium	24000	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:48	7439-95-4	
Manganese	283	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:48	7439-96-5	
Molybdenum	1.4J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:48	7439-98-7	
Nickel	5.8	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:48	7440-02-0	
Potassium	5030	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:48	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:48	7440-22-4	
Sodium	27200	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:48	7440-23-5	
Zinc	16.8J	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:48	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 13:25	11/20/18 17:54	7429-90-5	
Barium, Dissolved	95.8	ug/L	5.0	1.5	1	11/16/18 13:25	11/20/18 17:54	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 13:25	11/20/18 17:54	7440-41-7	
Boron, Dissolved	45.2J	ug/L	100	12.5	1	11/16/18 13:25	11/20/18 17:54	7440-42-8	
Calcium, Dissolved	60000	ug/L	200	53.5	1	11/16/18 13:25	11/20/18 17:54	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 13:25	11/20/18 17:54	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 13:25	11/20/18 17:54	7440-50-8	
Iron, Dissolved	8.7J	ug/L	50.0	6.1	1	11/16/18 13:25	11/20/18 17:54	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 13:25	11/20/18 17:54	7439-92-1	
Lithium, Dissolved	21.2	ug/L	10.0	4.6	1	11/16/18 13:25	11/20/18 17:54	7439-93-2	D9
Magnesium, Dissolved	22300	ug/L	50.0	14.0	1	11/16/18 13:25	11/20/18 17:54	7439-95-4	
Manganese, Dissolved	78.8	ug/L	5.0	0.73	1	11/16/18 13:25	11/20/18 17:54	7439-96-5	
Molybdenum, Dissolved	1.9J	ug/L	20.0	0.90	1	11/16/18 13:25	11/20/18 17:54	7439-98-7	
Nickel, Dissolved	1.6J	ug/L	5.0	1.4	1	11/16/18 13:25	11/20/18 17:54	7440-02-0	
Potassium, Dissolved	4750	ug/L	500	79.3	1	11/16/18 13:25	11/20/18 17:54	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 13:25	11/20/18 17:54	7440-22-4	
Sodium, Dissolved	27800	ug/L	500	157	1	11/16/18 13:25	11/20/18 17:54	7440-23-5	D9
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 13:25	11/20/18 17:54	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.29J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:18	7440-36-0	B
Arsenic	4.3	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:18	7440-38-2	
Cadmium	0.23J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:18	7440-43-9	B
Chromium	5.3	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:18	7440-47-3	
Selenium	2.0	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:18	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:18	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-3 **Lab ID: 60285081004** Collected: 10/29/18 12:30 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony, Dissolved	0.23J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:26	7440-36-0	
Arsenic, Dissolved	2.1	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:26	7440-38-2	
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 19:26	7440-43-9	
Chromium, Dissolved	0.19J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 19:26	7440-47-3	
Selenium, Dissolved	1.1	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 19:26	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 19:26	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:22	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO ₃	153	mg/L	20.0	4.9	1		11/05/18 16:50		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	184	mg/L	5.0	5.0	1		11/02/18 00:20		
Iron, Ferric (Calculation)									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	2.6	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.092J	mg/L	0.20	0.012	1		10/31/18 16:28		H6
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	17.0	mg/L	1.0	0.29	1		11/08/18 23:31	16887-00-6	
Fluoride	0.28	mg/L	0.20	0.19	1		11/08/18 23:31	16984-48-8	
Sulfate	95.3	mg/L	10.0	2.4	10		11/09/18 00:19	14808-79-8	
365.4 Total Phosphorus									
Analytical Method: EPA 365.4									
Phosphorus	0.096J	mg/L	0.10	0.050	1		11/02/18 16:55	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-4 **Lab ID: 60285081005** Collected: 10/29/18 13:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	4700	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:51	7429-90-5	
Barium	192	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:51	7440-39-3	
Beryllium	0.57J	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:51	7440-41-7	
Boron	58.1J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:51	7440-42-8	
Calcium	72400	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:51	7440-70-2	
Cobalt	4.4J	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:51	7440-48-4	
Copper	11.3	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:51	7440-50-8	
Iron	6730	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:51	7439-89-6	
Lead	8.8J	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:51	7439-92-1	
Lithium	22.5	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:51	7439-93-2	
Magnesium	25600	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:51	7439-95-4	
Manganese	570	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:51	7439-96-5	
Molybdenum	1.1J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:51	7439-98-7	
Nickel	11.2	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:51	7440-02-0	
Potassium	5700	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:51	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:51	7440-22-4	
Sodium	27500	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:51	7440-23-5	
Zinc	97.5	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:51	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	<21.1	ug/L	75.0	21.1	1	11/16/18 13:25	11/20/18 17:56	7429-90-5	
Barium, Dissolved	102	ug/L	5.0	1.5	1	11/16/18 13:25	11/20/18 17:56	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/16/18 13:25	11/20/18 17:56	7440-41-7	
Boron, Dissolved	45.3J	ug/L	100	12.5	1	11/16/18 13:25	11/20/18 17:56	7440-42-8	
Calcium, Dissolved	59900	ug/L	200	53.5	1	11/16/18 13:25	11/20/18 17:56	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/16/18 13:25	11/20/18 17:56	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/16/18 13:25	11/20/18 17:56	7440-50-8	
Iron, Dissolved	7.2J	ug/L	50.0	6.1	1	11/16/18 13:25	11/20/18 17:56	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/16/18 13:25	11/20/18 17:56	7439-92-1	
Lithium, Dissolved	15.5	ug/L	10.0	4.6	1	11/16/18 13:25	11/20/18 17:56	7439-93-2	
Magnesium, Dissolved	22100	ug/L	50.0	14.0	1	11/16/18 13:25	11/20/18 17:56	7439-95-4	
Manganese, Dissolved	200	ug/L	5.0	0.73	1	11/16/18 13:25	11/20/18 17:56	7439-96-5	
Molybdenum, Dissolved	1.7J	ug/L	20.0	0.90	1	11/16/18 13:25	11/20/18 17:56	7439-98-7	
Nickel, Dissolved	<1.4	ug/L	5.0	1.4	1	11/16/18 13:25	11/20/18 17:56	7440-02-0	
Potassium, Dissolved	4740	ug/L	500	79.3	1	11/16/18 13:25	11/20/18 17:56	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/16/18 13:25	11/20/18 17:56	7440-22-4	
Sodium, Dissolved	27800	ug/L	500	157	1	11/16/18 13:25	11/20/18 17:56	7440-23-5	D9
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/16/18 13:25	11/20/18 17:56	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.33J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:21	7440-36-0	B
Arsenic	6.2	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:21	7440-38-2	
Cadmium	0.33J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:21	7440-43-9	B
Chromium	10.9	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:21	7440-47-3	
Selenium	2.8	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:21	7782-49-2	
Thallium	0.18J	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:21	7440-28-0	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-4 **Lab ID: 60285081005** Collected: 10/29/18 13:00 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony, Dissolved	0.23J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:28	7440-36-0	
Arsenic, Dissolved	2.1	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:28	7440-38-2	
Cadmium, Dissolved	<0.070	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 19:28	7440-43-9	
Chromium, Dissolved	0.23J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 19:28	7440-47-3	
Selenium, Dissolved	1.1	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 19:28	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 19:28	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:25	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	186	mg/L	20.0	4.9	1		11/05/18 16:54		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	362	mg/L	5.0	5.0	1		11/02/18 00:37		
Iron, Ferric (Calculation)									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	6.6	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	0.13J	mg/L	0.20	0.012	1		10/31/18 16:31		H6
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	16.9	mg/L	1.0	0.29	1		11/09/18 00:51	16887-00-6	
Fluoride	0.29	mg/L	0.20	0.19	1		11/09/18 00:51	16984-48-8	
Sulfate	94.7	mg/L	10.0	2.4	10		11/09/18 01:07	14808-79-8	
365.4 Total Phosphorus									
Analytical Method: EPA 365.4									
Phosphorus	0.65	mg/L	0.10	0.050	1		11/02/18 16:57	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-FB-1 Lab ID: 60285081006 Collected: 10/29/18 13:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total									
Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	<21.1	ug/L	75.0	21.1	1	01/17/19 11:48	01/18/19 10:29	7429-90-5	
Barium	<1.5	ug/L	5.0	1.5	1	01/17/19 11:48	01/18/19 10:29	7440-39-3	
Beryllium	<0.16	ug/L	1.0	0.16	1	01/17/19 11:48	01/18/19 10:29	7440-41-7	
Boron	<12.5	ug/L	100	12.5	1	01/17/19 11:48	01/18/19 10:29	7440-42-8	
Calcium	<53.5	ug/L	200	53.5	1	01/17/19 11:48	01/18/19 10:29	7440-70-2	
Cobalt	<0.87	ug/L	5.0	0.87	1	01/17/19 11:48	01/18/19 10:29	7440-48-4	
Copper	<4.5	ug/L	10.0	4.5	1	01/17/19 11:48	01/18/19 10:29	7440-50-8	
Iron	<6.1	ug/L	50.0	6.1	1	01/17/19 11:48	01/18/19 10:29	7439-89-6	
Lead	<3.0	ug/L	10.0	3.0	1	01/17/19 11:48	01/18/19 10:29	7439-92-1	
Lithium	<4.6	ug/L	10.0	4.6	1	01/17/19 11:48	01/18/19 10:29	7439-93-2	
Magnesium	19.6J	ug/L	50.0	14.0	1	01/17/19 11:48	01/18/19 10:29	7439-95-4	B
Manganese	1.2J	ug/L	5.0	0.73	1	01/17/19 11:48	01/18/19 10:29	7439-96-5	
Molybdenum	<0.90	ug/L	20.0	0.90	1	01/17/19 11:48	01/18/19 10:29	7439-98-7	
Nickel	<1.4	ug/L	5.0	1.4	1	01/17/19 11:48	01/18/19 10:29	7440-02-0	
Potassium	<79.3	ug/L	500	79.3	1	01/17/19 11:48	01/18/19 10:29	7440-09-7	
Silver	<2.0	ug/L	7.0	2.0	1	01/17/19 11:48	01/18/19 10:29	7440-22-4	
Sodium	<157	ug/L	500	157	1	01/17/19 11:48	01/18/19 10:29	7440-23-5	
Zinc	<3.5	ug/L	50.0	3.5	1	01/17/19 11:48	01/18/19 10:29	7440-66-6	
200.8 MET ICPMS									
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	<0.078	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:24	7440-36-0	
Arsenic	<0.065	ug/L	1.0	0.065	1	11/29/18 11:07	11/29/18 16:24	7440-38-2	
Cadmium	<0.033	ug/L	0.50	0.033	1	11/29/18 11:07	11/29/18 16:24	7440-43-9	
Chromium	0.12J	ug/L	1.0	0.078	1	11/29/18 11:07	11/29/18 16:24	7440-47-3	B
Selenium	<0.085	ug/L	1.0	0.085	1	11/29/18 11:07	11/29/18 16:24	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/29/18 11:07	11/29/18 16:24	7440-28-0	
7470 Mercury									
Analytical Method: EPA 7470 Preparation Method: EPA 7470									
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:27	7439-97-6	
2320B Alkalinity									
Analytical Method: SM 2320B									
Alkalinity, Total as CaCO3	<4.9	mg/L	20.0	4.9	1		11/05/18 16:58		
2540C Total Dissolved Solids									
Analytical Method: SM 2540C									
Total Dissolved Solids	14.0	mg/L	5.0	5.0	1		11/02/18 00:37		
Iron, Ferric (Calculation)									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferric	0.035J	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous									
Analytical Method: SM 3500-Fe B#4									
Iron, Ferrous	<0.012	mg/L	0.20	0.012	1		10/31/18 16:32		H6
300.0 IC Anions 28 Days									
Analytical Method: EPA 300.0									
Chloride	<0.29	mg/L	1.0	0.29	1		11/09/18 01:39	16887-00-6	
Fluoride	<0.19	mg/L	0.20	0.19	1		11/09/18 01:39	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-FB-1 **Lab ID: 60285081006** Collected: 10/29/18 13:10 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	<0.24	mg/L	1.0	0.24	1		11/09/18 01:39	14808-79-8	
365.4 Total Phosphorus	Analytical Method: EPA 365.4								
Phosphorus	<0.050	mg/L	0.10	0.050	1		11/02/18 16:58	7723-14-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-5 Lab ID: 60285081007 Collected: 10/29/18 13:50 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum	1380	ug/L	75.0	21.1	1	10/31/18 16:35	11/01/18 14:59	7429-90-5	R1
Barium	146	ug/L	5.0	1.5	1	10/31/18 16:35	11/01/18 14:59	7440-39-3	R1
Beryllium	0.52J	ug/L	1.0	0.16	1	10/31/18 16:35	11/01/18 14:59	7440-41-7	
Boron	60.7J	ug/L	100	12.5	1	10/31/18 16:35	11/01/18 14:59	7440-42-8	
Calcium	68700	ug/L	200	53.5	1	10/31/18 16:35	11/01/18 14:59	7440-70-2	
Cobalt	1.8J	ug/L	5.0	0.87	1	10/31/18 16:35	11/01/18 14:59	7440-48-4	
Copper	6.7J	ug/L	10.0	4.5	1	10/31/18 16:35	11/01/18 14:59	7440-50-8	
Iron	2180	ug/L	50.0	6.1	1	10/31/18 16:35	11/01/18 14:59	7439-89-6	R1
Lead	6.8J	ug/L	10.0	3.0	1	10/31/18 16:35	11/01/18 14:59	7439-92-1	
Lithium	19.6	ug/L	10.0	4.6	1	10/31/18 16:35	11/01/18 14:59	7439-93-2	R1
Magnesium	23600	ug/L	50.0	14.0	1	10/31/18 16:35	11/01/18 14:59	7439-95-4	R1
Manganese	383	ug/L	5.0	0.73	1	10/31/18 16:35	11/01/18 14:59	7439-96-5	R1
Molybdenum	1.5J	ug/L	20.0	0.90	1	10/31/18 16:35	11/01/18 14:59	7439-98-7	
Nickel	5.6	ug/L	5.0	1.4	1	10/31/18 16:35	11/01/18 14:59	7440-02-0	R1
Potassium	5660	ug/L	500	79.3	1	10/31/18 16:35	11/01/18 14:59	7440-09-7	R1
Silver	<2.0	ug/L	7.0	2.0	1	10/31/18 16:35	11/01/18 14:59	7440-22-4	
Sodium	26100	ug/L	500	157	1	10/31/18 16:35	11/01/18 14:59	7440-23-5	R1
Zinc	42.6J	ug/L	50.0	3.5	1	10/31/18 16:35	11/01/18 14:59	7440-66-6	
200.7 Metals, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Aluminum, Dissolved	67.9J	ug/L	75.0	21.1	1	11/27/18 11:45	11/27/18 19:08	7429-90-5	B
Barium, Dissolved	96.7	ug/L	5.0	1.5	1	11/27/18 11:45	11/27/18 19:08	7440-39-3	
Beryllium, Dissolved	<0.16	ug/L	1.0	0.16	1	11/27/18 11:45	11/27/18 19:08	7440-41-7	
Boron, Dissolved	59.1J	ug/L	100	12.5	1	11/27/18 11:45	11/27/18 19:08	7440-42-8	
Calcium, Dissolved	58700	ug/L	200	53.5	1	11/27/18 11:45	11/27/18 19:08	7440-70-2	
Cobalt, Dissolved	<0.87	ug/L	5.0	0.87	1	11/27/18 11:45	11/27/18 19:08	7440-48-4	
Copper, Dissolved	<4.5	ug/L	15.0	4.5	1	11/27/18 11:45	11/27/18 19:08	7440-50-8	
Iron, Dissolved	12.5J	ug/L	50.0	6.1	1	11/27/18 11:45	11/27/18 19:08	7439-89-6	
Lead, Dissolved	<3.0	ug/L	10.0	3.0	1	11/27/18 11:45	11/27/18 19:08	7439-92-1	
Lithium, Dissolved	16.7	ug/L	10.0	4.6	1	11/27/18 11:45	11/27/18 19:08	7439-93-2	B
Magnesium, Dissolved	21900	ug/L	50.0	14.0	1	11/27/18 11:45	11/27/18 19:08	7439-95-4	
Manganese, Dissolved	111	ug/L	5.0	0.73	1	11/27/18 11:45	11/27/18 19:08	7439-96-5	
Molybdenum, Dissolved	1.8J	ug/L	20.0	0.90	1	11/27/18 11:45	11/27/18 19:08	7439-98-7	
Nickel, Dissolved	<1.4	ug/L	5.0	1.4	1	11/27/18 11:45	11/27/18 19:08	7440-02-0	
Potassium, Dissolved	4890	ug/L	500	79.3	1	11/27/18 11:45	11/27/18 19:08	7440-09-7	
Silver, Dissolved	<2.0	ug/L	7.0	2.0	1	11/27/18 11:45	11/27/18 19:08	7440-22-4	
Sodium, Dissolved	25300	ug/L	500	157	1	11/27/18 11:45	11/27/18 19:08	7440-23-5	
Zinc, Dissolved	<3.5	ug/L	50.0	3.5	1	11/27/18 11:45	11/27/18 19:08	7440-66-6	
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8									
Antimony	0.29J	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:23	7440-36-0	B
Arsenic	3.9	ug/L	1.0	0.065	1	11/15/18 11:26	11/16/18 14:23	7440-38-2	
Cadmium	0.13J	ug/L	0.50	0.033	1	11/15/18 11:26	11/16/18 14:23	7440-43-9	B
Chromium	3.8	ug/L	1.0	0.078	1	11/15/18 11:26	11/16/18 14:23	7440-47-3	
Selenium	1.7	ug/L	1.0	0.085	1	11/15/18 11:26	11/16/18 14:23	7782-49-2	
Thallium	<0.099	ug/L	1.0	0.099	1	11/15/18 11:26	11/16/18 14:23	7440-28-0	

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ANALYTICAL RESULTS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Sample: SW-5 **Lab ID: 60285081007** Collected: 10/29/18 13:50 Received: 10/30/18 03:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8							
Antimony, Dissolved	0.28J	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:30	7440-36-0	
Arsenic, Dissolved	2.3	ug/L	1.0	0.15	1	11/07/18 14:42	11/08/18 19:30	7440-38-2	
Cadmium, Dissolved	0.073J	ug/L	0.50	0.070	1	11/07/18 14:42	11/08/18 19:30	7440-43-9	
Chromium, Dissolved	0.28J	ug/L	1.0	0.19	1	11/07/18 14:42	11/08/18 19:30	7440-47-3	
Selenium, Dissolved	1.1	ug/L	1.0	0.16	1	11/07/18 14:42	11/08/18 19:30	7782-49-2	
Thallium, Dissolved	<0.14	ug/L	1.0	0.14	1	11/07/18 14:42	11/08/18 19:30	7440-28-0	
7470 Mercury		Analytical Method: EPA 7470 Preparation Method: EPA 7470							
Mercury	<0.090	ug/L	0.20	0.090	1	11/06/18 15:50	11/07/18 16:29	7439-97-6	
2320B Alkalinity		Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	180	mg/L	20.0	4.9	1		11/05/18 17:02		
2540C Total Dissolved Solids		Analytical Method: SM 2540C							
Total Dissolved Solids	346	mg/L	5.0	5.0	1		11/02/18 00:37		
Iron, Ferric (Calculation)		Analytical Method: SM 3500-Fe B#4							
Iron, Ferric	2.1	mg/L	0.050		1		11/09/18 08:38	7439-89-6	
Iron, Ferrous		Analytical Method: SM 3500-Fe B#4							
Iron, Ferrous	0.068J	mg/L	0.20	0.012	1		10/31/18 16:35		H6
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Chloride	16.6	mg/L	1.0	0.29	1		11/09/18 02:27	16887-00-6	M1
Fluoride	0.29	mg/L	0.20	0.19	1		11/09/18 02:27	16984-48-8	M1
Sulfate	95.2	mg/L	10.0	2.4	10		11/12/18 12:53	14808-79-8	M1,R1
365.4 Total Phosphorus		Analytical Method: EPA 365.4							
Phosphorus	0.23	mg/L	0.10	0.050	1		11/02/18 16:59	7723-14-0	D6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 553779 Analysis Method: EPA 7470
 QC Batch Method: EPA 7470 Analysis Description: 7470 Mercury
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

METHOD BLANK: 2270730 Matrix: Water
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	ug/L	<0.090	0.20	0.090	11/07/18 16:03	

LABORATORY CONTROL SAMPLE: 2270731

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	4.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2270732 2270733

Parameter	Units	60285081007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	<0.090	5	5	5.0	4.9	100	97	75-125	3	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552666

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Total

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

METHOD BLANK: 2266490

Matrix: Water

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	<21.1	75.0	21.1	11/01/18 14:11	
Barium	ug/L	<1.5	5.0	1.5	11/01/18 14:11	
Beryllium	ug/L	<0.16	1.0	0.16	11/01/18 14:11	
Boron	ug/L	<12.5	100	12.5	11/01/18 14:11	
Calcium	ug/L	<53.5	200	53.5	11/01/18 14:11	
Cobalt	ug/L	<0.87	5.0	0.87	11/01/18 14:11	
Copper	ug/L	<4.5	10.0	4.5	11/01/18 14:11	
Iron	ug/L	<6.1	50.0	6.1	11/01/18 14:11	
Lead	ug/L	<3.0	10.0	3.0	11/01/18 14:11	
Lithium	ug/L	<4.6	10.0	4.6	11/01/18 14:11	
Magnesium	ug/L	<14.0	50.0	14.0	11/01/18 14:11	
Manganese	ug/L	<0.73	5.0	0.73	11/01/18 14:11	
Molybdenum	ug/L	<0.90	20.0	0.90	11/01/18 14:11	
Nickel	ug/L	<1.4	5.0	1.4	11/01/18 14:11	
Potassium	ug/L	<79.3	500	79.3	11/01/18 14:11	
Silver	ug/L	<2.0	7.0	2.0	11/01/18 14:11	
Sodium	ug/L	<157	500	157	11/01/18 14:11	
Zinc	ug/L	<3.5	50.0	3.5	11/01/18 14:11	

LABORATORY CONTROL SAMPLE: 2266491

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9860	99	85-115	
Barium	ug/L	1000	972	97	85-115	
Beryllium	ug/L	1000	976	98	85-115	
Boron	ug/L	1000	981	98	85-115	
Calcium	ug/L	10000	10000	100	85-115	
Cobalt	ug/L	1000	998	100	85-115	
Copper	ug/L	1000	993	99	85-115	
Iron	ug/L	10000	10000	100	85-115	
Lead	ug/L	1000	982	98	85-115	
Lithium	ug/L	1000	983	98	85-115	
Magnesium	ug/L	10000	10100	101	85-115	
Manganese	ug/L	1000	960	96	85-115	
Molybdenum	ug/L	1000	1000	100	85-115	
Nickel	ug/L	1000	995	99	85-115	
Potassium	ug/L	10000	9900	99	85-115	
Silver	ug/L	500	507	101	85-115	
Sodium	ug/L	10000	10000	100	85-115	
Zinc	ug/L	1000	977	98	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

MATRIX SPIKE SAMPLE: 2266492		60285081001	Spike	MS	MS	% Rec	
Parameter	Units	Result	Conc.	Result	% Rec	Limits	Qualifiers
Aluminum	ug/L	216	10000	10300	101	70-130	
Barium	ug/L	104	1000	1080	97	70-130	
Beryllium	ug/L	<0.16	1000	983	98	70-130	
Boron	ug/L	63.2J	1000	1070	101	70-130	
Calcium	ug/L	66300	10000	75700	94	70-130	
Cobalt	ug/L	<0.87	1000	974	97	70-130	
Copper	ug/L	<4.5	1000	997	99	70-130	
Iron	ug/L	292	10000	10300	100	70-130	
Lead	ug/L	<3.0	1000	965	96	70-130	
Lithium	ug/L	12.7	1000	991	98	70-130	
Magnesium	ug/L	24000	10000	33800	99	70-130	
Manganese	ug/L	86.2	1000	1040	95	70-130	
Molybdenum	ug/L	1.4J	1000	1010	101	70-130	
Nickel	ug/L	1.9J	1000	972	97	70-130	
Potassium	ug/L	6050	10000	16000	100	70-130	
Silver	ug/L	<2.0	500	507	101	70-130	
Sodium	ug/L	24700	10000	34400	97	70-130	
Zinc	ug/L	<3.5	1000	964	96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2266493		2266494										
Parameter	Units	60285081007	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual	
		Result	Spike	Spike	Result	Result	% Rec	% Rec	Limits	RPD		
Aluminum	ug/L	1380	10000	10000	17200	17900	158	165	70-130	4	20	M1
Barium	ug/L	146	1000	1000	1160	1160	101	102	70-130	1	20	
Beryllium	ug/L	0.52J	1000	1000	992	994	99	99	70-130	0	20	
Boron	ug/L	60.7J	1000	1000	1080	1080	102	102	70-130	0	20	
Calcium	ug/L	68700	10000	10000	78000	77800	93	91	70-130	0	20	
Cobalt	ug/L	1.8J	1000	1000	974	988	97	99	70-130	1	20	
Copper	ug/L	6.7J	1000	1000	1020	1020	101	102	70-130	0	20	
Iron	ug/L	2180	10000	10000	16500	17000	143	149	70-130	3	20	M1
Lead	ug/L	6.8J	1000	1000	969	977	96	97	70-130	1	20	
Lithium	ug/L	19.6	1000	1000	1010	1020	99	100	70-130	0	20	
Magnesium	ug/L	23600	10000	10000	34400	34300	108	107	70-130	0	20	
Manganese	ug/L	383	1000	1000	1360	1370	98	98	70-130	0	20	
Molybdenum	ug/L	1.5J	1000	1000	1010	1020	100	102	70-130	1	20	
Nickel	ug/L	5.6	1000	1000	974	988	97	98	70-130	1	20	
Potassium	ug/L	5660	10000	10000	16500	16600	108	110	70-130	1	20	
Silver	ug/L	<2.0	500	500	511	513	102	103	70-130	1	20	
Sodium	ug/L	26100	10000	10000	35900	35900	98	98	70-130	0	20	
Zinc	ug/L	42.6J	1000	1000	1010	1020	96	98	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch:	565130	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Total
Associated Lab Samples:	60285081006		

METHOD BLANK: 2318749 Matrix: Water

Associated Lab Samples: 60285081006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum	ug/L	22.2J	75.0	21.1	01/18/19 10:25	
Barium	ug/L	<1.5	5.0	1.5	01/18/19 10:25	
Beryllium	ug/L	<0.16	1.0	0.16	01/18/19 10:25	
Boron	ug/L	<12.5	100	12.5	01/18/19 10:25	
Calcium	ug/L	<53.5	200	53.5	01/18/19 10:25	
Cobalt	ug/L	<0.87	5.0	0.87	01/18/19 10:25	
Copper	ug/L	<4.5	10.0	4.5	01/18/19 10:25	
Iron	ug/L	6.9J	50.0	6.1	01/18/19 10:25	
Lead	ug/L	<3.0	10.0	3.0	01/18/19 10:25	
Lithium	ug/L	<4.6	10.0	4.6	01/18/19 10:25	
Magnesium	ug/L	16.9J	50.0	14.0	01/18/19 10:25	
Manganese	ug/L	<0.73	5.0	0.73	01/18/19 10:25	
Molybdenum	ug/L	<0.90	20.0	0.90	01/18/19 10:25	
Nickel	ug/L	<1.4	5.0	1.4	01/18/19 10:25	
Potassium	ug/L	<79.3	500	79.3	01/18/19 10:25	
Silver	ug/L	<2.0	7.0	2.0	01/18/19 10:25	
Sodium	ug/L	<157	500	157	01/18/19 10:25	
Zinc	ug/L	<3.5	50.0	3.5	01/18/19 10:25	

LABORATORY CONTROL SAMPLE: 2318750

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	10000	9920	99	85-115	
Barium	ug/L	1000	976	98	85-115	
Beryllium	ug/L	1000	969	97	85-115	
Boron	ug/L	1000	950	95	85-115	
Calcium	ug/L	10000	9780	98	85-115	
Cobalt	ug/L	1000	974	97	85-115	
Copper	ug/L	1000	983	98	85-115	
Iron	ug/L	10000	9850	98	85-115	
Lead	ug/L	1000	970	97	85-115	
Lithium	ug/L	1000	971	97	85-115	
Magnesium	ug/L	10000	9750	98	85-115	
Manganese	ug/L	1000	963	96	85-115	
Molybdenum	ug/L	1000	997	100	85-115	
Nickel	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9670	97	85-115	
Silver	ug/L	500	495	99	85-115	
Sodium	ug/L	10000	9860	99	85-115	
Zinc	ug/L	1000	1010	101	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 555597

Analysis Method: EPA 200.7

QC Batch Method: EPA 200.7

Analysis Description: 200.7 Metals, Dissolved

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005

METHOD BLANK: 2279306

Matrix: Water

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<21.1	75.0	21.1	11/20/18 18:38	
Barium, Dissolved	ug/L	<1.5	5.0	1.5	11/20/18 18:38	
Beryllium, Dissolved	ug/L	0.28J	1.0	0.16	11/20/18 18:38	
Boron, Dissolved	ug/L	<12.5	100	12.5	11/20/18 18:38	
Calcium, Dissolved	ug/L	<53.5	200	53.5	11/20/18 18:38	
Cobalt, Dissolved	ug/L	<0.87	5.0	0.87	11/20/18 18:38	
Copper, Dissolved	ug/L	<4.5	15.0	4.5	11/20/18 18:38	
Iron, Dissolved	ug/L	<6.1	50.0	6.1	11/20/18 18:38	
Lead, Dissolved	ug/L	<3.0	10.0	3.0	11/20/18 18:38	
Lithium, Dissolved	ug/L	<4.6	10.0	4.6	11/20/18 18:38	
Magnesium, Dissolved	ug/L	<14.0	50.0	14.0	11/20/18 18:38	
Manganese, Dissolved	ug/L	<0.73	5.0	0.73	11/20/18 18:38	
Molybdenum, Dissolved	ug/L	<0.90	20.0	0.90	11/20/18 18:38	
Nickel, Dissolved	ug/L	<1.4	5.0	1.4	11/20/18 18:38	
Potassium, Dissolved	ug/L	<79.3	500	79.3	11/20/18 18:38	
Silver, Dissolved	ug/L	<2.0	7.0	2.0	11/20/18 18:38	
Sodium, Dissolved	ug/L	<157	500	157	11/20/18 18:38	
Zinc, Dissolved	ug/L	<3.5	50.0	3.5	11/20/18 18:38	

LABORATORY CONTROL SAMPLE: 2279307

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	9860	99	85-115	
Barium, Dissolved	ug/L	1000	975	98	85-115	
Beryllium, Dissolved	ug/L	1000	949	95	85-115	
Boron, Dissolved	ug/L	1000	967	97	85-115	
Calcium, Dissolved	ug/L	10000	9680	97	85-115	
Cobalt, Dissolved	ug/L	1000	1020	102	85-115	
Copper, Dissolved	ug/L	1000	996	100	85-115	
Iron, Dissolved	ug/L	10000	9580	96	85-115	
Lead, Dissolved	ug/L	1000	1000	100	85-115	
Lithium, Dissolved	ug/L	1000	992	99	85-115	
Magnesium, Dissolved	ug/L	10000	9900	99	85-115	
Manganese, Dissolved	ug/L	1000	986	99	85-115	
Molybdenum, Dissolved	ug/L	1000	1030	103	85-115	
Nickel, Dissolved	ug/L	1000	1020	102	85-115	
Potassium, Dissolved	ug/L	10000	9760	98	85-115	
Silver, Dissolved	ug/L	500	506	101	85-115	
Sodium, Dissolved	ug/L	10000	10000	100	85-115	
Zinc, Dissolved	ug/L	1000	987	99	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Parameter	Units	MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2279308		2279309		MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
		60285081007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
Aluminum, Dissolved	ug/L	67.9J			14300	14300			0	20	
Barium, Dissolved	ug/L	96.7			1090	1100			1	20	
Beryllium, Dissolved	ug/L	<0.16			928	939			1	20	
Boron, Dissolved	ug/L	59.1J			1030	1010			2	20	
Calcium, Dissolved	ug/L	58700			71700	73000			2	20	
Cobalt, Dissolved	ug/L	<0.87			968	976			1	20	
Copper, Dissolved	ug/L	<4.5			993	975			2	20	
Iron, Dissolved	ug/L	12.5J			12500	12700			1	20	
Lead, Dissolved	ug/L	<3.0			954	964			1	20	
Lithium, Dissolved	ug/L	16.7			994	1010			1	20	
Magnesium, Dissolved	ug/L	21900			32700	32200			2	20	
Manganese, Dissolved	ug/L	111			1180	1160			2	20	
Molybdenum, Dissolved	ug/L	1.8J			1010	1020			1	20	
Nickel, Dissolved	ug/L	<1.4			971	982			1	20	
Potassium, Dissolved	ug/L	4890			16100	16200			1	20	
Silver, Dissolved	ug/L	<2.0			498	488			2	20	
Sodium, Dissolved	ug/L	25300			36400	37000			2	20	
Zinc, Dissolved	ug/L	<3.5			969	981			1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch:	556929	Analysis Method:	EPA 200.7
QC Batch Method:	EPA 200.7	Analysis Description:	200.7 Metals, Dissolved
Associated Lab Samples:	60285081007		

METHOD BLANK: 2285152 Matrix: Water

Associated Lab Samples: 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	32.8J	75.0	21.1	11/27/18 19:04	
Barium, Dissolved	ug/L	<1.5	5.0	1.5	11/27/18 19:04	
Beryllium, Dissolved	ug/L	<0.16	1.0	0.16	11/27/18 19:04	
Boron, Dissolved	ug/L	<12.5	100	12.5	11/27/18 19:04	
Calcium, Dissolved	ug/L	<53.5	200	53.5	11/27/18 19:04	
Cobalt, Dissolved	ug/L	<0.87	5.0	0.87	11/27/18 19:04	
Copper, Dissolved	ug/L	<4.5	15.0	4.5	11/27/18 19:04	
Iron, Dissolved	ug/L	<6.1	50.0	6.1	11/27/18 19:04	
Lead, Dissolved	ug/L	<3.0	10.0	3.0	11/27/18 19:04	
Lithium, Dissolved	ug/L	4.6J	10.0	4.6	11/27/18 19:04	
Magnesium, Dissolved	ug/L	<14.0	50.0	14.0	11/27/18 19:04	
Manganese, Dissolved	ug/L	<0.73	5.0	0.73	11/27/18 19:04	
Molybdenum, Dissolved	ug/L	<0.90	20.0	0.90	11/27/18 19:04	
Nickel, Dissolved	ug/L	<1.4	5.0	1.4	11/27/18 19:04	
Potassium, Dissolved	ug/L	<79.3	500	79.3	11/27/18 19:04	
Silver, Dissolved	ug/L	<2.0	7.0	2.0	11/27/18 19:04	
Sodium, Dissolved	ug/L	<157	500	157	11/27/18 19:04	
Zinc, Dissolved	ug/L	<3.5	50.0	3.5	11/27/18 19:04	

LABORATORY CONTROL SAMPLE: 2285153

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	10000	9520	95	85-115	
Barium, Dissolved	ug/L	1000	947	95	85-115	
Beryllium, Dissolved	ug/L	1000	938	94	85-115	
Boron, Dissolved	ug/L	1000	964	96	85-115	
Calcium, Dissolved	ug/L	10000	9470	95	85-115	
Cobalt, Dissolved	ug/L	1000	1000	100	85-115	
Copper, Dissolved	ug/L	1000	997	100	85-115	
Iron, Dissolved	ug/L	10000	9450	95	85-115	
Lead, Dissolved	ug/L	1000	988	99	85-115	
Lithium, Dissolved	ug/L	1000	951	95	85-115	
Magnesium, Dissolved	ug/L	10000	9920	99	85-115	
Manganese, Dissolved	ug/L	1000	973	97	85-115	
Molybdenum, Dissolved	ug/L	1000	1010	101	85-115	
Nickel, Dissolved	ug/L	1000	999	100	85-115	
Potassium, Dissolved	ug/L	10000	9620	96	85-115	
Silver, Dissolved	ug/L	500	498	100	85-115	
Sodium, Dissolved	ug/L	10000	9710	97	85-115	
Zinc, Dissolved	ug/L	1000	978	98	85-115	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Parameter	Units	2285154		2285155		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60285081007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							
Aluminum, Dissolved	ug/L	67.9J	10000	10000	9800	10100	97	100	70-130	3	20	
Barium, Dissolved	ug/L	96.7	1000	1000	1070	1080	97	98	70-130	1	20	
Beryllium, Dissolved	ug/L	<0.16	1000	1000	972	986	97	99	70-130	1	20	
Boron, Dissolved	ug/L	59.1J	1000	1000	1050	1060	99	100	70-130	1	20	
Calcium, Dissolved	ug/L	58700	10000	10000	70000	70100	113	114	70-130	0	20	
Cobalt, Dissolved	ug/L	<0.87	1000	1000	970	973	97	97	70-130	0	20	
Copper, Dissolved	ug/L	<4.5	1000	1000	994	1000	99	100	70-130	1	20	
Iron, Dissolved	ug/L	12.5J	10000	10000	9600	9720	96	97	70-130	1	20	
Lead, Dissolved	ug/L	<3.0	1000	1000	954	954	95	95	70-130	0	20	
Lithium, Dissolved	ug/L	16.7	1000	1000	996	1010	98	99	70-130	1	20	
Magnesium, Dissolved	ug/L	21900	10000	10000	32000	31800	101	99	70-130	1	20	
Manganese, Dissolved	ug/L	111	1000	1000	1150	1010	104	90	70-130	13	20	
Molybdenum, Dissolved	ug/L	1.8J	1000	1000	1010	1010	101	101	70-130	0	20	
Nickel, Dissolved	ug/L	<1.4	1000	1000	965	967	96	97	70-130	0	20	
Potassium, Dissolved	ug/L	4890	10000	10000	15100	15400	102	105	70-130	2	20	
Silver, Dissolved	ug/L	<2.0	500	500	495	503	99	101	70-130	2	20	
Sodium, Dissolved	ug/L	25300	10000	10000	36200	35700	109	105	70-130	1	20	
Zinc, Dissolved	ug/L	<3.5	1000	1000	956	959	95	96	70-130	0	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 555338 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

METHOD BLANK: 2278064 Matrix: Water
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	0.079J	1.0	0.078	11/16/18 14:08	
Arsenic	ug/L	0.072J	1.0	0.065	11/16/18 14:08	
Cadmium	ug/L	0.040J	0.50	0.033	11/16/18 14:08	
Chromium	ug/L	<0.078	1.0	0.078	11/16/18 14:08	
Selenium	ug/L	<0.085	1.0	0.085	11/16/18 14:08	
Thallium	ug/L	<0.099	1.0	0.099	11/16/18 14:08	

LABORATORY CONTROL SAMPLE: 2278065

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	40.2	101	85-115	
Arsenic	ug/L	40	40.1	100	85-115	
Cadmium	ug/L	40	39.6	99	85-115	
Chromium	ug/L	40	40.4	101	85-115	
Selenium	ug/L	40	39.4	99	85-115	
Thallium	ug/L	40	38.1	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2278066 2278067

Parameter	Units	60285081007		60285081004		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Spike Conc.	MSD Spike Conc.								
Antimony	ug/L	0.29J	40	40	34.2	34.4	85	85	70-130	0	20		
Arsenic	ug/L	3.9	40	40	41.1	41.1	93	93	70-130	0	20		
Cadmium	ug/L	0.13J	40	40	38.2	38.5	95	96	70-130	1	20		
Chromium	ug/L	3.8	40	40	43.5	43.6	99	100	70-130	0	20		
Selenium	ug/L	1.7	40	40	35.8	36.4	85	87	70-130	2	20		
Thallium	ug/L	<0.099	40	40	36.4	36.6	91	91	70-130	0	20		

MATRIX SPIKE SAMPLE: 2278068

Parameter	Units	60286261004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	ND	40	39.8	99	70-130	
Arsenic	ug/L	0.59	40	40.8	100	70-130	
Cadmium	ug/L	ND	40	36.9	92	70-130	
Chromium	ug/L	1.3	40	40.0	97	70-130	
Selenium	ug/L	1.2	40	26.0	62	70-130 M1	
Thallium	ug/L	ND	40	35.0	88	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 557460 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 60285081006

METHOD BLANK: 2286955 Matrix: Water
 Associated Lab Samples: 60285081006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony	ug/L	<0.078	1.0	0.078	11/29/18 16:21	
Arsenic	ug/L	<0.065	1.0	0.065	11/29/18 16:21	
Cadmium	ug/L	<0.033	0.50	0.033	11/29/18 16:21	
Chromium	ug/L	0.19J	1.0	0.078	11/29/18 16:21	
Selenium	ug/L	<0.085	1.0	0.085	11/29/18 16:21	
Thallium	ug/L	<0.099	1.0	0.099	11/29/18 16:21	

LABORATORY CONTROL SAMPLE: 2286956

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	40	39.3	98	85-115	
Arsenic	ug/L	40	39.7	99	85-115	
Cadmium	ug/L	40	39.7	99	85-115	
Chromium	ug/L	40	39.2	98	85-115	
Selenium	ug/L	40	37.5	94	85-115	
Thallium	ug/L	40	37.8	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2286959 2286960

Parameter	Units	60286655002		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	Spike Conc.	Result	MS Result	MSD Result	% Rec	% Rec			
Antimony	ug/L		40	40	39.2	39.1	97	97	70-130	0	20	
Arsenic	ug/L	0.56J	40	40	40.6	40.5	100	100	70-130	0	20	
Cadmium	ug/L		40	40	39.0	39.0	97	97	70-130	0	20	
Chromium	ug/L		40	40	38.7	38.6	96	96	70-130	0	20	
Selenium	ug/L		40	40	43.2	42.1	95	92	70-130	3	20	
Thallium	ug/L		40	40	38.6	38.8	96	97	70-130	1	20	

MATRIX SPIKE SAMPLE: 2286961

Parameter	Units	60286571009 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	<0.078	40	39.2	98	70-130	
Arsenic	ug/L	0.52J	40	40.4	100	70-130	
Cadmium	ug/L	0.034J	40	39.0	97	70-130	
Chromium	ug/L	0.20J	40	38.5	96	70-130	
Selenium	ug/L	<0.085	40	36.0	90	70-130	
Thallium	ug/L	<0.099	40	39.2	98	70-130	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

SAMPLE DUPLICATE: 2288579

Parameter	Units	60286571009 Result	Dup Result	RPD	Max RPD	Qualifiers
Antimony	ug/L	<0.078	<0.078		20	
Arsenic	ug/L	0.52J	0.53J		20	
Cadmium	ug/L	0.034J	<0.033		20	
Chromium	ug/L	0.20J	0.28J		20	
Selenium	ug/L	<0.085	0.11J		20	
Thallium	ug/L	<0.099	<0.099		20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285081

QC Batch: 552610 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 60285081001

METHOD BLANK: 2266280 Matrix: Water
Associated Lab Samples: 60285081001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.078	1.0	0.078	11/02/18 14:56	
Arsenic, Dissolved	ug/L	<0.065	1.0	0.065	11/02/18 14:56	
Cadmium, Dissolved	ug/L	<0.033	0.50	0.033	11/02/18 14:56	
Chromium, Dissolved	ug/L	<0.078	1.0	0.078	11/02/18 14:56	
Selenium, Dissolved	ug/L	<0.085	1.0	0.085	11/02/18 14:56	
Thallium, Dissolved	ug/L	<0.099	1.0	0.099	11/02/18 14:56	

LABORATORY CONTROL SAMPLE: 2266281

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	39.1	98	85-115	
Arsenic, Dissolved	ug/L	40	37.8	95	85-115	
Cadmium, Dissolved	ug/L	40	37.9	95	85-115	
Chromium, Dissolved	ug/L	40	37.6	94	85-115	
Selenium, Dissolved	ug/L	40	41.9	105	85-115	
Thallium, Dissolved	ug/L	40	37.5	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2266282 2266283

Parameter	Units	60283942010		MSD		MS		MSD		% Rec Limits	Max RPD	Qual
		Result	MS Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	% Rec				
Antimony, Dissolved	ug/L	ND	40	40	39.7	40.3	98	100	70-130	2	20	
Arsenic, Dissolved	ug/L	ND	40	40	39.4	39.9	96	98	70-130	1	20	
Cadmium, Dissolved	ug/L	ND	40	40	36.8	37.1	92	93	70-130	1	20	
Chromium, Dissolved	ug/L	ND	40	40	35.7	35.9	88	89	70-130	1	20	
Selenium, Dissolved	ug/L	ND	40	40	40.1	40.4	99	99	70-130	1	20	
Thallium, Dissolved	ug/L	ND	40	40	39.3	39.8	98	100	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 553967 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

METHOD BLANK: 2271491 Matrix: Water
 Associated Lab Samples: 60285081002, 60285081003, 60285081004, 60285081005, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	<0.078	1.0	0.078	11/08/18 19:17	
Arsenic, Dissolved	ug/L	<0.065	1.0	0.065	11/08/18 19:17	
Cadmium, Dissolved	ug/L	<0.033	0.50	0.033	11/08/18 19:17	
Chromium, Dissolved	ug/L	0.087J	1.0	0.078	11/08/18 19:17	
Selenium, Dissolved	ug/L	<0.085	1.0	0.085	11/08/18 19:17	
Thallium, Dissolved	ug/L	<0.099	1.0	0.099	11/08/18 19:17	

LABORATORY CONTROL SAMPLE: 2271492

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	40	39.7	99	85-115	
Arsenic, Dissolved	ug/L	40	40.6	101	85-115	
Cadmium, Dissolved	ug/L	40	39.2	98	85-115	
Chromium, Dissolved	ug/L	40	40.5	101	85-115	
Selenium, Dissolved	ug/L	40	38.0	95	85-115	
Thallium, Dissolved	ug/L	40	38.8	97	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271493 2271494

Parameter	Units	60285081007		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony, Dissolved	ug/L	0.28J	40	40	40.2	39.6	100	98	70-130	2	20		
Arsenic, Dissolved	ug/L	2.3	40	40	42.7	42.6	101	101	70-130	0	20		
Cadmium, Dissolved	ug/L	0.073J	40	40	38.5	38.7	96	97	70-130	1	20		
Chromium, Dissolved	ug/L	0.28J	40	40	39.6	39.6	98	98	70-130	0	20		
Selenium, Dissolved	ug/L	1.1	40	40	37.5	37.2	91	90	70-130	1	20		
Thallium, Dissolved	ug/L	<0.14	40	40	37.1	36.9	93	92	70-130	1	20		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2271495 2271496

Parameter	Units	60285463002		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec					
Antimony, Dissolved	ug/L	<0.15	40	40	39.7	40.0	99	100	70-130	1	20		
Arsenic, Dissolved	ug/L	3.5	40	40	44.9	44.9	103	104	70-130	0	20		
Cadmium, Dissolved	ug/L	<0.070	40	40	38.7	38.5	97	96	70-130	1	20		
Chromium, Dissolved	ug/L	<0.19	40	40	43.1	42.8	107	107	70-130	1	20		
Selenium, Dissolved	ug/L	<0.16	40	40	37.1	37.3	93	93	70-130	0	20		

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Parameter	Units	2271495		2271496		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
		60285463002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result							
Thallium, Dissolved	ug/L	<0.14	40	40	36.9	37.1	92	93	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 553401 Analysis Method: SM 2320B
 QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

METHOD BLANK: 2269411 Matrix: Water
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	1.4J	20.0		11/05/18 13:36	

LABORATORY CONTROL SAMPLE: 2269412

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	505	101	90-110	

SAMPLE DUPLICATE: 2269413

Parameter	Units	60285082002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	137	144	5	10	

SAMPLE DUPLICATE: 2269414

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	180	191	6	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552835

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004

METHOD BLANK: 2266982

Matrix: Water

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/01/18 16:59	

LABORATORY CONTROL SAMPLE: 2266983

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1030	103	80-120	

SAMPLE DUPLICATE: 2266984

Parameter	Units	60285065001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1330	1330	0	10	

SAMPLE DUPLICATE: 2266985

Parameter	Units	60285068002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	218	212	3	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552837

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60285081005, 60285081006, 60285081007

METHOD BLANK: 2266988

Matrix: Water

Associated Lab Samples: 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/02/18 00:20	

LABORATORY CONTROL SAMPLE: 2266989

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	996	100	80-120	

SAMPLE DUPLICATE: 2266990

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	346	338	3	10	

SAMPLE DUPLICATE: 2267568

Parameter	Units	60284830001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	871	859	1	10	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552548

Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4

Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006

METHOD BLANK: 2265964

Matrix: Water

Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	10/31/18 16:09	H6

LABORATORY CONTROL SAMPLE: 2265965

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	105	90-110	H6

SAMPLE DUPLICATE: 2265966

Parameter	Units	60285082002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.092J	0.056J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552549 Analysis Method: SM 3500-Fe B#4

QC Batch Method: SM 3500-Fe B#4 Analysis Description: Iron, Ferrous

Associated Lab Samples: 60285081007

METHOD BLANK: 2265971 Matrix: Water

Associated Lab Samples: 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	<0.012	0.20	0.012	10/31/18 16:33	H6

LABORATORY CONTROL SAMPLE: 2265972

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2	2.1	106	90-110	H6

SAMPLE DUPLICATE: 2265973

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.068J	0.066J		20	H6

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch:	554134	Analysis Method:	EPA 300.0
QC Batch Method:	EPA 300.0	Analysis Description:	300.0 IC Anions
Associated Lab Samples:	60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007		

METHOD BLANK: 2272557 Matrix: Water
Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.29	1.0	0.29	11/08/18 08:45	
Fluoride	mg/L	<0.19	0.20	0.19	11/08/18 08:45	
Sulfate	mg/L	<0.24	1.0	0.24	11/08/18 08:45	

LABORATORY CONTROL SAMPLE: 2272558

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE SAMPLE: 2272559

Parameter	Units	60285081007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	16.6	5	23.0	128	90-110	E,M1
Fluoride	mg/L	0.29	2.5	3.2	116	90-110	M1

MATRIX SPIKE SAMPLE: 2272561

Parameter	Units	60285930001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	22.6	50	77.9	111	90-110	M1
Fluoride	mg/L		2.5	3.6	122	90-110	M1
Sulfate	mg/L		50	251	129	90-110	E,M1

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR
Pace Project No.: 60285081

QC Batch: 554692 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60285081007

METHOD BLANK: 2275367 Matrix: Water
Associated Lab Samples: 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	11/12/18 12:21	

LABORATORY CONTROL SAMPLE: 2275368

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2275369 2275370

Parameter	Units	60285081007		2275370		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result						
Sulfate	mg/L	95.2	50	50	174	146	157	102	90-110	17	15 M1,R1

MATRIX SPIKE SAMPLE: 2275371

Parameter	Units	60285082002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	126	100	229	102	90-110	

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QUALITY CONTROL DATA

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

QC Batch: 552716 Analysis Method: EPA 365.4
 QC Batch Method: EPA 365.4 Analysis Description: 365.4 Phosphorus
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

METHOD BLANK: 2266612 Matrix: Water
 Associated Lab Samples: 60285081001, 60285081002, 60285081003, 60285081004, 60285081005, 60285081006, 60285081007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Phosphorus	mg/L	<0.050	0.10	0.050	11/02/18 16:34	

LABORATORY CONTROL SAMPLE: 2266613

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	2	2.0	99	90-110	

MATRIX SPIKE SAMPLE: 2266614

Parameter	Units	60285028001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	9.7	2	12.2	125	90-110	M1

SAMPLE DUPLICATE: 2266615

Parameter	Units	60285081007 Result	Dup Result	RPD	Max RPD	Qualifiers
Phosphorus	mg/L	0.23	0.18	25	10	D6

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QUALIFIERS

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

D9 Dissolved result is greater than the total. Data is within laboratory control limits.

E Analyte concentration exceeded the calibration range. The reported result is estimated.

H6 Analysis initiated outside of the 15 minute EPA required holding time.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285081001	SW-2	EPA 200.7	552666	EPA 200.7	552783
60285081002	SW-DUP-1	EPA 200.7	552666	EPA 200.7	552783
60285081003	SW-1	EPA 200.7	552666	EPA 200.7	552783
60285081004	SW-3	EPA 200.7	552666	EPA 200.7	552783
60285081005	SW-4	EPA 200.7	552666	EPA 200.7	552783
60285081006	SW-FB-1	EPA 200.7	565130	EPA 200.7	565147
60285081007	SW-5	EPA 200.7	552666	EPA 200.7	552783
60285081001	SW-2	EPA 200.7	555597	EPA 200.7	555721
60285081002	SW-DUP-1	EPA 200.7	555597	EPA 200.7	555721
60285081003	SW-1	EPA 200.7	555597	EPA 200.7	555721
60285081004	SW-3	EPA 200.7	555597	EPA 200.7	555721
60285081005	SW-4	EPA 200.7	555597	EPA 200.7	555721
60285081007	SW-5	EPA 200.7	556929	EPA 200.7	557057
60285081001	SW-2	EPA 200.8	555338	EPA 200.8	555405
60285081002	SW-DUP-1	EPA 200.8	555338	EPA 200.8	555405
60285081003	SW-1	EPA 200.8	555338	EPA 200.8	555405
60285081004	SW-3	EPA 200.8	555338	EPA 200.8	555405
60285081005	SW-4	EPA 200.8	555338	EPA 200.8	555405
60285081006	SW-FB-1	EPA 200.8	557460	EPA 200.8	557561
60285081007	SW-5	EPA 200.8	555338	EPA 200.8	555405
60285081001	SW-2	EPA 200.8	552610	EPA 200.8	552694
60285081002	SW-DUP-1	EPA 200.8	553967	EPA 200.8	554042
60285081003	SW-1	EPA 200.8	553967	EPA 200.8	554042
60285081004	SW-3	EPA 200.8	553967	EPA 200.8	554042
60285081005	SW-4	EPA 200.8	553967	EPA 200.8	554042
60285081007	SW-5	EPA 200.8	553967	EPA 200.8	554042
60285081001	SW-2	EPA 7470	553779	EPA 7470	553822
60285081002	SW-DUP-1	EPA 7470	553779	EPA 7470	553822
60285081003	SW-1	EPA 7470	553779	EPA 7470	553822
60285081004	SW-3	EPA 7470	553779	EPA 7470	553822
60285081005	SW-4	EPA 7470	553779	EPA 7470	553822
60285081006	SW-FB-1	EPA 7470	553779	EPA 7470	553822
60285081007	SW-5	EPA 7470	553779	EPA 7470	553822
60285081001	SW-2	SM 2320B	553401		
60285081002	SW-DUP-1	SM 2320B	553401		
60285081003	SW-1	SM 2320B	553401		
60285081004	SW-3	SM 2320B	553401		
60285081005	SW-4	SM 2320B	553401		
60285081006	SW-FB-1	SM 2320B	553401		
60285081007	SW-5	SM 2320B	553401		
60285081001	SW-2	SM 2540C	552835		
60285081002	SW-DUP-1	SM 2540C	552835		
60285081003	SW-1	SM 2540C	552835		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN RUSH ISLAND ENERGY CTR

Pace Project No.: 60285081

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60285081004	SW-3	SM 2540C	552835		
60285081005	SW-4	SM 2540C	552837		
60285081006	SW-FB-1	SM 2540C	552837		
60285081007	SW-5	SM 2540C	552837		
60285081001	SW-2	SM 3500-Fe B#4	554281		
60285081002	SW-DUP-1	SM 3500-Fe B#4	554281		
60285081003	SW-1	SM 3500-Fe B#4	554281		
60285081004	SW-3	SM 3500-Fe B#4	554281		
60285081005	SW-4	SM 3500-Fe B#4	554281		
60285081006	SW-FB-1	SM 3500-Fe B#4	554281		
60285081007	SW-5	SM 3500-Fe B#4	554281		
60285081001	SW-2	SM 3500-Fe B#4	552548		
60285081002	SW-DUP-1	SM 3500-Fe B#4	552548		
60285081003	SW-1	SM 3500-Fe B#4	552548		
60285081004	SW-3	SM 3500-Fe B#4	552548		
60285081005	SW-4	SM 3500-Fe B#4	552548		
60285081006	SW-FB-1	SM 3500-Fe B#4	552548		
60285081007	SW-5	SM 3500-Fe B#4	552549		
60285081001	SW-2	EPA 300.0	554134		
60285081002	SW-DUP-1	EPA 300.0	554134		
60285081003	SW-1	EPA 300.0	554134		
60285081004	SW-3	EPA 300.0	554134		
60285081005	SW-4	EPA 300.0	554134		
60285081006	SW-FB-1	EPA 300.0	554134		
60285081007	SW-5	EPA 300.0	554134		
60285081007	SW-5	EPA 300.0	554692		
60285081001	SW-2	EPA 365.4	552716		
60285081002	SW-DUP-1	EPA 365.4	552716		
60285081003	SW-1	EPA 365.4	552716		
60285081004	SW-3	EPA 365.4	552716		
60285081005	SW-4	EPA 365.4	552716		
60285081006	SW-FB-1	EPA 365.4	552716		
60285081007	SW-5	EPA 365.4	552716		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO#: 60285081

60285081

Client Name: Golder Associates

Courier: FedEx UPS VIA Clay PEX ECI Pace Xroads Client Other

Tracking #: _____ Pace Shipping Label Used? Yes No

Custody Seal on Cooler/Box Present: Yes No Seals intact: Yes No

Packing Material: Bubble Wrap Bubble Bags Foam None Other CPIC

Thermometer Used: T500 Type of Ice: Wet Blue None

Cooler Temperature (°C): As-read 0.1 Corr. Factor +0.2 Corrected 0.3
1.8

Date and initials of person examining contents: 10/30/18 JLS

Temperature should be above freezing to 6°C 1.6

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Short Hold Time analyses (<72hr):	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>Fe + 2</u>
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>The COC Reads Sw-5ms + Sw-5msd</u>
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<u>containers read. Sw-3msd + Sw-3msd</u>
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<u>The COC Reads Sw-5 the</u>
Filtered volume received for dissolved tests?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<u>container reads Sw-3 the</u>
Sample labels match COC: Date / time / ID / analyses	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<u>Date / time matches Sw-5</u>
Samples contain multiple phases? Matrix: <u>WT</u>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks:		
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ Date: _____

MEMORANDUM**DATE** January 18, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – SURFACE WATER SAMPLING – DATA PACKAGE 60285081R2**

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- Analysis of Ferrous Iron for all samples was initiated outside of the 15-minute EPA required holding time, the detections in samples were qualified as estimates (J) or non-detect and estimates (UJ).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).
- When a sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates Project Manager: J Ingram
 Project Name: Ameren - RIEC - Surface Waters - Oct 2018 Project Number: 1531406
 Reviewer: T Goodwin Validation Date: 1/18/19

Laboratory: Pace Analytical SDG #: 60285081r2
 Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0) (12)
 Matrix: Air Soil/Sed. Water Waste _____
 Sample Names: SW-2, SW-DUP-1, SW-1, SW-3, SW-4, SW-FB-1, SW-5

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/22/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Grab</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>pH, Cond, Turb, Temp, DO, ORP, Q, DTW</u>
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Fe²⁺</u>
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
b) Were analytes detected in the field blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>FB-1: B(7.0), B(50.3), C(716.0), C(10.1), F(35.5),</u>
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<u>L(15.0), Mg(1200), Mn(16.0), EPA See Notes</u>
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Dup-1@ SW-2</u>
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>FB-1@ SW-4</u>
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Al(d/200); Be, t(200); Be, d(200); Fe, t(63); Fe, d(49);</u>
d) Were lab dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>L; d(93); N; t(48); Zn, t(200); Zn, d(200); Cr(342);</u>
				<u>C; d(200); P, t(35); Fe³⁺(149)</u>

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Al, Fe, Se, Cl⁻, F⁻, SO₄²⁻, P</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>Al, Fe</u>
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>SO₄²⁻</u>

Comments/Notes:

FB-1: EPA 2007 data was unusable and excluded from FB comparison qualifications. (12)

Cr (0.12), TDS (14.0), Fe³⁺ (0.035), Mg (19.6), Mn (1.2)

MP: not [1006]

[1001-67] Be (0.25), Sb (0.079), As (0.072), Cd (0.040), Alk (1.1)

[1007] Al (32.8), L (4.6)

[1006] Cr (0.19)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
All Samples	Ferrous Iron (Fe^{2+})	—	J/UJ	Analyzed outside EPA hold time
SW-2	Antimony, total (Sb, t)	1.0	U	Detected in Method Blank (MB); PQL > Result > MDL
	Cadmium, t (Cd, t)	0.50	U	┌ ───────────┐ │ ───────────┘
	Antimony, dissolved (Sb, d)	1.0	U	
	Alumina, d (Al, d)	21.1	UJ	RPD exceeded limits; Result < MDL
	Beryllium, t (Be, t)	0.16	UJ	┌ ───────────┐ │ ───────────┘
	Be, d	0.16	UJ	
	Iron, t (Fe, t)	292	J	; Result > MDL
	Fe, d	10.2	J	┌ ───────────┐ │ ───────────┘
	Lithium, d (Li, d)	5.8	J	
	Nickel, t (Ni, t)	1.5	J	┌ ───────────┐ │ ───────────┘
	Zinc, t (Zn, t)	3.5	UJ	
	Zinc, d (Zn, d)	3.5	UJ	; MDL > Result
	Chromium, t (Cr, t)	1.0	J	┌ ───────────┐ │ ───────────┘
	Chromium, d (Cr, d)	0.19	UJ	
	Phosphorus (P)	0.19	J	; Result > MDL
	Ferrous Iron (Fe^{2+})	0.042	J	; MDL > Result
	Ferrous Iron (Fe^{2+})	0.042	J	; Result > MDL
SW-DUP-1	Al, d	39.3	J	┌ ───────────┐ │ ───────────┘
	Be, t	0.36	J	
	Be, d	0.16	J	┌ ───────────┐ │ ───────────┘
	Fe, d	6.2	J	
	Li, d	15.8	J	┌ ───────────┐ │ ───────────┘
	Ni, t	3.1	J	
	Zn, t	4.4	J	┌ ───────────┐ │ ───────────┘
	Zn, d	3.9	J	
	Cr, t	0.73	J	┌ ───────────┐ │ ───────────┘
	Cr, d	0.24	J	
	P	0.27	J	┌ ───────────┐ │ ───────────┘
	Fe^{3+}	0.29	J	
	Beryllium (Be, t)	1.0	U	MB; PQL > Result > MDL
	Be, d	1.0	U	┌ ───────────┐ │ ───────────┘

Signature: Continue on Next Page

Date: _____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
SW-DUP-1	Sb,t	1.0	U	MB; PQL > Result > MDL
┆	Sb,d	1.0	U	
┆	Cd,t	0.50	U	
SW-1	Sb,t	1.0	U	
┆	Cd,t	0.50	U	
┆	Sb,d	1.0	U	
┆	Cd,d	0.50	U	
SW-3	Sb,t	1.0	U	
┆	Cd,t	0.50	U	
┆	Sb,d	1.0	U	
┆	Be,t	1.0	U	
SW-4	Be,t	1.0	U	
┆	Sb,t	1.0	U	
┆	Cd,t	0.50	U	
┆	Sb,t	1.0	U	
SW-FB-1	Cr,t	1.0	U	
SW-5	Al,d	75.0	U	
┆	Li,t	19.6	J	; 10xMB > Result > PQL
┆	Li,d	16.7	J	
┆	Be,t	1.0	U	; PQL > Result > MDL
┆	Sb,t	1.0	U	
┆	Cd,t	0.50	U	
┆	Sb,d	1.0	U	
┆	Cd,d	0.50	U	

Signature: Tommy Goodlip

Date: 4/18/19

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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

TestAmerica Job ID: 140-13229-1

Client Project/Site: Rush Island Energy Center - Soil & Speci

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

Attn: Jeffrey Ingram



Authorized for release by:
11/30/2018 12:27:22 PM

Terry Walker Wasmund, Project Manager II
(865)291-3000
terry.wasmund@testamericainc.com

LINKS

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www.testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

- 1
- 2
- 3
- 4
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Definitions/Glossary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Qualifiers

Metals

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
*	RPD of the LCS and LCSD exceeds the control limits
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

Case Narrative

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Job ID: 140-13229-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative 140-13229-1

Receipt

The samples were received on 11/1/2018 at 12:00 PM. The samples arrived in good condition, properly preserved, and on ice. The temperature of the cooler at receipt was 0.3° C.

Receipt Exceptions

The container label for sample BH-01 (130-135) (140-13229-11) did not match the information listed on the Chain-of-Custody (COC). The container labeled BH-01 (130-135), while the COC listed BH-01 (130-35). The client was contacted and confirmed the correct ID is BH-01 (130-135).

Metals - Method 6010B

7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in 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:

$$\text{Result, } \mu\text{g/g or mg/Kg, dry weight} = (C \times V \times V1 \times D) / (W \times S \times V2)$$

Case Narrative

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Job ID: 140-13229-1 (Continued)

Laboratory: TestAmerica Knoxville (Continued)

Where:

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

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

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

SEP Report Notes:

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

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 SEP: The method blank for preparation batch 140-25604 and analytical batch 140-25767 contained Iron above the reporting limit (RL). Associated samples were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Methods 6010B, 6010B SEP: Samples BH-03 (30-32) (140-13229-1), BH-03 (70-75) (140-13229-2), BH-03 (110-115) (140-13229-3), DUP-1 (140-13229-4), BH-02 (70-72) (140-13229-7), BH-02 (125-130) (140-13229-8), BH-01 (75-80) (140-13229-10) and BH-01 (130-135) (140-13229-11) were diluted due to the presence of Silicon or Titanium which interferes with Arsenic and Lead. Elevated reporting limits (RLs) are provided.

Methods 3050B/6020

Sample BH-02 (70-72) (140-13229-7) could not be thoroughly homogenized before sub-sampling was performed due to sample matrix. The sample was clay.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

% Moisture: The samples were analyzed for percent moisture using SOP number KNOX-WC-0012 (based on Modified MCAWW 160.3 and SM2540B and on the percent moisture determinations described in methods 3540C and 3550B).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Comments

No additional comments.

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (30-32)

Lab Sample ID: 140-13229-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	34	*	17	10	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	22		12	2.4	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	2.4		0.58	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Iron	1400		5.8	3.3	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.80	*	0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	490		12	1.8	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.9	B	0.58	0.25	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2000		5.8	3.3	mg/Kg	1	☼	6010B SEP	Step 4
Lead	1.5		0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.91	J	2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	29	J*	170	27	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.8	J B*	43	2.5	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	690		12	1.8	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	1.1		0.58	0.17	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2700		5.8	3.3	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.50	J	0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.93	J	2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	29000		120	18	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	2.1		1.2	0.30	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3800	B	5.8	4.7	mg/Kg	1	☼	6010B SEP	Step 7
Lead	8.0		1.2	0.25	mg/Kg	2	☼	6010B SEP	Step 7
Li	3.3		2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.20	J	2.3	0.095	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	30000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	7.5		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	10000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	11		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	9.0		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.20	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	33000		120	18	mg/Kg	10	☼	6010B	Total/NA
Arsenic	8.2		1.2	0.30	mg/Kg	2	☼	6010B	Total/NA
Iron	11000		5.8	4.7	mg/Kg	1	☼	6010B	Total/NA
Lead	9.8		1.2	0.25	mg/Kg	2	☼	6010B	Total/NA
Lithium	5.2		2.9	0.17	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1100		3.5	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	1.8		0.12	0.031	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	4500		5.9	2.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	2.1		0.12	0.041	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	1.9		0.59	0.33	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.094	J	0.59	0.073	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-03 (70-75)

Lab Sample ID: 140-13229-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	6.0	J*	36	5.7	mg/Kg	3	☼	6010B SEP	Step 2
Iron	60	*	18	10	mg/Kg	3	☼	6010B SEP	Step 2

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (70-75) (Continued)

Lab Sample ID: 140-13229-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	28		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.34	J	0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Iron	460		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.27	J*	0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	330		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.65	B	0.59	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1100		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.82		0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.71	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	38	J*	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.7	J B*	45	2.6	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	470		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.65		0.59	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1500		5.9	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.39	J	0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.79	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	29000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.88		0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 7
Iron	1600	B	5.9	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Lead	6.8		0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 7
Li	2.3	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	30000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	2.5		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	4700		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	8.3		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	7.5		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	32000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	5.3		1.2	0.31	mg/Kg	2	☼	6010B	Total/NA
Iron	6300		5.9	4.9	mg/Kg	1	☼	6010B	Total/NA
Lead	8.9		1.2	0.26	mg/Kg	2	☼	6010B	Total/NA
Lithium	4.4		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.19	J	2.4	0.097	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1000		3.5	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	15		0.12	0.030	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	4400		5.8	2.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	5.6		0.12	0.041	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	1.8		0.58	0.32	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.20	J	0.58	0.072	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9.3	J*	35	5.6	mg/Kg	3	☼	6010B SEP	Step 2
Iron	83	*	18	10	mg/Kg	3	☼	6010B SEP	Step 2
Li	0.84	J	8.8	0.53	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	22		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.36	J	0.58	0.15	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (110-115) (Continued)

Lab Sample ID: 140-13229-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	440		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.67	J	2.3	0.096	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	290		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.66	B	0.58	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1300		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.69		0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.86	J	2.9	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Mo	0.41	J	2.3	0.096	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	42	J *	180	27	mg/Kg	5	☼	6010B SEP	Step 5
Li	4.4	J B *	44	2.6	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1000		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.65		0.58	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3400		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.57	J	0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.9	J	2.9	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	33000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		1.2	0.30	mg/Kg	2	☼	6010B SEP	Step 7
Iron	4900	B	5.8	4.8	mg/Kg	1	☼	6010B SEP	Step 7
Lead	4.6		1.2	0.26	mg/Kg	2	☼	6010B SEP	Step 7
Li	2.9		2.9	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.19	J	2.3	0.096	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	34000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	2.9		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	10000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	5.9		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	11		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	1.3	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	28000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	4.3		1.2	0.30	mg/Kg	2	☼	6010B	Total/NA
Iron	9800		5.8	4.8	mg/Kg	1	☼	6010B	Total/NA
Lead	5.1		1.2	0.26	mg/Kg	2	☼	6010B	Total/NA
Lithium	5.8		2.9	0.18	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	1.8	J	2.3	0.096	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1200		3.6	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	1.2		0.12	0.031	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	3800		6.0	2.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	1.0		0.12	0.042	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	2.5		0.60	0.33	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.42	J	0.60	0.074	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: DUP-1

Lab Sample ID: 140-13229-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	6.5	J *	36	5.7	mg/Kg	3	☼	6010B SEP	Step 2
Iron	110	*	18	10	mg/Kg	3	☼	6010B SEP	Step 2
Li	0.78	J	8.9	0.54	mg/Kg	3	☼	6010B SEP	Step 2

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: DUP-1 (Continued)

Lab Sample ID: 140-13229-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	23		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.38	J	0.59	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Iron	580		5.9	3.5	mg/Kg	1	☼	6010B SEP	Step 3
Mo	1.3	J	2.4	0.098	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	370		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.95	B	0.59	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1600		5.9	3.5	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.64		0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.99	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Mo	0.68	J	2.4	0.098	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	38	J*	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.3	J B*	45	2.6	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	900		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.78		0.59	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3500		5.9	3.5	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.43	J	0.59	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.7	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	27000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		1.2	0.31	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3100	B	5.9	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Lead	4.4		1.2	0.26	mg/Kg	2	☼	6010B SEP	Step 7
Li	3.1		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	29000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	3.3		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	8900		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	5.4		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	9.8		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	2.0		2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	33000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.0		1.2	0.31	mg/Kg	2	☼	6010B	Total/NA
Iron	10000		5.9	4.9	mg/Kg	1	☼	6010B	Total/NA
Lead	4.8		1.2	0.26	mg/Kg	2	☼	6010B	Total/NA
Lithium	6.4		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	2.4		2.4	0.098	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1300		3.5	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	1.1		0.12	0.030	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	4000		5.8	2.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	1.1		0.12	0.041	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	2.8		0.58	0.32	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.44	J	0.58	0.072	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	14	J*	36	5.8	mg/Kg	3	☼	6010B SEP	Step 2
Iron	290	*	18	11	mg/Kg	3	☼	6010B SEP	Step 2

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (41-45) (Continued)

Lab Sample ID: 140-13229-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Lead	0.81	J	1.8	0.40	mg/Kg	3		☼	6010B SEP	Step 2
Aluminum	63		12	2.5	mg/Kg	1		☼	6010B SEP	Step 3
Arsenic	0.84		0.60	0.16	mg/Kg	1		☼	6010B SEP	Step 3
Iron	970		6.0	3.5	mg/Kg	1		☼	6010B SEP	Step 3
Lead	0.35	J *	0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 3
Aluminum	550		12	1.9	mg/Kg	1		☼	6010B SEP	Step 4
Arsenic	1.2	B	0.60	0.27	mg/Kg	1		☼	6010B SEP	Step 4
Iron	1900		6.0	3.5	mg/Kg	1		☼	6010B SEP	Step 4
Lead	1.8		0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 4
Li	1.2	J	3.0	0.18	mg/Kg	1		☼	6010B SEP	Step 4
Aluminum	33	J *	180	28	mg/Kg	5		☼	6010B SEP	Step 5
Li	4.4	J B *	45	2.7	mg/Kg	5		☼	6010B SEP	Step 5
Aluminum	1200		12	1.9	mg/Kg	1		☼	6010B SEP	Step 6
Arsenic	1.0		0.60	0.18	mg/Kg	1		☼	6010B SEP	Step 6
Iron	2600		6.0	3.5	mg/Kg	1		☼	6010B SEP	Step 6
Lead	0.92		0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 6
Li	1.6	J	3.0	0.18	mg/Kg	1		☼	6010B SEP	Step 6
Aluminum	30000		120	19	mg/Kg	10		☼	6010B SEP	Step 7
Arsenic	1.8		0.60	0.16	mg/Kg	1		☼	6010B SEP	Step 7
Iron	2600	B	6.0	5.0	mg/Kg	1		☼	6010B SEP	Step 7
Lead	5.7		0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 7
Li	4.2		3.0	0.18	mg/Kg	1		☼	6010B SEP	Step 7
Aluminum	32000		10	1.6	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Arsenic	4.9		0.50	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Iron	8400		5.0	4.1	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Lead	9.5		0.50	0.11	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Li	11		2.5	0.15	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Aluminum	37000		120	19	mg/Kg	10		☼	6010B	Total/NA
Arsenic	4.2		0.60	0.16	mg/Kg	1		☼	6010B	Total/NA
Iron	8600		6.0	5.0	mg/Kg	1		☼	6010B	Total/NA
Lead	9.1		0.60	0.13	mg/Kg	1		☼	6010B	Total/NA
Lithium	7.5		3.0	0.18	mg/Kg	1		☼	6010B	Total/NA
Molybdenum	0.25	J	2.4	0.099	mg/Kg	1		☼	6010B	Total/NA
Aluminum	2100		3.8	1.8	mg/Kg	1		☼	EPA 6020A	Total/NA
Arsenic	1.7		0.13	0.033	mg/Kg	1		☼	EPA 6020A	Total/NA
Iron	5600		6.3	3.1	mg/Kg	1		☼	EPA 6020A	Total/NA
Lead	3.8		0.13	0.044	mg/Kg	1		☼	EPA 6020A	Total/NA
Lithium	3.3		0.63	0.35	mg/Kg	1		☼	EPA 6020A	Total/NA
Molybdenum	0.18	J	0.63	0.078	mg/Kg	1		☼	EPA 6020A	Total/NA

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Aluminum	6.1	J *	35	5.5	mg/Kg	3		☼	6010B SEP	Step 2
Iron	180	*	17	10	mg/Kg	3		☼	6010B SEP	Step 2
Lead	0.61	J	1.7	0.38	mg/Kg	3		☼	6010B SEP	Step 2
Aluminum	54		12	2.4	mg/Kg	1		☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (72-75) (Continued)

Lab Sample ID: 140-13229-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.32	J	0.58	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Iron	650		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.26	J *	0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	640		12	1.8	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.80	B	0.58	0.25	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1700		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 4
Lead	1.3		0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	1.3	J	2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	27	J *	170	27	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.1	J B *	43	2.5	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	990		12	1.8	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.94		0.58	0.17	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2300		5.8	3.4	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.68		0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.3	J	2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	40000		120	18	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.4		0.58	0.15	mg/Kg	1	☼	6010B SEP	Step 7
Iron	3000	B	5.8	4.7	mg/Kg	1	☼	6010B SEP	Step 7
Lead	7.8		0.58	0.13	mg/Kg	1	☼	6010B SEP	Step 7
Li	3.6		2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	42000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	3.5		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	7800		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	11		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	9.3		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	37000		120	18	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.3		0.58	0.15	mg/Kg	1	☼	6010B	Total/NA
Iron	8700		5.8	4.7	mg/Kg	1	☼	6010B	Total/NA
Lead	8.8		0.58	0.13	mg/Kg	1	☼	6010B	Total/NA
Lithium	6.6		2.9	0.17	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.23	J	2.3	0.095	mg/Kg	1	☼	6010B	Total/NA
Aluminum	2800		3.5	1.6	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	2.0		0.12	0.030	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	5600		5.8	2.8	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	4.4		0.12	0.040	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	3.9		0.58	0.32	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.26	J	0.58	0.072	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	24	J	26	15	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	18	J *	39	6.2	mg/Kg	3	☼	6010B SEP	Step 2
Iron	720	*	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Lead	2.0		1.9	0.43	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	170		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.57	J	0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (70-72) (Continued)

Lab Sample ID: 140-13229-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	1500		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.26	J *	0.65	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Li	0.21	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.12	J	2.6	0.11	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	2200		13	2.1	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.4	B	0.65	0.29	mg/Kg	1	☼	6010B SEP	Step 4
Iron	4500		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 4
Lead	5.1		0.65	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Li	5.2		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	34	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Li	4.1	J B *	49	2.9	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	4100		13	2.1	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	1.6		0.65	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Iron	6100		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 6
Lead	1.3		0.65	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Li	3.6		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	26000		130	21	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.5		0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Iron	6200	B	6.5	5.3	mg/Kg	1	☼	6010B SEP	Step 7
Lead	2.6		0.65	0.14	mg/Kg	1	☼	6010B SEP	Step 7
Li	8.9		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	33000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	5.0		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	19000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	11		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	22		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.12	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	53000		130	21	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.8		0.65	0.17	mg/Kg	1	☼	6010B	Total/NA
Iron	19000		6.5	5.3	mg/Kg	1	☼	6010B	Total/NA
Lead	12		1.3	0.29	mg/Kg	2	☼	6010B	Total/NA
Lithium	24		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.30	J	2.6	0.11	mg/Kg	1	☼	6010B	Total/NA
Aluminum	8300		3.9	1.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	2.6		0.13	0.034	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	15000		6.6	3.2	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	12		0.13	0.046	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	12		0.66	0.36	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.50	J	0.66	0.081	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-02 (125-130)

Lab Sample ID: 140-13229-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	86	*	18	11	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	28		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.20	J	0.61	0.16	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (125-130) (Continued)

Lab Sample ID: 140-13229-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	640		6.1	3.5	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.18	J*	0.61	0.13	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.22	J	2.4	0.099	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	440		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.76	B	0.61	0.27	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2000		6.1	3.5	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.73		0.61	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	1.2	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	39	J*	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.9	J B*	45	2.7	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	900		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.41	J	0.61	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3100		6.1	3.5	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.35	J	0.61	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.7	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	27000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		1.2	0.32	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3200	B	6.1	5.0	mg/Kg	1	☼	6010B SEP	Step 7
Lead	4.3		1.2	0.27	mg/Kg	2	☼	6010B SEP	Step 7
Li	2.7	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	28000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	2.6		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	9000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	5.6		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	9.5		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.22	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	31000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	2.2		1.2	0.32	mg/Kg	2	☼	6010B	Total/NA
Iron	9200		6.1	5.0	mg/Kg	1	☼	6010B	Total/NA
Lead	6.2		1.2	0.27	mg/Kg	2	☼	6010B	Total/NA
Lithium	4.8		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.53	J	2.4	0.099	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1200		3.5	1.6	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	0.60		0.12	0.030	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	4600		5.8	2.8	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	1.4		0.12	0.040	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	2.5		0.58	0.32	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.53	J	0.58	0.072	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-01 (26-31)

Lab Sample ID: 140-13229-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	11	J*	18	10	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	15		12	2.5	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.62		0.60	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Iron	230		6.0	3.5	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (26-31) (Continued)

Lab Sample ID: 140-13229-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.50	J *	0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	310		12	1.9	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.98	B	0.60	0.26	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1200		6.0	3.5	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.91		0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.57	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	36	J *	180	28	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.5	J B *	45	2.6	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	610		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.63		0.60	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1800		6.0	3.5	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.43	J	0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.1	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	32000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.1		0.60	0.16	mg/Kg	1	☼	6010B SEP	Step 7
Iron	2200	B	6.0	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Lead	11		0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 7
Li	2.1	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	33000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	3.3		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	5400		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	13		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	7.2		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	54000		120	19	mg/Kg	10	☼	6010B	Total/NA
Arsenic	2.9		0.60	0.16	mg/Kg	1	☼	6010B	Total/NA
Iron	4500		6.0	4.9	mg/Kg	1	☼	6010B	Total/NA
Lead	17		0.60	0.13	mg/Kg	1	☼	6010B	Total/NA
Lithium	3.7		3.0	0.18	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1200		3.7	1.8	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	1.3		0.12	0.032	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	3400		6.2	3.1	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	2.2		0.12	0.044	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	1.5		0.62	0.34	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.12	J	0.62	0.077	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	8.7	J *	37	5.9	mg/Kg	3	☼	6010B SEP	Step 2
Iron	290	*	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	42		12	2.6	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.44	J	0.62	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Iron	1100		6.2	3.6	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.26	J *	0.62	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	480		12	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.64	B	0.62	0.27	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1700		6.2	3.6	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (75-80) (Continued)

Lab Sample ID: 140-13229-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	0.90		0.62	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.97	J	3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	40	J *	190	29	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	910		12	2.0	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.92		0.62	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2700		6.2	3.6	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.44	J	0.62	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.5	J	3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	36000		120	20	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.4		1.2	0.32	mg/Kg	2	☼	6010B SEP	Step 7
Iron	2700	B	6.2	5.1	mg/Kg	1	☼	6010B SEP	Step 7
Lead	4.7		1.2	0.27	mg/Kg	2	☼	6010B SEP	Step 7
Li	2.8	J	3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	38000		10	1.6	mg/Kg	1		6010B SEP	Sum of
Arsenic	3.4		0.50	0.13	mg/Kg	1		6010B SEP	Sum of
Iron	8400		5.0	4.1	mg/Kg	1		6010B SEP	Sum of
Lead	6.3		0.50	0.11	mg/Kg	1		6010B SEP	Sum of
Li	5.3		2.5	0.15	mg/Kg	1		6010B SEP	Sum of
Aluminum	31000		120	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	4.3		1.2	0.32	mg/Kg	2	☼	6010B	Total/NA
Iron	8800		6.2	5.1	mg/Kg	1	☼	6010B	Total/NA
Lead	5.7		1.2	0.27	mg/Kg	2	☼	6010B	Total/NA
Lithium	5.3		3.1	0.19	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.17	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1200		3.6	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	2.3		0.12	0.031	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	4500		5.9	2.9	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	2.0		0.12	0.042	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	2.1		0.59	0.33	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.21	J	0.59	0.074	mg/Kg	1	☼	EPA 6020A	Total/NA

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	87	*	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Li	0.58	J	9.5	0.57	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	26		13	2.6	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.19	J	0.63	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Iron	610		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.18	J *	0.63	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	410		13	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.70	B	0.63	0.28	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2100		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 4
Lead	0.93		0.63	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Li	1.1	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	50	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Li	3.2	J B *	47	2.8	mg/Kg	5	☼	6010B SEP	Step 5

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Detection Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (130-135) (Continued)

Lab Sample ID: 140-13229-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	830		13	2.0	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.60	J	0.63	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3600		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 6
Lead	0.66		0.63	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.4	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	24000		130	20	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.3		1.3	0.33	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3500	B	6.3	5.2	mg/Kg	1	☼	6010B SEP	Step 7
Lead	3.9		1.3	0.28	mg/Kg	2	☼	6010B SEP	Step 7
Li	2.4	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	25000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	2.8		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	9800		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	5.6		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	8.6		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	28000		130	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	2.9		1.3	0.33	mg/Kg	2	☼	6010B	Total/NA
Iron	8700		6.3	5.2	mg/Kg	1	☼	6010B	Total/NA
Lead	6.3		1.3	0.28	mg/Kg	2	☼	6010B	Total/NA
Lithium	4.9		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.16	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA
Aluminum	1200		3.7	1.7	mg/Kg	1	☼	EPA 6020A	Total/NA
Arsenic	0.64		0.12	0.032	mg/Kg	1	☼	EPA 6020A	Total/NA
Iron	5100		6.1	3.0	mg/Kg	1	☼	EPA 6020A	Total/NA
Lead	1.7		0.12	0.043	mg/Kg	1	☼	EPA 6020A	Total/NA
Lithium	2.4		0.61	0.34	mg/Kg	1	☼	EPA 6020A	Total/NA
Molybdenum	0.23	J	0.61	0.076	mg/Kg	1	☼	EPA 6020A	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (30-32)

Lab Sample ID: 140-13229-1

Date Collected: 10/27/18 08:30

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		46	7.4	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4
Arsenic	ND		2.3	0.60	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4
Iron	ND		23	13	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4
Lead	ND		2.3	0.51	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4
Li	ND		12	0.69	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4
Mo	ND		9.2	0.38	mg/Kg	☼	11/14/18 08:00	11/17/18 10:56	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	35	5.5	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3
Arsenic	ND	*	1.7	0.45	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3
Iron	34	*	17	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3
Lead	ND		1.7	0.38	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3
Li	ND		8.7	0.52	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3
Mo	ND		6.9	0.28	mg/Kg	☼	11/15/18 08:00	11/17/18 13:03	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22		12	2.4	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1
Arsenic	2.4		0.58	0.15	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1
Iron	1400		5.8	3.3	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1
Lead	0.80	*	0.58	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1
Li	ND		2.9	0.17	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1
Mo	ND		2.3	0.095	mg/Kg	☼	11/16/18 08:00	11/19/18 13:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	490		12	1.8	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1
Arsenic	1.9	B	0.58	0.25	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1
Iron	2000		5.8	3.3	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1
Lead	1.5		0.58	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1
Li	0.91	J	2.9	0.17	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1
Mo	ND		2.3	0.095	mg/Kg	☼	11/17/18 08:00	11/19/18 15:53	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29	J*	170	27	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5
Arsenic	ND		8.7	2.2	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5
Iron	ND	*	87	51	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5
Lead	ND	*	8.7	1.9	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5
Li	3.8	J B*	43	2.5	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5
Mo	ND		35	1.4	mg/Kg	☼	11/20/18 08:00	11/26/18 11:35	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	690		12	1.8	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1
Arsenic	1.1		0.58	0.17	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1
Iron	2700		5.8	3.3	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1
Lead	0.50	J	0.58	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1
Li	0.93	J	2.9	0.17	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (30-32)

Lab Sample ID: 140-13229-1

Date Collected: 10/27/18 08:30

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.3	0.11	mg/Kg	☼	11/20/18 09:43	11/26/18 13:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		120	18	mg/Kg	☼	11/21/18 07:44	11/28/18 16:14	10
Arsenic	2.1		1.2	0.30	mg/Kg	☼	11/21/18 07:44	11/28/18 19:34	2
Iron	3800	B	5.8	4.7	mg/Kg	☼	11/21/18 07:44	11/28/18 12:11	1
Lead	8.0		1.2	0.25	mg/Kg	☼	11/21/18 07:44	11/28/18 19:34	2
Li	3.3		2.9	0.17	mg/Kg	☼	11/21/18 07:44	11/28/18 12:11	1
Mo	0.20	J	2.3	0.095	mg/Kg	☼	11/21/18 07:44	11/28/18 12:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	7.5		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	10000		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	11		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	9.0		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	0.20	J	2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		120	18	mg/Kg	☼	11/12/18 08:00	11/28/18 17:48	10
Arsenic	8.2		1.2	0.30	mg/Kg	☼	11/12/18 08:00	11/28/18 20:40	2
Iron	11000		5.8	4.7	mg/Kg	☼	11/12/18 08:00	11/28/18 14:07	1
Lead	9.8		1.2	0.25	mg/Kg	☼	11/12/18 08:00	11/28/18 20:40	2
Lithium	5.2		2.9	0.17	mg/Kg	☼	11/12/18 08:00	11/28/18 14:07	1
Molybdenum	ND		2.3	0.095	mg/Kg	☼	11/12/18 08:00	11/28/18 14:07	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1100		3.5	1.7	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1
Arsenic	1.8		0.12	0.031	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1
Iron	4500		5.9	2.9	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1
Lead	2.1		0.12	0.041	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1
Lithium	1.9		0.59	0.33	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1
Molybdenum	0.094	J	0.59	0.073	mg/Kg	☼	11/21/18 14:04	11/28/18 20:07	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (70-75)

Lab Sample ID: 140-13229-2

Date Collected: 10/27/18 12:15

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.6	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4
Iron	ND		24	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4
Lead	ND		2.4	0.52	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4
Li	ND		12	0.71	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4
Mo	ND		9.5	0.39	mg/Kg	☼	11/14/18 08:00	11/17/18 11:01	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.0	J *	36	5.7	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3
Arsenic	ND	*	1.8	0.46	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3
Iron	60	*	18	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3
Lead	ND		1.8	0.39	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3
Li	ND		8.9	0.53	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3
Mo	ND		7.1	0.29	mg/Kg	☼	11/15/18 08:00	11/17/18 13:08	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	1
Arsenic	0.34	J	0.59	0.15	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	1
Iron	460		5.9	3.4	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	1
Lead	0.27	J *	0.59	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	1
Li	ND		3.0	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	1
Mo	ND		2.4	0.097	mg/Kg	☼	11/16/18 08:00	11/19/18 13:53	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	☼	11/17/18 08:00	11/19/18 15:58	1
Arsenic	0.65	B	0.59	0.26	mg/Kg	☼	11/17/18 08:00	11/19/18 15:58	1
Iron	1100		5.9	3.4	mg/Kg	☼	11/17/18 08:00	11/19/18 15:58	1
Lead	0.82		0.59	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 15:58	1
Li	0.71	J	3.0	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 15:58	1
Mo	ND		2.4	0.097	mg/Kg	☼	11/17/18 08:00	11/19/18 15:58	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38	J *	180	28	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5
Iron	ND	*	89	52	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5
Lead	ND	*	8.9	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5
Li	3.7	J B *	45	2.6	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5
Mo	ND		36	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 11:40	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	470		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1
Arsenic	0.65		0.59	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1
Iron	1500		5.9	3.4	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1
Lead	0.39	J	0.59	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1
Li	0.79	J	3.0	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (70-75)

Lab Sample ID: 140-13229-2

Date Collected: 10/27/18 12:15

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 84.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.4	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 13:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:19	10
Arsenic	0.88		0.59	0.15	mg/Kg	☼	11/21/18 07:44	11/28/18 12:17	1
Iron	1600	B	5.9	4.9	mg/Kg	☼	11/21/18 07:44	11/28/18 12:17	1
Lead	6.8		0.59	0.13	mg/Kg	☼	11/21/18 07:44	11/28/18 12:17	1
Li	2.3	J	3.0	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 12:17	1
Mo	ND		2.4	0.097	mg/Kg	☼	11/21/18 07:44	11/28/18 12:17	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			11/29/18 14:47	1
Arsenic	2.5		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	4700		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	8.3		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	7.5		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	32000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:08	10
Arsenic	5.3		1.2	0.31	mg/Kg	☼	11/12/18 08:00	11/28/18 20:45	2
Iron	6300		5.9	4.9	mg/Kg	☼	11/12/18 08:00	11/28/18 14:13	1
Lead	8.9		1.2	0.26	mg/Kg	☼	11/12/18 08:00	11/28/18 20:45	2
Lithium	4.4		3.0	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:13	1
Molybdenum	0.19	J	2.4	0.097	mg/Kg	☼	11/12/18 08:00	11/28/18 14:13	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1000		3.5	1.7	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1
Arsenic	15		0.12	0.030	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1
Iron	4400		5.8	2.9	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1
Lead	5.6		0.12	0.041	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1
Lithium	1.8		0.58	0.32	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1
Molybdenum	0.20	J	0.58	0.072	mg/Kg	☼	11/21/18 14:04	11/28/18 20:12	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Date Collected: 10/27/18 16:20

Matrix: Solid

Date Received: 11/01/18 12:00

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	☼	11/14/18 08:00	11/17/18 11:06	4
Arsenic	ND		2.3	0.61	mg/Kg	☼	11/14/18 08:00	11/17/18 11:06	4
Iron	ND		23	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:06	4
Lead	ND		2.3	0.51	mg/Kg	☼	11/14/18 08:00	11/17/18 11:06	4
Li	ND		12	0.70	mg/Kg	☼	11/14/18 08:00	11/17/18 11:06	4
Mo	ND		9.3	0.38	mg/Kg	☼	11/14/18 08:00	11/17/18 11:06	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9.3	J *	35	5.6	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3
Arsenic	ND	*	1.8	0.46	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3
Iron	83	*	18	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3
Lead	ND		1.8	0.39	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3
Li	0.84	J	8.8	0.53	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3
Mo	ND		7.0	0.29	mg/Kg	☼	11/15/18 08:00	11/17/18 13:13	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1
Arsenic	0.36	J	0.58	0.15	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1
Iron	440		5.8	3.4	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1
Lead	ND	*	0.58	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1
Li	ND		2.9	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1
Mo	0.67	J	2.3	0.096	mg/Kg	☼	11/16/18 08:00	11/19/18 13:58	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	290		12	1.9	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1
Arsenic	0.66	B	0.58	0.26	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1
Iron	1300		5.8	3.4	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1
Lead	0.69		0.58	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1
Li	0.86	J	2.9	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1
Mo	0.41	J	2.3	0.096	mg/Kg	☼	11/17/18 08:00	11/19/18 16:03	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42	J *	180	27	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5
Arsenic	ND		8.8	2.2	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5
Iron	ND	*	88	51	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5
Lead	ND	*	8.8	1.9	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5
Li	4.4	J B *	44	2.6	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5
Mo	ND		35	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 11:45	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1000		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1
Arsenic	0.65		0.58	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1
Iron	3400		5.8	3.4	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1
Lead	0.57	J	0.58	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1
Li	1.9	J	2.9	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Date Collected: 10/27/18 16:20

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 85.7

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.3	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 13:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:24	10
Arsenic	1.2		1.2	0.30	mg/Kg	☼	11/21/18 07:44	11/28/18 19:39	2
Iron	4900	B	5.8	4.8	mg/Kg	☼	11/21/18 07:44	11/28/18 12:22	1
Lead	4.6		1.2	0.26	mg/Kg	☼	11/21/18 07:44	11/28/18 19:39	2
Li	2.9		2.9	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 12:22	1
Mo	0.19	J	2.3	0.096	mg/Kg	☼	11/21/18 07:44	11/28/18 12:22	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	34000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	2.9		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	10000		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	5.9		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	11		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	1.3	J	2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:13	10
Arsenic	4.3		1.2	0.30	mg/Kg	☼	11/12/18 08:00	11/28/18 20:50	2
Iron	9800		5.8	4.8	mg/Kg	☼	11/12/18 08:00	11/28/18 14:18	1
Lead	5.1		1.2	0.26	mg/Kg	☼	11/12/18 08:00	11/28/18 20:50	2
Lithium	5.8		2.9	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:18	1
Molybdenum	1.8	J	2.3	0.096	mg/Kg	☼	11/12/18 08:00	11/28/18 14:18	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.6	1.7	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1
Arsenic	1.2		0.12	0.031	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1
Iron	3800		6.0	2.9	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1
Lead	1.0		0.12	0.042	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1
Lithium	2.5		0.60	0.33	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1
Molybdenum	0.42	J	0.60	0.074	mg/Kg	☼	11/21/18 14:04	11/28/18 20:17	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: DUP-1

Date Collected: 10/27/18 00:00

Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-4

Matrix: Solid

Percent Solids: 84.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.6	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4
Iron	ND		24	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4
Lead	ND		2.4	0.52	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4
Li	ND		12	0.71	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4
Mo	ND		9.5	0.39	mg/Kg	☼	11/14/18 08:00	11/17/18 11:12	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.5	J *	36	5.7	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3
Arsenic	ND	*	1.8	0.46	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3
Iron	110	*	18	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3
Lead	ND		1.8	0.39	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3
Li	0.78	J	8.9	0.54	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3
Mo	ND		7.1	0.29	mg/Kg	☼	11/15/18 08:00	11/17/18 13:18	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1
Arsenic	0.38	J	0.59	0.15	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1
Iron	580		5.9	3.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1
Lead	ND	*	0.59	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1
Li	ND		3.0	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1
Mo	1.3	J	2.4	0.098	mg/Kg	☼	11/16/18 08:00	11/19/18 14:03	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	370		12	1.9	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1
Arsenic	0.95	B	0.59	0.26	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1
Iron	1600		5.9	3.5	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1
Lead	0.64		0.59	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1
Li	0.99	J	3.0	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1
Mo	0.68	J	2.4	0.098	mg/Kg	☼	11/17/18 08:00	11/19/18 16:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38	J *	180	28	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5
Arsenic	ND		8.9	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5
Iron	ND	*	89	52	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5
Lead	ND	*	8.9	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5
Li	3.3	J B *	45	2.6	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5
Mo	ND		36	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 11:50	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	900		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1
Arsenic	0.78		0.59	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1
Iron	3500		5.9	3.5	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1
Lead	0.43	J	0.59	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1
Li	1.7	J	3.0	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: DUP-1

Lab Sample ID: 140-13229-4

Date Collected: 10/27/18 00:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 84.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.4	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 13:57	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:29	10
Arsenic	1.2		1.2	0.31	mg/Kg	☼	11/21/18 07:44	11/28/18 19:44	2
Iron	3100	B	5.9	4.9	mg/Kg	☼	11/21/18 07:44	11/28/18 12:27	1
Lead	4.4		1.2	0.26	mg/Kg	☼	11/21/18 07:44	11/28/18 19:44	2
Li	3.1		3.0	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 12:27	1
Mo	ND		2.4	0.098	mg/Kg	☼	11/21/18 07:44	11/28/18 12:27	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			11/29/18 14:47	1
Arsenic	3.3		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	8900		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	5.4		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	9.8		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	2.0		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:18	10
Arsenic	3.0		1.2	0.31	mg/Kg	☼	11/12/18 08:00	11/28/18 20:56	2
Iron	10000		5.9	4.9	mg/Kg	☼	11/12/18 08:00	11/28/18 14:24	1
Lead	4.8		1.2	0.26	mg/Kg	☼	11/12/18 08:00	11/28/18 20:56	2
Lithium	6.4		3.0	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:24	1
Molybdenum	2.4		2.4	0.098	mg/Kg	☼	11/12/18 08:00	11/28/18 14:24	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1300		3.5	1.7	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1
Arsenic	1.1		0.12	0.030	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1
Iron	4000		5.8	2.9	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1
Lead	1.1		0.12	0.041	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1
Lithium	2.8		0.58	0.32	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1
Molybdenum	0.44	J	0.58	0.072	mg/Kg	☼	11/21/18 14:04	11/28/18 20:21	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.6

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	☼	11/14/18 08:00	11/17/18 11:17	4
Arsenic	ND		2.4	0.63	mg/Kg	☼	11/14/18 08:00	11/17/18 11:17	4
Iron	ND		24	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:17	4
Lead	ND		2.4	0.53	mg/Kg	☼	11/14/18 08:00	11/17/18 11:17	4
Li	ND		12	0.73	mg/Kg	☼	11/14/18 08:00	11/17/18 11:17	4
Mo	ND		9.7	0.40	mg/Kg	☼	11/14/18 08:00	11/17/18 11:17	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	14	J *	36	5.8	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3
Arsenic	ND	*	1.8	0.47	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3
Iron	290	*	18	11	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3
Lead	0.81	J	1.8	0.40	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3
Li	ND		9.1	0.54	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3
Mo	ND		7.3	0.30	mg/Kg	☼	11/15/18 08:00	11/17/18 13:23	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	63		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1
Arsenic	0.84		0.60	0.16	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1
Iron	970		6.0	3.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1
Lead	0.35	J *	0.60	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1
Li	ND		3.0	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1
Mo	ND		2.4	0.099	mg/Kg	☼	11/16/18 08:00	11/19/18 14:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	550		12	1.9	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1
Arsenic	1.2	B	0.60	0.27	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1
Iron	1900		6.0	3.5	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1
Lead	1.8		0.60	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1
Li	1.2	J	3.0	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1
Mo	ND		2.4	0.099	mg/Kg	☼	11/17/18 08:00	11/19/18 16:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33	J *	180	28	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5
Arsenic	ND		9.1	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5
Iron	ND	*	91	53	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5
Lead	ND	*	9.1	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5
Li	4.4	J B *	45	2.7	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5
Mo	ND		36	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 11:56	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1
Arsenic	1.0		0.60	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1
Iron	2600		6.0	3.5	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1
Lead	0.92		0.60	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1
Li	1.6	J	3.0	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.4	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 14:02	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:34	10
Arsenic	1.8		0.60	0.16	mg/Kg	☼	11/21/18 07:44	11/28/18 12:33	1
Iron	2600	B	6.0	5.0	mg/Kg	☼	11/21/18 07:44	11/28/18 12:33	1
Lead	5.7		0.60	0.13	mg/Kg	☼	11/21/18 07:44	11/28/18 12:33	1
Li	4.2		3.0	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 12:33	1
Mo	ND		2.4	0.099	mg/Kg	☼	11/21/18 07:44	11/28/18 12:33	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			11/29/18 14:47	1
Arsenic	4.9		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	8400		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	9.5		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	11		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:23	10
Arsenic	4.2		0.60	0.16	mg/Kg	☼	11/12/18 08:00	11/28/18 14:30	1
Iron	8600		6.0	5.0	mg/Kg	☼	11/12/18 08:00	11/28/18 14:30	1
Lead	9.1		0.60	0.13	mg/Kg	☼	11/12/18 08:00	11/28/18 14:30	1
Lithium	7.5		3.0	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:30	1
Molybdenum	0.25	J	2.4	0.099	mg/Kg	☼	11/12/18 08:00	11/28/18 14:30	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100		3.8	1.8	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1
Arsenic	1.7		0.13	0.033	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1
Iron	5600		6.3	3.1	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1
Lead	3.8		0.13	0.044	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1
Lithium	3.3		0.63	0.35	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1
Molybdenum	0.18	J	0.63	0.078	mg/Kg	☼	11/21/18 14:04	11/28/18 20:26	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Date Collected: 10/28/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		46	7.4	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4
Arsenic	ND		2.3	0.60	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4
Iron	ND		23	13	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4
Lead	ND		2.3	0.51	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4
Li	ND		12	0.69	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4
Mo	ND		9.2	0.38	mg/Kg	☼	11/14/18 08:00	11/17/18 11:22	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.1	J *	35	5.5	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3
Arsenic	ND	*	1.7	0.45	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3
Iron	180	*	17	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3
Lead	0.61	J	1.7	0.38	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3
Li	ND		8.7	0.52	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3
Mo	ND		6.9	0.28	mg/Kg	☼	11/15/18 08:00	11/17/18 13:28	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	54		12	2.4	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1
Arsenic	0.32	J	0.58	0.15	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1
Iron	650		5.8	3.4	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1
Lead	0.26	J *	0.58	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1
Li	ND		2.9	0.17	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1
Mo	ND		2.3	0.095	mg/Kg	☼	11/16/18 08:00	11/19/18 14:14	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	640		12	1.8	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1
Arsenic	0.80	B	0.58	0.25	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1
Iron	1700		5.8	3.4	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1
Lead	1.3		0.58	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1
Li	1.3	J	2.9	0.17	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1
Mo	ND		2.3	0.095	mg/Kg	☼	11/17/18 08:00	11/19/18 16:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27	J *	170	27	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5
Arsenic	ND		8.7	2.2	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5
Iron	ND	*	87	51	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5
Lead	ND	*	8.7	1.9	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5
Li	3.1	J B *	43	2.5	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5
Mo	ND		35	1.4	mg/Kg	☼	11/20/18 08:00	11/26/18 12:01	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	990		12	1.8	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1
Arsenic	0.94		0.58	0.17	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1
Iron	2300		5.8	3.4	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1
Lead	0.68		0.58	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1
Li	1.3	J	2.9	0.17	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Date Collected: 10/28/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.3	0.11	mg/Kg	☼	11/20/18 09:43	11/26/18 14:07	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	40000		120	18	mg/Kg	☼	11/21/18 07:44	11/28/18 16:39	10
Arsenic	1.4		0.58	0.15	mg/Kg	☼	11/21/18 07:44	11/28/18 12:38	1
Iron	3000	B	5.8	4.7	mg/Kg	☼	11/21/18 07:44	11/28/18 12:38	1
Lead	7.8		0.58	0.13	mg/Kg	☼	11/21/18 07:44	11/28/18 12:38	1
Li	3.6		2.9	0.17	mg/Kg	☼	11/21/18 07:44	11/28/18 12:38	1
Mo	ND		2.3	0.095	mg/Kg	☼	11/21/18 07:44	11/28/18 12:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	3.5		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	7800		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	11		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	9.3		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		120	18	mg/Kg	☼	11/12/18 08:00	11/28/18 18:28	10
Arsenic	3.3		0.58	0.15	mg/Kg	☼	11/12/18 08:00	11/28/18 14:35	1
Iron	8700		5.8	4.7	mg/Kg	☼	11/12/18 08:00	11/28/18 14:35	1
Lead	8.8		0.58	0.13	mg/Kg	☼	11/12/18 08:00	11/28/18 14:35	1
Lithium	6.6		2.9	0.17	mg/Kg	☼	11/12/18 08:00	11/28/18 14:35	1
Molybdenum	0.23	J	2.3	0.095	mg/Kg	☼	11/12/18 08:00	11/28/18 14:35	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2800		3.5	1.6	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1
Arsenic	2.0		0.12	0.030	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1
Iron	5600		5.8	2.8	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1
Lead	4.4		0.12	0.040	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1
Lithium	3.9		0.58	0.32	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1
Molybdenum	0.26	J	0.58	0.072	mg/Kg	☼	11/21/18 14:04	11/28/18 20:30	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Date Collected: 10/28/18 17:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 77.1

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	☼	11/14/18 08:00	11/17/18 11:27	4
Arsenic	ND		2.6	0.67	mg/Kg	☼	11/14/18 08:00	11/17/18 11:27	4
Iron	24	J	26	15	mg/Kg	☼	11/14/18 08:00	11/17/18 11:27	4
Lead	ND		2.6	0.57	mg/Kg	☼	11/14/18 08:00	11/17/18 11:27	4
Li	ND		13	0.78	mg/Kg	☼	11/14/18 08:00	11/17/18 11:27	4
Mo	ND		10	0.43	mg/Kg	☼	11/14/18 08:00	11/17/18 11:27	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	18	J *	39	6.2	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3
Arsenic	ND	*	1.9	0.51	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3
Iron	720	*	19	11	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3
Lead	2.0		1.9	0.43	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3
Li	ND		9.7	0.58	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3
Mo	ND		7.8	0.32	mg/Kg	☼	11/15/18 08:00	11/17/18 13:33	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170		13	2.7	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1
Arsenic	0.57	J	0.65	0.17	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1
Iron	1500		6.5	3.8	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1
Lead	0.26	J *	0.65	0.14	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1
Li	0.21	J	3.2	0.19	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1
Mo	0.12	J	2.6	0.11	mg/Kg	☼	11/16/18 08:00	11/19/18 14:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2200		13	2.1	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1
Arsenic	1.4	B	0.65	0.29	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1
Iron	4500		6.5	3.8	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1
Lead	5.1		0.65	0.14	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1
Li	5.2		3.2	0.19	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1
Mo	ND		2.6	0.11	mg/Kg	☼	11/17/18 08:00	11/19/18 16:23	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	34	J *	190	30	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5
Arsenic	ND		9.7	2.5	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5
Iron	ND	*	97	57	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5
Lead	ND	*	9.7	2.1	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5
Li	4.1	J B *	49	2.9	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5
Mo	ND		39	1.6	mg/Kg	☼	11/20/18 08:00	11/26/18 12:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4100		13	2.1	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1
Arsenic	1.6		0.65	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1
Iron	6100		6.5	3.8	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1
Lead	1.3		0.65	0.14	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1
Li	3.6		3.2	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Date Collected: 10/28/18 17:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 77.1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.6	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 14:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26000		130	21	mg/Kg	☼	11/21/18 07:44	11/28/18 16:44	10
Arsenic	1.5		0.65	0.17	mg/Kg	☼	11/21/18 07:44	11/28/18 12:44	1
Iron	6200	B	6.5	5.3	mg/Kg	☼	11/21/18 07:44	11/28/18 12:44	1
Lead	2.6		0.65	0.14	mg/Kg	☼	11/21/18 07:44	11/28/18 12:44	1
Li	8.9		3.2	0.19	mg/Kg	☼	11/21/18 07:44	11/28/18 12:44	1
Mo	ND		2.6	0.11	mg/Kg	☼	11/21/18 07:44	11/28/18 12:44	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	5.0		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	19000		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	11		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	22		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	0.12	J	2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	53000		130	21	mg/Kg	☼	11/12/18 08:00	11/28/18 18:33	10
Arsenic	3.8		0.65	0.17	mg/Kg	☼	11/12/18 08:00	11/28/18 14:41	1
Iron	19000		6.5	5.3	mg/Kg	☼	11/12/18 08:00	11/28/18 14:41	1
Lead	12		1.3	0.29	mg/Kg	☼	11/12/18 08:00	11/28/18 21:11	2
Lithium	24		3.2	0.19	mg/Kg	☼	11/12/18 08:00	11/28/18 14:41	1
Molybdenum	0.30	J	2.6	0.11	mg/Kg	☼	11/12/18 08:00	11/28/18 14:41	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8300		3.9	1.9	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1
Arsenic	2.6		0.13	0.034	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1
Iron	15000		6.6	3.2	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1
Lead	12		0.13	0.046	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1
Lithium	12		0.66	0.36	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1
Molybdenum	0.50	J	0.66	0.081	mg/Kg	☼	11/21/18 14:04	11/28/18 20:35	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (125-130)

Lab Sample ID: 140-13229-8

Date Collected: 10/29/18 12:05

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.8	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4
Arsenic	ND		2.4	0.63	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4
Iron	ND		24	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4
Lead	ND		2.4	0.53	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4
Li	ND		12	0.73	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4
Mo	ND		9.7	0.40	mg/Kg	☼	11/14/18 08:00	11/17/18 11:31	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	36	5.8	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3
Arsenic	ND	*	1.8	0.47	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3
Iron	86	*	18	11	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3
Lead	ND		1.8	0.40	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3
Li	ND		9.1	0.55	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3
Mo	ND		7.3	0.30	mg/Kg	☼	11/15/18 08:00	11/17/18 13:39	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1
Arsenic	0.20	J	0.61	0.16	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1
Iron	640		6.1	3.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1
Lead	0.18	J *	0.61	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1
Li	ND		3.0	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1
Mo	0.22	J	2.4	0.099	mg/Kg	☼	11/16/18 08:00	11/19/18 14:24	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	440		12	1.9	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1
Arsenic	0.76	B	0.61	0.27	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1
Iron	2000		6.1	3.5	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1
Lead	0.73		0.61	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1
Li	1.2	J	3.0	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1
Mo	ND		2.4	0.099	mg/Kg	☼	11/17/18 08:00	11/19/18 16:28	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	39	J *	180	28	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5
Arsenic	ND		9.1	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5
Iron	ND	*	91	53	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5
Lead	ND	*	9.1	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5
Li	3.9	J B *	45	2.7	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5
Mo	ND		36	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 12:11	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	900		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1
Arsenic	0.41	J	0.61	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1
Iron	3100		6.1	3.5	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1
Lead	0.35	J	0.61	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1
Li	1.7	J	3.0	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (125-130)

Lab Sample ID: 140-13229-8

Date Collected: 10/29/18 12:05

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.4	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 14:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:49	10
Arsenic	1.2		1.2	0.32	mg/Kg	☼	11/21/18 07:44	11/28/18 19:49	2
Iron	3200	B	6.1	5.0	mg/Kg	☼	11/21/18 07:44	11/28/18 12:59	1
Lead	4.3		1.2	0.27	mg/Kg	☼	11/21/18 07:44	11/28/18 19:49	2
Li	2.7	J	3.0	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 12:59	1
Mo	ND		2.4	0.099	mg/Kg	☼	11/21/18 07:44	11/28/18 12:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	2.6		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	9000		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	5.6		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	9.5		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	0.22	J	2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	31000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:38	10
Arsenic	2.2		1.2	0.32	mg/Kg	☼	11/12/18 08:00	11/28/18 21:16	2
Iron	9200		6.1	5.0	mg/Kg	☼	11/12/18 08:00	11/28/18 14:47	1
Lead	6.2		1.2	0.27	mg/Kg	☼	11/12/18 08:00	11/28/18 21:16	2
Lithium	4.8		3.0	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:47	1
Molybdenum	0.53	J	2.4	0.099	mg/Kg	☼	11/12/18 08:00	11/28/18 14:47	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.5	1.6	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1
Arsenic	0.60		0.12	0.030	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1
Iron	4600		5.8	2.8	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1
Lead	1.4		0.12	0.040	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1
Lithium	2.5		0.58	0.32	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1
Molybdenum	0.53	J	0.58	0.072	mg/Kg	☼	11/21/18 14:04	11/28/18 20:53	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (26-31)

Lab Sample ID: 140-13229-9

Date Collected: 10/30/18 08:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 83.6

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	☼	11/14/18 08:00	11/17/18 11:36	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	11/14/18 08:00	11/17/18 11:36	4
Iron	ND		24	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:36	4
Lead	ND		2.4	0.53	mg/Kg	☼	11/14/18 08:00	11/17/18 11:36	4
Li	ND		12	0.72	mg/Kg	☼	11/14/18 08:00	11/17/18 11:36	4
Mo	ND		9.6	0.39	mg/Kg	☼	11/14/18 08:00	11/17/18 11:36	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	36	5.7	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3
Arsenic	ND	*	1.8	0.47	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3
Iron	11	J *	18	10	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3
Lead	ND		1.8	0.39	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3
Li	ND		9.0	0.54	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3
Mo	ND		7.2	0.29	mg/Kg	☼	11/15/18 08:00	11/17/18 13:44	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	15		12	2.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1
Arsenic	0.62		0.60	0.16	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1
Iron	230		6.0	3.5	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1
Lead	0.50	J *	0.60	0.13	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1
Li	ND		3.0	0.18	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1
Mo	ND		2.4	0.098	mg/Kg	☼	11/16/18 08:00	11/19/18 14:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	310		12	1.9	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1
Arsenic	0.98	B	0.60	0.26	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1
Iron	1200		6.0	3.5	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1
Lead	0.91		0.60	0.13	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1
Li	0.57	J	3.0	0.18	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1
Mo	ND		2.4	0.098	mg/Kg	☼	11/17/18 08:00	11/19/18 16:32	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	36	J *	180	28	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5
Iron	ND	*	90	53	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5
Lead	ND	*	9.0	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5
Li	3.5	J B *	45	2.6	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5
Mo	ND		36	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 12:16	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	610		12	1.9	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1
Arsenic	0.63		0.60	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1
Iron	1800		6.0	3.5	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1
Lead	0.43	J	0.60	0.13	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1
Li	1.1	J	3.0	0.18	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (26-31)

Lab Sample ID: 140-13229-9

Date Collected: 10/30/18 08:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 83.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.4	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 14:22	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	32000		120	19	mg/Kg	☼	11/21/18 07:44	11/28/18 16:54	10
Arsenic	1.1		0.60	0.16	mg/Kg	☼	11/21/18 07:44	11/28/18 13:04	1
Iron	2200	B	6.0	4.9	mg/Kg	☼	11/21/18 07:44	11/28/18 13:04	1
Lead	11		0.60	0.13	mg/Kg	☼	11/21/18 07:44	11/28/18 13:04	1
Li	2.1	J	3.0	0.18	mg/Kg	☼	11/21/18 07:44	11/28/18 13:04	1
Mo	ND		2.4	0.098	mg/Kg	☼	11/21/18 07:44	11/28/18 13:04	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	3.3		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	5400		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	13		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	7.2		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	54000		120	19	mg/Kg	☼	11/12/18 08:00	11/28/18 18:43	10
Arsenic	2.9		0.60	0.16	mg/Kg	☼	11/12/18 08:00	11/28/18 14:52	1
Iron	4500		6.0	4.9	mg/Kg	☼	11/12/18 08:00	11/28/18 14:52	1
Lead	17		0.60	0.13	mg/Kg	☼	11/12/18 08:00	11/28/18 14:52	1
Lithium	3.7		3.0	0.18	mg/Kg	☼	11/12/18 08:00	11/28/18 14:52	1
Molybdenum	ND		2.4	0.098	mg/Kg	☼	11/12/18 08:00	11/28/18 14:52	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.7	1.8	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1
Arsenic	1.3		0.12	0.032	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1
Iron	3400		6.2	3.1	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1
Lead	2.2		0.12	0.044	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1
Lithium	1.5		0.62	0.34	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1
Molybdenum	0.12	J	0.62	0.077	mg/Kg	☼	11/21/18 14:04	11/28/18 20:57	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Date Collected: 10/30/18 10:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 81.0

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	☼	11/14/18 08:00	11/17/18 11:42	4
Arsenic	ND		2.5	0.64	mg/Kg	☼	11/14/18 08:00	11/17/18 11:42	4
Iron	ND		25	14	mg/Kg	☼	11/14/18 08:00	11/17/18 11:42	4
Lead	ND		2.5	0.54	mg/Kg	☼	11/14/18 08:00	11/17/18 11:42	4
Li	ND		12	0.74	mg/Kg	☼	11/14/18 08:00	11/17/18 11:42	4
Mo	ND		9.9	0.40	mg/Kg	☼	11/14/18 08:00	11/17/18 11:42	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8.7	J *	37	5.9	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	3
Arsenic	ND	*	1.9	0.48	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	3
Iron	290	*	19	11	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	3
Lead	ND		1.9	0.41	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	3
Li	ND		9.3	0.56	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	3
Mo	ND		7.4	0.30	mg/Kg	☼	11/15/18 08:00	11/17/18 13:59	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	☼	11/16/18 08:00	11/19/18 14:34	1
Arsenic	0.44	J	0.62	0.16	mg/Kg	☼	11/16/18 08:00	11/19/18 14:34	1
Iron	1100		6.2	3.6	mg/Kg	☼	11/16/18 08:00	11/19/18 14:34	1
Lead	0.26	J *	0.62	0.14	mg/Kg	☼	11/16/18 08:00	11/19/18 14:34	1
Li	ND		3.1	0.19	mg/Kg	☼	11/16/18 08:00	11/19/18 14:34	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/16/18 08:00	11/19/18 14:34	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	480		12	2.0	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	1
Arsenic	0.64	B	0.62	0.27	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	1
Iron	1700		6.2	3.6	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	1
Lead	0.90		0.62	0.14	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	1
Li	0.97	J	3.1	0.19	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/17/18 08:00	11/19/18 16:47	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	☼	11/20/18 08:00	11/26/18 12:21	5
Arsenic	ND		9.3	2.3	mg/Kg	☼	11/20/18 08:00	11/26/18 12:21	5
Iron	ND	*	93	54	mg/Kg	☼	11/20/18 08:00	11/26/18 12:21	5
Lead	ND	*	9.3	2.0	mg/Kg	☼	11/20/18 08:00	11/26/18 12:21	5
Li	ND	*	46	2.7	mg/Kg	☼	11/20/18 08:00	11/26/18 12:21	5
Mo	ND		37	1.5	mg/Kg	☼	11/20/18 08:00	11/26/18 12:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	910		12	2.0	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1
Arsenic	0.92		0.62	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1
Iron	2700		6.2	3.6	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1
Lead	0.44	J	0.62	0.14	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1
Li	1.5	J	3.1	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Date Collected: 10/30/18 10:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 81.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.5	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 14:37	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	36000		120	20	mg/Kg	☼	11/21/18 07:44	11/28/18 17:09	10
Arsenic	1.4		1.2	0.32	mg/Kg	☼	11/21/18 07:44	11/28/18 20:09	2
Iron	2700	B	6.2	5.1	mg/Kg	☼	11/21/18 07:44	11/28/18 13:10	1
Lead	4.7		1.2	0.27	mg/Kg	☼	11/21/18 07:44	11/28/18 20:09	2
Li	2.8	J	3.1	0.19	mg/Kg	☼	11/21/18 07:44	11/28/18 13:10	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/21/18 07:44	11/28/18 13:10	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	3.4		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	8400		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	6.3		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	5.3		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	31000		120	20	mg/Kg	☼	11/12/18 08:00	11/28/18 18:48	10
Arsenic	4.3		1.2	0.32	mg/Kg	☼	11/12/18 08:00	11/28/18 21:21	2
Iron	8800		6.2	5.1	mg/Kg	☼	11/12/18 08:00	11/28/18 15:08	1
Lead	5.7		1.2	0.27	mg/Kg	☼	11/12/18 08:00	11/28/18 21:21	2
Lithium	5.3		3.1	0.19	mg/Kg	☼	11/12/18 08:00	11/28/18 15:08	1
Molybdenum	0.17	J	2.5	0.10	mg/Kg	☼	11/12/18 08:00	11/28/18 15:08	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.6	1.7	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1
Arsenic	2.3		0.12	0.031	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1
Iron	4500		5.9	2.9	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1
Lead	2.0		0.12	0.042	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1
Lithium	2.1		0.59	0.33	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1
Molybdenum	0.21	J	0.59	0.074	mg/Kg	☼	11/21/18 14:04	11/28/18 21:02	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Date Collected: 10/30/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 79.3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	8.1	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4
Arsenic	ND		2.5	0.66	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4
Iron	ND		25	15	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4
Lead	ND		2.5	0.55	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4
Li	ND		13	0.76	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4
Mo	ND		10	0.41	mg/Kg	☼	11/14/18 08:00	11/17/18 11:56	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	38	6.1	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3
Arsenic	ND	*	1.9	0.49	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3
Iron	87	*	19	11	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3
Lead	ND		1.9	0.42	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3
Li	0.58	J	9.5	0.57	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3
Mo	ND		7.6	0.31	mg/Kg	☼	11/15/18 08:00	11/17/18 14:04	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26		13	2.6	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1
Arsenic	0.19	J	0.63	0.16	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1
Iron	610		6.3	3.7	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1
Lead	0.18	J *	0.63	0.14	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1
Li	ND		3.2	0.19	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/16/18 08:00	11/19/18 14:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	410		13	2.0	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1
Arsenic	0.70	B	0.63	0.28	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1
Iron	2100		6.3	3.7	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1
Lead	0.93		0.63	0.14	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1
Li	1.1	J	3.2	0.19	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/17/18 08:00	11/19/18 16:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	50	J *	190	30	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5
Arsenic	ND		9.5	2.4	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5
Iron	ND	*	95	55	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5
Lead	ND	*	9.5	2.1	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5
Li	3.2	J B *	47	2.8	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5
Mo	ND		38	1.6	mg/Kg	☼	11/20/18 08:00	11/26/18 12:36	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	830		13	2.0	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1
Arsenic	0.60	J	0.63	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1
Iron	3600		6.3	3.7	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1
Lead	0.66		0.63	0.14	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1
Li	1.4	J	3.2	0.19	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1

TestAmerica Knoxville

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Date Collected: 10/30/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 79.3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mo	ND		2.5	0.12	mg/Kg	☼	11/20/18 09:43	11/26/18 14:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	24000		130	20	mg/Kg	☼	11/21/18 07:44	11/28/18 17:14	10
Arsenic	1.3		1.3	0.33	mg/Kg	☼	11/21/18 07:44	11/28/18 20:20	2
Iron	3500	B	6.3	5.2	mg/Kg	☼	11/21/18 07:44	11/28/18 13:15	1
Lead	3.9		1.3	0.28	mg/Kg	☼	11/21/18 07:44	11/28/18 20:20	2
Li	2.4	J	3.2	0.19	mg/Kg	☼	11/21/18 07:44	11/28/18 13:15	1
Mo	ND		2.5	0.10	mg/Kg	☼	11/21/18 07:44	11/28/18 20:14	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	25000		10	1.6	mg/Kg			11/29/18 14:47	1
Arsenic	2.8		0.50	0.13	mg/Kg			11/29/18 14:47	1
Iron	9800		5.0	4.1	mg/Kg			11/29/18 14:47	1
Lead	5.6		0.50	0.11	mg/Kg			11/29/18 14:47	1
Li	8.6		2.5	0.15	mg/Kg			11/29/18 14:47	1
Mo	ND		2.0	0.082	mg/Kg			11/29/18 14:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000		130	20	mg/Kg	☼	11/12/18 08:00	11/28/18 18:53	10
Arsenic	2.9		1.3	0.33	mg/Kg	☼	11/12/18 08:00	11/28/18 21:26	2
Iron	8700		6.3	5.2	mg/Kg	☼	11/12/18 08:00	11/28/18 15:14	1
Lead	6.3		1.3	0.28	mg/Kg	☼	11/12/18 08:00	11/28/18 21:26	2
Lithium	4.9		3.2	0.19	mg/Kg	☼	11/12/18 08:00	11/28/18 15:14	1
Molybdenum	0.16	J	2.5	0.10	mg/Kg	☼	11/12/18 08:00	11/28/18 15:14	1

Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		3.7	1.7	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1
Arsenic	0.64		0.12	0.032	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1
Iron	5100		6.1	3.0	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1
Lead	1.7		0.12	0.043	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1
Lithium	2.4		0.61	0.34	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1
Molybdenum	0.23	J	0.61	0.076	mg/Kg	☼	11/21/18 14:05	11/28/18 21:07	1

TestAmerica Knoxville

Default Detection Limits

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Prep: 3010A

SEP: Exchangeable

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units	Method
Aluminum	10	2.1	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.22	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units	Method
Aluminum	30	4.7	mg/Kg	6010B SEP
Arsenic	1.5	0.38	mg/Kg	6010B SEP
Iron	15	8.8	mg/Kg	6010B SEP

TestAmerica Knoxville

Default Detection Limits

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Prep: 3010A
 SEP: Organic-Bound

Analyte	RL	MDL	Units	Method
Lead	1.5	0.33	mg/Kg	6010B SEP
Li	7.5	0.44	mg/Kg	6010B SEP
Mo	6.0	0.25	mg/Kg	6010B SEP

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

SEP: Acid/Sulfide

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.15	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.099	mg/Kg	6010B SEP

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

Prep: Residual

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Iron	5.0	4.1	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Iron	5.0	4.1	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP

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

Prep: Total

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B
Arsenic	0.50	0.13	mg/Kg	6010B
Iron	5.0	4.1	mg/Kg	6010B
Lead	0.50	0.11	mg/Kg	6010B
Lithium	2.5	0.15	mg/Kg	6010B
Molybdenum	2.0	0.082	mg/Kg	6010B

Method: EPA 6020A - Metals (ICP/MS)

Prep: 3050B

TestAmerica Knoxville

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Method: EPA 6020A - Metals (ICP/MS) Prep: 3050B

Analyte	RL	MDL	Units	Method
Aluminum	3.0	1.4	mg/Kg	EPA 6020A
Arsenic	0.10	0.026	mg/Kg	EPA 6020A
Iron	5.0	2.5	mg/Kg	EPA 6020A
Lead	0.10	0.035	mg/Kg	EPA 6020A
Lithium	0.50	0.28	mg/Kg	EPA 6020A
Molybdenum	0.50	0.062	mg/Kg	EPA 6020A

QC Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: MB 140-25278/18-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 25278

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/12/18 08:00	11/28/18 11:10	1
Arsenic	ND		0.50	0.13	mg/Kg		11/12/18 08:00	11/28/18 11:10	1
Iron	ND		5.0	4.1	mg/Kg		11/12/18 08:00	11/28/18 11:10	1
Lead	ND		0.50	0.11	mg/Kg		11/12/18 08:00	11/28/18 11:10	1
Lithium	ND		2.5	0.15	mg/Kg		11/12/18 08:00	11/28/18 11:10	1
Molybdenum	ND		2.0	0.082	mg/Kg		11/12/18 08:00	11/28/18 11:10	1

Lab Sample ID: LCS 140-25278/19-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 25278

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	101		mg/Kg		101	75 - 125
Arsenic	5.00	5.26		mg/Kg		105	75 - 125
Iron	50.0	53.9		mg/Kg		108	75 - 125
Lead	5.00	5.12		mg/Kg		102	75 - 125
Lithium	5.00	5.18		mg/Kg		104	75 - 125
Molybdenum	25.0	27.1		mg/Kg		108	75 - 125

Lab Sample ID: LCSD 140-25278/20-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 25278

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	107		mg/Kg		107	75 - 125	6	30
Arsenic	5.00	5.14		mg/Kg		103	75 - 125	2	30
Iron	50.0	54.6		mg/Kg		109	75 - 125	1	30
Lead	5.00	5.06		mg/Kg		101	75 - 125	1	30
Lithium	5.00	5.15		mg/Kg		103	75 - 125	1	30
Molybdenum	25.0	26.6		mg/Kg		106	75 - 125	2	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-25320/18-B ^4
Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 25357

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		11/14/18 08:00	11/17/18 09:57	4
Arsenic	ND		2.0	0.52	mg/Kg		11/14/18 08:00	11/17/18 09:57	4
Iron	ND		20	12	mg/Kg		11/14/18 08:00	11/17/18 09:57	4
Lead	ND		2.0	0.44	mg/Kg		11/14/18 08:00	11/17/18 09:57	4
Li	ND		10	0.60	mg/Kg		11/14/18 08:00	11/17/18 09:57	4
Mo	ND		8.0	0.33	mg/Kg		11/14/18 08:00	11/17/18 09:57	4

TestAmerica Knoxville

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: LCS 140-25320/19-B ^5

Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Lab Control Sample

Prep Type: Step 1
Prep Batch: 25357

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	95.1		mg/Kg		95	75 - 125
Arsenic	5.00	4.78		mg/Kg		96	75 - 125
Iron	50.0	48.1		mg/Kg		96	75 - 125
Lead	5.00	4.68		mg/Kg		94	75 - 125
Li	5.00	5.00	J	mg/Kg		100	75 - 125
Mo	25.0	24.4		mg/Kg		98	75 - 125

Lab Sample ID: LCSD 140-25320/20-B ^5

Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Lab Control Sample Dup

Prep Type: Step 1
Prep Batch: 25357

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	97.2		mg/Kg		97	75 - 125	2	30
Arsenic	5.00	4.83		mg/Kg		97	75 - 125	1	30
Iron	50.0	49.6		mg/Kg		99	75 - 125	3	30
Lead	5.00	4.84		mg/Kg		97	75 - 125	3	30
Li	5.00	5.08	J	mg/Kg		102	75 - 125	2	30
Mo	25.0	24.7		mg/Kg		99	75 - 125	1	30

Lab Sample ID: MB 140-25362/18-B ^3

Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Method Blank

Prep Type: Step 2
Prep Batch: 25392

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		11/15/18 08:00	11/17/18 12:01	3
Arsenic	ND		1.5	0.39	mg/Kg		11/15/18 08:00	11/17/18 12:01	3
Iron	ND		15	8.7	mg/Kg		11/15/18 08:00	11/17/18 12:01	3
Lead	ND		1.5	0.33	mg/Kg		11/15/18 08:00	11/17/18 12:01	3
Li	ND		7.5	0.45	mg/Kg		11/15/18 08:00	11/17/18 12:01	3
Mo	ND		6.0	0.25	mg/Kg		11/15/18 08:00	11/17/18 12:01	3

Lab Sample ID: LCS 140-25362/19-B ^5

Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Lab Control Sample

Prep Type: Step 2
Prep Batch: 25392

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	ND	*	mg/Kg		1	75 - 125
Arsenic	5.00	3.67	*	mg/Kg		73	75 - 125
Iron	50.0	ND	*	mg/Kg		3	75 - 125
Lead	5.00	3.92		mg/Kg		78	75 - 125
Li	5.00	4.35	J	mg/Kg		87	75 - 125
Mo	25.0	20.8		mg/Kg		83	75 - 125

Lab Sample ID: LCSD 140-25362/20-B ^5

Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Lab Control Sample Dup

Prep Type: Step 2
Prep Batch: 25392

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	ND	*	mg/Kg		-0.04	75 - 125	210	30

TestAmerica Knoxville

QC Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: LCSD 140-25362/20-B ^5
Matrix: Solid
Analysis Batch: 25503

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 25392

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	5.00	3.72	*	mg/Kg		74	75 - 125	1	30
Iron	50.0	ND	*	mg/Kg		2	75 - 125	16	30
Lead	5.00	4.33		mg/Kg		87	75 - 125	10	30
Li	5.00	4.46	J	mg/Kg		89	75 - 125	3	30
Mo	25.0	21.0		mg/Kg		84	75 - 125	1	30

Lab Sample ID: MB 140-25394/18-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 25444

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		11/16/18 08:00	11/19/18 12:49	1
Arsenic	ND		0.50	0.13	mg/Kg		11/16/18 08:00	11/19/18 12:49	1
Iron	ND		5.0	2.9	mg/Kg		11/16/18 08:00	11/19/18 12:49	1
Lead	ND		0.50	0.11	mg/Kg		11/16/18 08:00	11/19/18 12:49	1
Li	ND		2.5	0.15	mg/Kg		11/16/18 08:00	11/19/18 12:49	1
Mo	ND		2.0	0.082	mg/Kg		11/16/18 08:00	11/19/18 12:49	1

Lab Sample ID: LCS 140-25394/19-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 25444

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	93.5		mg/Kg		93	75 - 125
Arsenic	5.00	4.87		mg/Kg		97	75 - 125
Iron	50.0	49.9		mg/Kg		100	75 - 125
Lead	5.00	0.173	J *	mg/Kg		3	75 - 125
Li	5.00	4.79		mg/Kg		96	75 - 125
Mo	25.0	24.7		mg/Kg		99	75 - 125

Lab Sample ID: LCSD 140-25394/20-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 25444

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	96.0		mg/Kg		96	75 - 125	3	30
Arsenic	5.00	4.99		mg/Kg		100	75 - 125	2	30
Iron	50.0	51.4		mg/Kg		103	75 - 125	3	30
Lead	5.00	0.161	J *	mg/Kg		3	75 - 125	7	30
Li	5.00	4.91		mg/Kg		98	75 - 125	3	30
Mo	25.0	25.4		mg/Kg		102	75 - 125	3	30

Lab Sample ID: MB 140-25447/18-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 25493

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/17/18 08:00	11/19/18 14:54	1
Arsenic	0.473	J	0.50	0.22	mg/Kg		11/17/18 08:00	11/19/18 14:54	1

TestAmerica Knoxville

QC Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: MB 140-25447/18-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 25493

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		5.0	2.9	mg/Kg		11/17/18 08:00	11/19/18 14:54	1
Lead	ND		0.50	0.11	mg/Kg		11/17/18 08:00	11/19/18 14:54	1
Li	ND		2.5	0.15	mg/Kg		11/17/18 08:00	11/19/18 14:54	1
Mo	ND		2.0	0.082	mg/Kg		11/17/18 08:00	11/19/18 14:54	1

Lab Sample ID: LCS 140-25447/19-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 25493

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.7		mg/Kg		97	75 - 125
Arsenic	5.00	5.63		mg/Kg		113	75 - 125
Iron	50.0	50.4		mg/Kg		101	75 - 125
Lead	5.00	4.99		mg/Kg		100	75 - 125
Li	5.00	5.05		mg/Kg		101	75 - 125
Mo	25.0	25.3		mg/Kg		101	75 - 125

Lab Sample ID: LCSD 140-25447/20-B
Matrix: Solid
Analysis Batch: 25554

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 25493

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	100	99.7		mg/Kg		100	75 - 125	3	30
Arsenic	5.00	5.79		mg/Kg		116	75 - 125	3	30
Iron	50.0	52.1		mg/Kg		104	75 - 125	3	30
Lead	5.00	5.13		mg/Kg		103	75 - 125	3	30
Li	5.00	5.20		mg/Kg		104	75 - 125	3	30
Mo	25.0	26.8		mg/Kg		107	75 - 125	6	30

Lab Sample ID: MB 140-25494/18-B ^5
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 25553

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		11/20/18 08:00	11/26/18 10:33	5
Arsenic	ND		7.5	1.9	mg/Kg		11/20/18 08:00	11/26/18 10:33	5
Iron	ND		75	44	mg/Kg		11/20/18 08:00	11/26/18 10:33	5
Lead	ND		7.5	1.7	mg/Kg		11/20/18 08:00	11/26/18 10:33	5
Li	4.52	J	38	2.2	mg/Kg		11/20/18 08:00	11/26/18 10:33	5
Mo	ND		30	1.3	mg/Kg		11/20/18 08:00	11/26/18 10:33	5

Lab Sample ID: LCS 140-25494/19-B ^5
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 25553

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	31.4	J *	mg/Kg		10	75 - 125
Arsenic	15.0	12.1		mg/Kg		81	75 - 125
Iron	150	ND	*	mg/Kg		1	75 - 125

TestAmerica Knoxville

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: LCS 140-25494/19-B ^5
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 25553

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	15.0	7.22	J *	mg/Kg		48	75 - 125
Li	15.0	20.4	J *	mg/Kg		136	75 - 125
Mo	75.0	65.3		mg/Kg		87	75 - 125

Lab Sample ID: LCSD 140-25494/20-B ^5
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 25553

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	300	28.8	J *	mg/Kg		10	75 - 125	9	30
Arsenic	15.0	12.8		mg/Kg		85	75 - 125	5	30
Iron	150	ND	*	mg/Kg		2	75 - 125	26	30
Lead	15.0	6.72	J *	mg/Kg		45	75 - 125	7	30
Li	15.0	20.3	J *	mg/Kg		135	75 - 125	0	30
Mo	75.0	66.5		mg/Kg		89	75 - 125	2	30

Lab Sample ID: MB 140-25574/18-A
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 25574

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/20/18 09:43	11/26/18 12:42	1
Arsenic	ND		0.50	0.15	mg/Kg		11/20/18 09:43	11/26/18 12:42	1
Iron	ND		5.0	2.9	mg/Kg		11/20/18 09:43	11/26/18 12:42	1
Lead	ND		0.50	0.11	mg/Kg		11/20/18 09:43	11/26/18 12:42	1
Li	ND		2.5	0.15	mg/Kg		11/20/18 09:43	11/26/18 12:42	1
Mo	ND		2.0	0.099	mg/Kg		11/20/18 09:43	11/26/18 12:42	1

Lab Sample ID: LCS 140-25574/19-A
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 25574

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	91.7		mg/Kg		92	75 - 125
Arsenic	5.00	4.83		mg/Kg		97	75 - 125
Iron	50.0	47.1		mg/Kg		94	75 - 125
Lead	5.00	4.81		mg/Kg		96	75 - 125
Li	5.00	4.64		mg/Kg		93	75 - 125
Mo	25.0	24.4		mg/Kg		98	75 - 125

Lab Sample ID: LCSD 140-25574/20-A
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 25574

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	100	95.7		mg/Kg		96	75 - 125	4	30
Arsenic	5.00	5.00		mg/Kg		100	75 - 125	3	30
Iron	50.0	49.1		mg/Kg		98	75 - 125	4	30
Lead	5.00	4.95		mg/Kg		99	75 - 125	3	30

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QC Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

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

Lab Sample ID: LCSD 140-25574/20-A
Matrix: Solid
Analysis Batch: 25679

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 25574

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Li	5.00	4.73		mg/Kg		95	75 - 125	2	30
Mo	25.0	24.8		mg/Kg		99	75 - 125	1	30

Lab Sample ID: MB 140-25604/18-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 25604

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		11/21/18 07:44	11/28/18 10:55	1
Arsenic	ND		0.50	0.13	mg/Kg		11/21/18 07:44	11/28/18 10:55	1
Iron	5.08		5.0	4.1	mg/Kg		11/21/18 07:44	11/28/18 10:55	1
Lead	ND		0.50	0.11	mg/Kg		11/21/18 07:44	11/28/18 10:55	1
Li	ND		2.5	0.15	mg/Kg		11/21/18 07:44	11/28/18 10:55	1
Mo	ND		2.0	0.082	mg/Kg		11/21/18 07:44	11/28/18 10:55	1

Lab Sample ID: LCS 140-25604/19-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 25604

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	102		mg/Kg		102	75 - 125
Arsenic	5.00	5.29		mg/Kg		106	75 - 125
Iron	50.0	54.6		mg/Kg		109	75 - 125
Lead	5.00	5.14		mg/Kg		103	75 - 125
Li	5.00	5.24		mg/Kg		105	75 - 125
Mo	25.0	27.2		mg/Kg		109	75 - 125

Lab Sample ID: LCSD 140-25604/20-A
Matrix: Solid
Analysis Batch: 25767

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 25604

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	100		mg/Kg		100	75 - 125	1	30
Arsenic	5.00	5.17		mg/Kg		103	75 - 125	2	30
Iron	50.0	54.0		mg/Kg		108	75 - 125	1	30
Lead	5.00	5.05		mg/Kg		101	75 - 125	2	30
Li	5.00	5.14		mg/Kg		103	75 - 125	2	30
Mo	25.0	26.3		mg/Kg		105	75 - 125	3	30

Method: EPA 6020A - Metals (ICP/MS)

Lab Sample ID: MB 180-263578/1-A
Matrix: Solid
Analysis Batch: 264070

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 263578

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		3.0	1.4	mg/Kg		11/21/18 14:04	11/28/18 18:54	1
Arsenic	ND		0.10	0.026	mg/Kg		11/21/18 14:04	11/28/18 18:54	1
Iron	ND		5.0	2.5	mg/Kg		11/21/18 14:04	11/28/18 18:54	1

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QC Sample Results

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Method: EPA 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 180-263578/1-A
Matrix: Solid
Analysis Batch: 264070

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 263578

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.10	0.035	mg/Kg		11/21/18 14:04	11/28/18 18:54	1
Lithium	ND		0.50	0.28	mg/Kg		11/21/18 14:04	11/28/18 18:54	1
Molybdenum	ND		0.50	0.062	mg/Kg		11/21/18 14:04	11/28/18 18:54	1

Lab Sample ID: LCS 180-263578/2-A
Matrix: Solid
Analysis Batch: 264070

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 263578
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Aluminum	200	190		mg/Kg		95	80 - 120
Arsenic	4.00	3.90		mg/Kg		97	80 - 120
Iron	100	106		mg/Kg		106	80 - 120
Lead	2.00	2.17		mg/Kg		109	80 - 120
Lithium	5.00	4.85		mg/Kg		97	80 - 120
Molybdenum	100	102		mg/Kg		102	80 - 120

QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals

Prep Batch: 25278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Total/NA	Solid	Total	
140-13229-2	BH-03 (70-75)	Total/NA	Solid	Total	
140-13229-3	BH-03 (110-115)	Total/NA	Solid	Total	
140-13229-4	DUP-1	Total/NA	Solid	Total	
140-13229-5	BH-02 (41-45)	Total/NA	Solid	Total	
140-13229-6	BH-02 (72-75)	Total/NA	Solid	Total	
140-13229-7	BH-02 (70-72)	Total/NA	Solid	Total	
140-13229-8	BH-02 (125-130)	Total/NA	Solid	Total	
140-13229-9	BH-01 (26-31)	Total/NA	Solid	Total	
140-13229-10	BH-01 (75-80)	Total/NA	Solid	Total	
140-13229-11	BH-01 (130-135)	Total/NA	Solid	Total	
MB 140-25278/18-A	Method Blank	Total/NA	Solid	Total	
LCS 140-25278/19-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-25278/20-A	Lab Control Sample Dup	Total/NA	Solid	Total	

SEP Batch: 25320

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 1	Solid	Exchangeable	
140-13229-2	BH-03 (70-75)	Step 1	Solid	Exchangeable	
140-13229-3	BH-03 (110-115)	Step 1	Solid	Exchangeable	
140-13229-4	DUP-1	Step 1	Solid	Exchangeable	
140-13229-5	BH-02 (41-45)	Step 1	Solid	Exchangeable	
140-13229-6	BH-02 (72-75)	Step 1	Solid	Exchangeable	
140-13229-7	BH-02 (70-72)	Step 1	Solid	Exchangeable	
140-13229-8	BH-02 (125-130)	Step 1	Solid	Exchangeable	
140-13229-9	BH-01 (26-31)	Step 1	Solid	Exchangeable	
140-13229-10	BH-01 (75-80)	Step 1	Solid	Exchangeable	
140-13229-11	BH-01 (130-135)	Step 1	Solid	Exchangeable	
MB 140-25320/18-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-25320/19-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-25320/20-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	

Prep Batch: 25357

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 1	Solid	3010A	25320
140-13229-2	BH-03 (70-75)	Step 1	Solid	3010A	25320
140-13229-3	BH-03 (110-115)	Step 1	Solid	3010A	25320
140-13229-4	DUP-1	Step 1	Solid	3010A	25320
140-13229-5	BH-02 (41-45)	Step 1	Solid	3010A	25320
140-13229-6	BH-02 (72-75)	Step 1	Solid	3010A	25320
140-13229-7	BH-02 (70-72)	Step 1	Solid	3010A	25320
140-13229-8	BH-02 (125-130)	Step 1	Solid	3010A	25320
140-13229-9	BH-01 (26-31)	Step 1	Solid	3010A	25320
140-13229-10	BH-01 (75-80)	Step 1	Solid	3010A	25320
140-13229-11	BH-01 (130-135)	Step 1	Solid	3010A	25320
MB 140-25320/18-B ^4	Method Blank	Step 1	Solid	3010A	25320
LCS 140-25320/19-B ^5	Lab Control Sample	Step 1	Solid	3010A	25320
LCSD 140-25320/20-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	25320

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

SEP Batch: 25362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 2	Solid	Carbonate	
140-13229-2	BH-03 (70-75)	Step 2	Solid	Carbonate	
140-13229-3	BH-03 (110-115)	Step 2	Solid	Carbonate	
140-13229-4	DUP-1	Step 2	Solid	Carbonate	
140-13229-5	BH-02 (41-45)	Step 2	Solid	Carbonate	
140-13229-6	BH-02 (72-75)	Step 2	Solid	Carbonate	
140-13229-7	BH-02 (70-72)	Step 2	Solid	Carbonate	
140-13229-8	BH-02 (125-130)	Step 2	Solid	Carbonate	
140-13229-9	BH-01 (26-31)	Step 2	Solid	Carbonate	
140-13229-10	BH-01 (75-80)	Step 2	Solid	Carbonate	
140-13229-11	BH-01 (130-135)	Step 2	Solid	Carbonate	
MB 140-25362/18-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-25362/19-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-25362/20-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	

Prep Batch: 25392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 2	Solid	3010A	25362
140-13229-2	BH-03 (70-75)	Step 2	Solid	3010A	25362
140-13229-3	BH-03 (110-115)	Step 2	Solid	3010A	25362
140-13229-4	DUP-1	Step 2	Solid	3010A	25362
140-13229-5	BH-02 (41-45)	Step 2	Solid	3010A	25362
140-13229-6	BH-02 (72-75)	Step 2	Solid	3010A	25362
140-13229-7	BH-02 (70-72)	Step 2	Solid	3010A	25362
140-13229-8	BH-02 (125-130)	Step 2	Solid	3010A	25362
140-13229-9	BH-01 (26-31)	Step 2	Solid	3010A	25362
140-13229-10	BH-01 (75-80)	Step 2	Solid	3010A	25362
140-13229-11	BH-01 (130-135)	Step 2	Solid	3010A	25362
MB 140-25362/18-B ^3	Method Blank	Step 2	Solid	3010A	25362
LCS 140-25362/19-B ^5	Lab Control Sample	Step 2	Solid	3010A	25362
LCSD 140-25362/20-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	25362

SEP Batch: 25394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 3	Solid	Non-Crystalline	
140-13229-2	BH-03 (70-75)	Step 3	Solid	Non-Crystalline	
140-13229-3	BH-03 (110-115)	Step 3	Solid	Non-Crystalline	
140-13229-4	DUP-1	Step 3	Solid	Non-Crystalline	
140-13229-5	BH-02 (41-45)	Step 3	Solid	Non-Crystalline	
140-13229-6	BH-02 (72-75)	Step 3	Solid	Non-Crystalline	
140-13229-7	BH-02 (70-72)	Step 3	Solid	Non-Crystalline	
140-13229-8	BH-02 (125-130)	Step 3	Solid	Non-Crystalline	
140-13229-9	BH-01 (26-31)	Step 3	Solid	Non-Crystalline	
140-13229-10	BH-01 (75-80)	Step 3	Solid	Non-Crystalline	
140-13229-11	BH-01 (130-135)	Step 3	Solid	Non-Crystalline	
MB 140-25394/18-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-25394/19-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-25394/20-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

Prep Batch: 25444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 3	Solid	3010A	25394
140-13229-2	BH-03 (70-75)	Step 3	Solid	3010A	25394
140-13229-3	BH-03 (110-115)	Step 3	Solid	3010A	25394
140-13229-4	DUP-1	Step 3	Solid	3010A	25394
140-13229-5	BH-02 (41-45)	Step 3	Solid	3010A	25394
140-13229-6	BH-02 (72-75)	Step 3	Solid	3010A	25394
140-13229-7	BH-02 (70-72)	Step 3	Solid	3010A	25394
140-13229-8	BH-02 (125-130)	Step 3	Solid	3010A	25394
140-13229-9	BH-01 (26-31)	Step 3	Solid	3010A	25394
140-13229-10	BH-01 (75-80)	Step 3	Solid	3010A	25394
140-13229-11	BH-01 (130-135)	Step 3	Solid	3010A	25394
MB 140-25394/18-B	Method Blank	Step 3	Solid	3010A	25394
LCS 140-25394/19-B	Lab Control Sample	Step 3	Solid	3010A	25394
LCSD 140-25394/20-B	Lab Control Sample Dup	Step 3	Solid	3010A	25394

SEP Batch: 25447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 4	Solid	Metal Hydroxide	
140-13229-2	BH-03 (70-75)	Step 4	Solid	Metal Hydroxide	
140-13229-3	BH-03 (110-115)	Step 4	Solid	Metal Hydroxide	
140-13229-4	DUP-1	Step 4	Solid	Metal Hydroxide	
140-13229-5	BH-02 (41-45)	Step 4	Solid	Metal Hydroxide	
140-13229-6	BH-02 (72-75)	Step 4	Solid	Metal Hydroxide	
140-13229-7	BH-02 (70-72)	Step 4	Solid	Metal Hydroxide	
140-13229-8	BH-02 (125-130)	Step 4	Solid	Metal Hydroxide	
140-13229-9	BH-01 (26-31)	Step 4	Solid	Metal Hydroxide	
140-13229-10	BH-01 (75-80)	Step 4	Solid	Metal Hydroxide	
140-13229-11	BH-01 (130-135)	Step 4	Solid	Metal Hydroxide	
MB 140-25447/18-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-25447/19-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-25447/20-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	

Prep Batch: 25493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 4	Solid	3010A	25447
140-13229-2	BH-03 (70-75)	Step 4	Solid	3010A	25447
140-13229-3	BH-03 (110-115)	Step 4	Solid	3010A	25447
140-13229-4	DUP-1	Step 4	Solid	3010A	25447
140-13229-5	BH-02 (41-45)	Step 4	Solid	3010A	25447
140-13229-6	BH-02 (72-75)	Step 4	Solid	3010A	25447
140-13229-7	BH-02 (70-72)	Step 4	Solid	3010A	25447
140-13229-8	BH-02 (125-130)	Step 4	Solid	3010A	25447
140-13229-9	BH-01 (26-31)	Step 4	Solid	3010A	25447
140-13229-10	BH-01 (75-80)	Step 4	Solid	3010A	25447
140-13229-11	BH-01 (130-135)	Step 4	Solid	3010A	25447
MB 140-25447/18-B	Method Blank	Step 4	Solid	3010A	25447
LCS 140-25447/19-B	Lab Control Sample	Step 4	Solid	3010A	25447
LCSD 140-25447/20-B	Lab Control Sample Dup	Step 4	Solid	3010A	25447

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QC Association Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

SEP Batch: 25494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 5	Solid	Organic-Bound	
140-13229-2	BH-03 (70-75)	Step 5	Solid	Organic-Bound	
140-13229-3	BH-03 (110-115)	Step 5	Solid	Organic-Bound	
140-13229-4	DUP-1	Step 5	Solid	Organic-Bound	
140-13229-5	BH-02 (41-45)	Step 5	Solid	Organic-Bound	
140-13229-6	BH-02 (72-75)	Step 5	Solid	Organic-Bound	
140-13229-7	BH-02 (70-72)	Step 5	Solid	Organic-Bound	
140-13229-8	BH-02 (125-130)	Step 5	Solid	Organic-Bound	
140-13229-9	BH-01 (26-31)	Step 5	Solid	Organic-Bound	
140-13229-10	BH-01 (75-80)	Step 5	Solid	Organic-Bound	
140-13229-11	BH-01 (130-135)	Step 5	Solid	Organic-Bound	
MB 140-25494/18-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-25494/19-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-25494/20-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	

Analysis Batch: 25503

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 1	Solid	6010B SEP	25357
140-13229-1	BH-03 (30-32)	Step 2	Solid	6010B SEP	25392
140-13229-2	BH-03 (70-75)	Step 1	Solid	6010B SEP	25357
140-13229-2	BH-03 (70-75)	Step 2	Solid	6010B SEP	25392
140-13229-3	BH-03 (110-115)	Step 1	Solid	6010B SEP	25357
140-13229-3	BH-03 (110-115)	Step 2	Solid	6010B SEP	25392
140-13229-4	DUP-1	Step 1	Solid	6010B SEP	25357
140-13229-4	DUP-1	Step 2	Solid	6010B SEP	25392
140-13229-5	BH-02 (41-45)	Step 1	Solid	6010B SEP	25357
140-13229-5	BH-02 (41-45)	Step 2	Solid	6010B SEP	25392
140-13229-6	BH-02 (72-75)	Step 1	Solid	6010B SEP	25357
140-13229-6	BH-02 (72-75)	Step 2	Solid	6010B SEP	25392
140-13229-7	BH-02 (70-72)	Step 1	Solid	6010B SEP	25357
140-13229-7	BH-02 (70-72)	Step 2	Solid	6010B SEP	25392
140-13229-8	BH-02 (125-130)	Step 1	Solid	6010B SEP	25357
140-13229-8	BH-02 (125-130)	Step 2	Solid	6010B SEP	25392
140-13229-9	BH-01 (26-31)	Step 1	Solid	6010B SEP	25357
140-13229-9	BH-01 (26-31)	Step 2	Solid	6010B SEP	25392
140-13229-10	BH-01 (75-80)	Step 1	Solid	6010B SEP	25357
140-13229-10	BH-01 (75-80)	Step 2	Solid	6010B SEP	25392
140-13229-11	BH-01 (130-135)	Step 1	Solid	6010B SEP	25357
140-13229-11	BH-01 (130-135)	Step 2	Solid	6010B SEP	25392
MB 140-25320/18-B ^4	Method Blank	Step 1	Solid	6010B SEP	25357
MB 140-25362/18-B ^3	Method Blank	Step 2	Solid	6010B SEP	25392
LCS 140-25320/19-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	25357
LCS 140-25362/19-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	25392
LCSD 140-25320/20-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	25357
LCSD 140-25362/20-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	25392

Prep Batch: 25553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 5	Solid	3010A	25494
140-13229-2	BH-03 (70-75)	Step 5	Solid	3010A	25494
140-13229-3	BH-03 (110-115)	Step 5	Solid	3010A	25494

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

Prep Batch: 25553 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-4	DUP-1	Step 5	Solid	3010A	25494
140-13229-5	BH-02 (41-45)	Step 5	Solid	3010A	25494
140-13229-6	BH-02 (72-75)	Step 5	Solid	3010A	25494
140-13229-7	BH-02 (70-72)	Step 5	Solid	3010A	25494
140-13229-8	BH-02 (125-130)	Step 5	Solid	3010A	25494
140-13229-9	BH-01 (26-31)	Step 5	Solid	3010A	25494
140-13229-10	BH-01 (75-80)	Step 5	Solid	3010A	25494
140-13229-11	BH-01 (130-135)	Step 5	Solid	3010A	25494
MB 140-25494/18-B ^5	Method Blank	Step 5	Solid	3010A	25494
LCS 140-25494/19-B ^5	Lab Control Sample	Step 5	Solid	3010A	25494
LCSD 140-25494/20-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	25494

Analysis Batch: 25554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 3	Solid	6010B SEP	25444
140-13229-1	BH-03 (30-32)	Step 4	Solid	6010B SEP	25493
140-13229-2	BH-03 (70-75)	Step 3	Solid	6010B SEP	25444
140-13229-2	BH-03 (70-75)	Step 4	Solid	6010B SEP	25493
140-13229-3	BH-03 (110-115)	Step 3	Solid	6010B SEP	25444
140-13229-3	BH-03 (110-115)	Step 4	Solid	6010B SEP	25493
140-13229-4	DUP-1	Step 3	Solid	6010B SEP	25444
140-13229-4	DUP-1	Step 4	Solid	6010B SEP	25493
140-13229-5	BH-02 (41-45)	Step 3	Solid	6010B SEP	25444
140-13229-5	BH-02 (41-45)	Step 4	Solid	6010B SEP	25493
140-13229-6	BH-02 (72-75)	Step 3	Solid	6010B SEP	25444
140-13229-6	BH-02 (72-75)	Step 4	Solid	6010B SEP	25493
140-13229-7	BH-02 (70-72)	Step 3	Solid	6010B SEP	25444
140-13229-7	BH-02 (70-72)	Step 4	Solid	6010B SEP	25493
140-13229-8	BH-02 (125-130)	Step 3	Solid	6010B SEP	25444
140-13229-8	BH-02 (125-130)	Step 4	Solid	6010B SEP	25493
140-13229-9	BH-01 (26-31)	Step 3	Solid	6010B SEP	25444
140-13229-9	BH-01 (26-31)	Step 4	Solid	6010B SEP	25493
140-13229-10	BH-01 (75-80)	Step 3	Solid	6010B SEP	25444
140-13229-10	BH-01 (75-80)	Step 4	Solid	6010B SEP	25493
140-13229-11	BH-01 (130-135)	Step 3	Solid	6010B SEP	25444
140-13229-11	BH-01 (130-135)	Step 4	Solid	6010B SEP	25493
MB 140-25394/18-B	Method Blank	Step 3	Solid	6010B SEP	25444
MB 140-25447/18-B	Method Blank	Step 4	Solid	6010B SEP	25493
LCS 140-25394/19-B	Lab Control Sample	Step 3	Solid	6010B SEP	25444
LCS 140-25447/19-B	Lab Control Sample	Step 4	Solid	6010B SEP	25493
LCSD 140-25394/20-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	25444
LCSD 140-25447/20-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	25493

SEP Batch: 25574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 6	Solid	Acid/Sulfide	
140-13229-2	BH-03 (70-75)	Step 6	Solid	Acid/Sulfide	
140-13229-3	BH-03 (110-115)	Step 6	Solid	Acid/Sulfide	
140-13229-4	DUP-1	Step 6	Solid	Acid/Sulfide	
140-13229-5	BH-02 (41-45)	Step 6	Solid	Acid/Sulfide	
140-13229-6	BH-02 (72-75)	Step 6	Solid	Acid/Sulfide	

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

SEP Batch: 25574 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-7	BH-02 (70-72)	Step 6	Solid	Acid/Sulfide	
140-13229-8	BH-02 (125-130)	Step 6	Solid	Acid/Sulfide	
140-13229-9	BH-01 (26-31)	Step 6	Solid	Acid/Sulfide	
140-13229-10	BH-01 (75-80)	Step 6	Solid	Acid/Sulfide	
140-13229-11	BH-01 (130-135)	Step 6	Solid	Acid/Sulfide	
MB 140-25574/18-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-25574/19-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-25574/20-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	

Prep Batch: 25604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 7	Solid	Residual	
140-13229-2	BH-03 (70-75)	Step 7	Solid	Residual	
140-13229-3	BH-03 (110-115)	Step 7	Solid	Residual	
140-13229-4	DUP-1	Step 7	Solid	Residual	
140-13229-5	BH-02 (41-45)	Step 7	Solid	Residual	
140-13229-6	BH-02 (72-75)	Step 7	Solid	Residual	
140-13229-7	BH-02 (70-72)	Step 7	Solid	Residual	
140-13229-8	BH-02 (125-130)	Step 7	Solid	Residual	
140-13229-9	BH-01 (26-31)	Step 7	Solid	Residual	
140-13229-10	BH-01 (75-80)	Step 7	Solid	Residual	
140-13229-11	BH-01 (130-135)	Step 7	Solid	Residual	
MB 140-25604/18-A	Method Blank	Step 7	Solid	Residual	
LCS 140-25604/19-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-25604/20-A	Lab Control Sample Dup	Step 7	Solid	Residual	

Analysis Batch: 25679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 5	Solid	6010B SEP	25553
140-13229-1	BH-03 (30-32)	Step 6	Solid	6010B SEP	25574
140-13229-2	BH-03 (70-75)	Step 5	Solid	6010B SEP	25553
140-13229-2	BH-03 (70-75)	Step 6	Solid	6010B SEP	25574
140-13229-3	BH-03 (110-115)	Step 5	Solid	6010B SEP	25553
140-13229-3	BH-03 (110-115)	Step 6	Solid	6010B SEP	25574
140-13229-4	DUP-1	Step 5	Solid	6010B SEP	25553
140-13229-4	DUP-1	Step 6	Solid	6010B SEP	25574
140-13229-5	BH-02 (41-45)	Step 5	Solid	6010B SEP	25553
140-13229-5	BH-02 (41-45)	Step 6	Solid	6010B SEP	25574
140-13229-6	BH-02 (72-75)	Step 5	Solid	6010B SEP	25553
140-13229-6	BH-02 (72-75)	Step 6	Solid	6010B SEP	25574
140-13229-7	BH-02 (70-72)	Step 5	Solid	6010B SEP	25553
140-13229-7	BH-02 (70-72)	Step 6	Solid	6010B SEP	25574
140-13229-8	BH-02 (125-130)	Step 5	Solid	6010B SEP	25553
140-13229-8	BH-02 (125-130)	Step 6	Solid	6010B SEP	25574
140-13229-9	BH-01 (26-31)	Step 5	Solid	6010B SEP	25553
140-13229-9	BH-01 (26-31)	Step 6	Solid	6010B SEP	25574
140-13229-10	BH-01 (75-80)	Step 5	Solid	6010B SEP	25553
140-13229-10	BH-01 (75-80)	Step 6	Solid	6010B SEP	25574
140-13229-11	BH-01 (130-135)	Step 5	Solid	6010B SEP	25553
140-13229-11	BH-01 (130-135)	Step 6	Solid	6010B SEP	25574
MB 140-25494/18-B ^5	Method Blank	Step 5	Solid	6010B SEP	25553

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

Analysis Batch: 25679 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 140-25574/18-A	Method Blank	Step 6	Solid	6010B SEP	25574
LCS 140-25494/19-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	25553
LCS 140-25574/19-A	Lab Control Sample	Step 6	Solid	6010B SEP	25574
LCS D 140-25494/20-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	25553
LCS D 140-25574/20-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	25574

Analysis Batch: 25767

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Step 7	Solid	6010B SEP	25604
140-13229-1	BH-03 (30-32)	Step 7	Solid	6010B SEP	25604
140-13229-1	BH-03 (30-32)	Step 7	Solid	6010B SEP	25604
140-13229-1	BH-03 (30-32)	Total/NA	Solid	6010B	25278
140-13229-1	BH-03 (30-32)	Total/NA	Solid	6010B	25278
140-13229-1	BH-03 (30-32)	Total/NA	Solid	6010B	25278
140-13229-2	BH-03 (70-75)	Step 7	Solid	6010B SEP	25604
140-13229-2	BH-03 (70-75)	Step 7	Solid	6010B SEP	25604
140-13229-2	BH-03 (70-75)	Total/NA	Solid	6010B	25278
140-13229-2	BH-03 (70-75)	Total/NA	Solid	6010B	25278
140-13229-2	BH-03 (70-75)	Total/NA	Solid	6010B	25278
140-13229-3	BH-03 (110-115)	Step 7	Solid	6010B SEP	25604
140-13229-3	BH-03 (110-115)	Step 7	Solid	6010B SEP	25604
140-13229-3	BH-03 (110-115)	Step 7	Solid	6010B SEP	25604
140-13229-3	BH-03 (110-115)	Total/NA	Solid	6010B	25278
140-13229-3	BH-03 (110-115)	Total/NA	Solid	6010B	25278
140-13229-3	BH-03 (110-115)	Total/NA	Solid	6010B	25278
140-13229-4	DUP-1	Step 7	Solid	6010B SEP	25604
140-13229-4	DUP-1	Step 7	Solid	6010B SEP	25604
140-13229-4	DUP-1	Step 7	Solid	6010B SEP	25604
140-13229-4	DUP-1	Total/NA	Solid	6010B	25278
140-13229-4	DUP-1	Total/NA	Solid	6010B	25278
140-13229-4	DUP-1	Total/NA	Solid	6010B	25278
140-13229-5	BH-02 (41-45)	Step 7	Solid	6010B SEP	25604
140-13229-5	BH-02 (41-45)	Step 7	Solid	6010B SEP	25604
140-13229-5	BH-02 (41-45)	Total/NA	Solid	6010B	25278
140-13229-5	BH-02 (41-45)	Total/NA	Solid	6010B	25278
140-13229-6	BH-02 (72-75)	Step 7	Solid	6010B SEP	25604
140-13229-6	BH-02 (72-75)	Step 7	Solid	6010B SEP	25604
140-13229-6	BH-02 (72-75)	Total/NA	Solid	6010B	25278
140-13229-6	BH-02 (72-75)	Total/NA	Solid	6010B	25278
140-13229-7	BH-02 (70-72)	Step 7	Solid	6010B SEP	25604
140-13229-7	BH-02 (70-72)	Step 7	Solid	6010B SEP	25604
140-13229-7	BH-02 (70-72)	Total/NA	Solid	6010B	25278
140-13229-7	BH-02 (70-72)	Total/NA	Solid	6010B	25278
140-13229-7	BH-02 (70-72)	Total/NA	Solid	6010B	25278
140-13229-8	BH-02 (125-130)	Step 7	Solid	6010B SEP	25604
140-13229-8	BH-02 (125-130)	Step 7	Solid	6010B SEP	25604
140-13229-8	BH-02 (125-130)	Step 7	Solid	6010B SEP	25604
140-13229-8	BH-02 (125-130)	Total/NA	Solid	6010B	25278
140-13229-8	BH-02 (125-130)	Total/NA	Solid	6010B	25278
140-13229-8	BH-02 (125-130)	Total/NA	Solid	6010B	25278
140-13229-9	BH-01 (26-31)	Step 7	Solid	6010B SEP	25604

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

Analysis Batch: 25767 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-9	BH-01 (26-31)	Step 7	Solid	6010B SEP	25604
140-13229-9	BH-01 (26-31)	Total/NA	Solid	6010B	25278
140-13229-9	BH-01 (26-31)	Total/NA	Solid	6010B	25278
140-13229-10	BH-01 (75-80)	Step 7	Solid	6010B SEP	25604
140-13229-10	BH-01 (75-80)	Step 7	Solid	6010B SEP	25604
140-13229-10	BH-01 (75-80)	Step 7	Solid	6010B SEP	25604
140-13229-10	BH-01 (75-80)	Total/NA	Solid	6010B	25278
140-13229-10	BH-01 (75-80)	Total/NA	Solid	6010B	25278
140-13229-10	BH-01 (75-80)	Total/NA	Solid	6010B	25278
140-13229-11	BH-01 (130-135)	Step 7	Solid	6010B SEP	25604
140-13229-11	BH-01 (130-135)	Step 7	Solid	6010B SEP	25604
140-13229-11	BH-01 (130-135)	Step 7	Solid	6010B SEP	25604
140-13229-11	BH-01 (130-135)	Step 7	Solid	6010B SEP	25604
140-13229-11	BH-01 (130-135)	Total/NA	Solid	6010B	25278
140-13229-11	BH-01 (130-135)	Total/NA	Solid	6010B	25278
140-13229-11	BH-01 (130-135)	Total/NA	Solid	6010B	25278
MB 140-25278/18-A	Method Blank	Total/NA	Solid	6010B	25278
MB 140-25604/18-A	Method Blank	Step 7	Solid	6010B SEP	25604
LCS 140-25278/19-A	Lab Control Sample	Total/NA	Solid	6010B	25278
LCS 140-25604/19-A	Lab Control Sample	Step 7	Solid	6010B SEP	25604
LCSD 140-25278/20-A	Lab Control Sample Dup	Total/NA	Solid	6010B	25278
LCSD 140-25604/20-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	25604

Analysis Batch: 25806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-2	BH-03 (70-75)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-3	BH-03 (110-115)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-4	DUP-1	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-5	BH-02 (41-45)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-6	BH-02 (72-75)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-7	BH-02 (70-72)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-8	BH-02 (125-130)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-9	BH-01 (26-31)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-10	BH-01 (75-80)	Sum of Steps 1-7	Solid	6010B SEP	
140-13229-11	BH-01 (130-135)	Sum of Steps 1-7	Solid	6010B SEP	

Prep Batch: 263578

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Total/NA	Solid	3050B	
140-13229-2	BH-03 (70-75)	Total/NA	Solid	3050B	
140-13229-3	BH-03 (110-115)	Total/NA	Solid	3050B	
140-13229-4	DUP-1	Total/NA	Solid	3050B	
140-13229-5	BH-02 (41-45)	Total/NA	Solid	3050B	
140-13229-6	BH-02 (72-75)	Total/NA	Solid	3050B	
140-13229-7	BH-02 (70-72)	Total/NA	Solid	3050B	
140-13229-8	BH-02 (125-130)	Total/NA	Solid	3050B	
140-13229-9	BH-01 (26-31)	Total/NA	Solid	3050B	
140-13229-10	BH-01 (75-80)	Total/NA	Solid	3050B	
140-13229-11	BH-01 (130-135)	Total/NA	Solid	3050B	
MB 180-263578/1-A	Method Blank	Total/NA	Solid	3050B	

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QC Association Summary

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Metals (Continued)

Prep Batch: 263578 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-263578/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 264070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Total/NA	Solid	EPA 6020A	263578
140-13229-2	BH-03 (70-75)	Total/NA	Solid	EPA 6020A	263578
140-13229-3	BH-03 (110-115)	Total/NA	Solid	EPA 6020A	263578
140-13229-4	DUP-1	Total/NA	Solid	EPA 6020A	263578
140-13229-5	BH-02 (41-45)	Total/NA	Solid	EPA 6020A	263578
140-13229-6	BH-02 (72-75)	Total/NA	Solid	EPA 6020A	263578
140-13229-7	BH-02 (70-72)	Total/NA	Solid	EPA 6020A	263578
140-13229-8	BH-02 (125-130)	Total/NA	Solid	EPA 6020A	263578
140-13229-9	BH-01 (26-31)	Total/NA	Solid	EPA 6020A	263578
140-13229-10	BH-01 (75-80)	Total/NA	Solid	EPA 6020A	263578
140-13229-11	BH-01 (130-135)	Total/NA	Solid	EPA 6020A	263578
MB 180-263578/1-A	Method Blank	Total/NA	Solid	EPA 6020A	263578
LCS 180-263578/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	263578

Analysis Batch: 264192

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Total/NA	Solid	EPA 6020A	263578
140-13229-2	BH-03 (70-75)	Total/NA	Solid	EPA 6020A	263578
140-13229-3	BH-03 (110-115)	Total/NA	Solid	EPA 6020A	263578
140-13229-4	DUP-1	Total/NA	Solid	EPA 6020A	263578
140-13229-5	BH-02 (41-45)	Total/NA	Solid	EPA 6020A	263578
140-13229-6	BH-02 (72-75)	Total/NA	Solid	EPA 6020A	263578
140-13229-7	BH-02 (70-72)	Total/NA	Solid	EPA 6020A	263578
140-13229-8	BH-02 (125-130)	Total/NA	Solid	EPA 6020A	263578
140-13229-9	BH-01 (26-31)	Total/NA	Solid	EPA 6020A	263578
140-13229-10	BH-01 (75-80)	Total/NA	Solid	EPA 6020A	263578
140-13229-11	BH-01 (130-135)	Total/NA	Solid	EPA 6020A	263578
MB 180-263578/1-A	Method Blank	Total/NA	Solid	EPA 6020A	263578
LCS 180-263578/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	263578

General Chemistry

Analysis Batch: 25110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13229-1	BH-03 (30-32)	Total/NA	Solid	Moisture	
140-13229-2	BH-03 (70-75)	Total/NA	Solid	Moisture	
140-13229-3	BH-03 (110-115)	Total/NA	Solid	Moisture	
140-13229-4	DUP-1	Total/NA	Solid	Moisture	
140-13229-5	BH-02 (41-45)	Total/NA	Solid	Moisture	
140-13229-6	BH-02 (72-75)	Total/NA	Solid	Moisture	
140-13229-7	BH-02 (70-72)	Total/NA	Solid	Moisture	
140-13229-8	BH-02 (125-130)	Total/NA	Solid	Moisture	
140-13229-9	BH-01 (26-31)	Total/NA	Solid	Moisture	
140-13229-10	BH-01 (75-80)	Total/NA	Solid	Moisture	
140-13229-11	BH-01 (130-135)	Total/NA	Solid	Moisture	
140-13229-5 DU	BH-02 (41-45)	Total/NA	Solid	Moisture	

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (30-32)
Date Collected: 10/27/18 08:30
Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-1
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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-03 (30-32)
Date Collected: 10/27/18 08:30
Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-1
Matrix: Solid
Percent Solids: 86.6

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:07	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 17:48	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 20:40	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 10:56	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:03	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 13:48	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 15:53	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 11:35	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 13:42	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:11	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.

TestAmerica Job ID: 140-13229-1

Project/Site: Rush Island Energy Center - Soil & Speci

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:14	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 19:34	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	3050B			0.98 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:07	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	3050B			0.98 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:07	WTR	TAL PIT
Instrument ID: M										

Client Sample ID: BH-03 (70-75)

Lab Sample ID: 140-13229-2

Date Collected: 10/27/18 12:15

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
Instrument ID: W3										

Client Sample ID: BH-03 (70-75)

Lab Sample ID: 140-13229-2

Date Collected: 10/27/18 12:15

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 84.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:13	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:08	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 20:45	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:01	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:08	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 13:53	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.

TestAmerica Job ID: 140-13229-1

Project/Site: Rush Island Energy Center - Soil & Speci

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	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 15:58	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 11:40	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 13:47	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:17	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:19	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			1.02 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:12	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			1.02 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:12	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Date Collected: 10/27/18 16:20

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Date Collected: 10/27/18 16:20

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:18	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:13	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 20:50	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-03 (110-115)

Lab Sample ID: 140-13229-3

Date Collected: 10/27/18 16:20

Matrix: Solid

Date Received: 11/01/18 12:00

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 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:06	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:13	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 13:58	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:03	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 11:45	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 13:52	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:22	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:24	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 19:39	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			0.98 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:17	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			0.98 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:17	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: DUP-1

Lab Sample ID: 140-13229-4

Date Collected: 10/27/18 00:00

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: DUP-1
Date Collected: 10/27/18 00:00
Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-4
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			25806	11/29/18 14:47	DKW	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
Instrument ID: W3										

Client Sample ID: DUP-1
Date Collected: 10/27/18 00:00
Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-4
Matrix: Solid
Percent Solids: 84.0

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:24	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:18	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 20:56	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:12	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:18	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:03	KNC	TAL KNX
Instrument ID: DUO										
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:08	KNC	TAL KNX
Instrument ID: DUO										
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 11:50	KNC	TAL KNX
Instrument ID: DUO										
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 13:57	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:27	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: DUP-1

Lab Sample ID: 140-13229-4

Date Collected: 10/27/18 00:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 84.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:29	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 19:44	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	3050B			1.02 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:21	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	3050B			1.02 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:21	WTR	TAL PIT
Instrument ID: M										

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
Instrument ID: W3										

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.6

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:30	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:23	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:17	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:23	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:08	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:13	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 11:56	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:02	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:33	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:34	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			0.96 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:26	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			0.96 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:26	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Date Collected: 10/28/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Date Collected: 10/28/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.5

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:35	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (72-75)

Lab Sample ID: 140-13229-6

Date Collected: 10/28/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 86.5

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:28	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:22	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:28	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:14	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:18	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 12:01	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:07	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:38	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:39	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			1.00 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:30	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			1.00 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:30	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Date Collected: 10/28/18 17:00

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Date Collected: 10/28/18 17:00

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-02 (70-72)

Lab Sample ID: 140-13229-7

Date Collected: 10/28/18 17:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 77.1

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:41	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:33	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 21:11	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:27	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:33	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:19	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:23	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 12:06	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:12	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:44	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (70-72)

Date Collected: 10/28/18 17:00

Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-7

Matrix: Solid

Percent Solids: 77.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:44	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			0.99 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:35	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			0.99 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:35	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: BH-02 (125-130)

Date Collected: 10/29/18 12:05

Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-02 (125-130)

Date Collected: 10/29/18 12:05

Date Received: 11/01/18 12:00

Lab Sample ID: 140-13229-8

Matrix: Solid

Percent Solids: 82.5

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 14:47	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:38	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 21:16	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:31	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:39	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (125-130)

Lab Sample ID: 140-13229-8

Date Collected: 10/29/18 12:05

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 82.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:24	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:28	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 12:11	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:17	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 12:59	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 16:49	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 19:49	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			1.05 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 20:53	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			1.05 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 20:53	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: BH-01 (26-31)

Lab Sample ID: 140-13229-9

Date Collected: 10/30/18 08:00

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (26-31)

Lab Sample ID: 140-13229-9

Date Collected: 10/30/18 08:00

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 83.6

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B Instrument ID: DUO		1			25767	11/28/18 14:52	KNC	TAL KNX
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B Instrument ID: DUO		10			25767	11/28/18 18:43	KNC	TAL KNX
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP Instrument ID: DUO		4			25503	11/17/18 11:36	KNC	TAL KNX
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP Instrument ID: DUO		3			25503	11/17/18 13:44	KNC	TAL KNX
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP Instrument ID: DUO		1			25554	11/19/18 14:29	KNC	TAL KNX
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP Instrument ID: DUO		1			25554	11/19/18 16:32	KNC	TAL KNX
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP Instrument ID: DUO		5			25679	11/26/18 12:16	KNC	TAL KNX
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP Instrument ID: DUO		1			25679	11/26/18 14:22	KNC	TAL KNX
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP Instrument ID: DUO		1			25767	11/28/18 13:04	KNC	TAL KNX
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP Instrument ID: DUO		10			25767	11/28/18 16:54	KNC	TAL KNX
Total/NA	Prep	3050B			0.96 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A Instrument ID: M		1	1.0 mL	1.0 mL	264070	11/28/18 20:57	WTR	TAL PIT
Total/NA	Prep	3050B			0.96 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A Instrument ID: M		1			264192	11/28/18 20:57	WTR	TAL PIT

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Date Collected: 10/30/18 10:50

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
		Instrument ID: W3								

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Date Collected: 10/30/18 10:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 81.0

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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 15:08	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:48	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 21:21	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:42	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 13:59	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:34	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:47	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 12:21	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:37	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 13:10	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (75-80)

Lab Sample ID: 140-13229-10

Date Collected: 10/30/18 10:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 81.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 17:09	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 20:09	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	3050B			1.04 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 21:02	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	3050B			1.04 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 21:02	WTR	TAL PIT
Instrument ID: M										

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Date Collected: 10/30/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

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			25806	11/29/18 14:47	DKW	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			25110	11/06/18 08:29	BKD	TAL KNX
Instrument ID: W3										

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Date Collected: 10/30/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 79.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 15:14	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			25767	11/28/18 18:53	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			25767	11/28/18 21:26	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 11:56	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-01 (130-135)

Lab Sample ID: 140-13229-11

Date Collected: 10/30/18 16:50

Matrix: Solid

Date Received: 11/01/18 12:00

Percent Solids: 79.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	Analysis	6010B SEP		3			25503	11/17/18 14:04	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 14:49	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 16:52	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 12:36	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 14:42	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 13:15	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			25767	11/28/18 17:14	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 20:14	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			25767	11/28/18 20:20	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	3050B			1.03 g	100 mL	263578	11/21/18 14:05	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 21:07	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	3050B			1.03 g	100 mL	263578	11/21/18 14:05	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 21:07	WTR	TAL PIT
		Instrument ID: M								

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25278/18-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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 11:10	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25320/18-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			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			25503	11/17/18 09:57	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25362/18-B ^3

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			25503	11/17/18 12:01	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25394/18-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			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 12:49	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25447/18-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	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 14:54	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25494/18-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	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 10:33	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25574/18-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 12:42	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 140-25604/18-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 10:55	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Method Blank

Lab Sample ID: MB 180-263578/1-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			1.0 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 18:54	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	3050B			1.0 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 18:54	WTR	TAL PIT
Instrument ID: M										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25278/19-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	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 11:15	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25320/19-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			25503	11/17/18 10:02	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25362/19-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			25503	11/17/18 12:07	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25394/19-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 12:54	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25447/19-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 14:59	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25494/19-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 10:39	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25574/19-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 12:47	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-25604/19-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 11:00	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 180-263578/2-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			1.0 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	264070	11/28/18 18:40	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	3050B			1.0 g	100 mL	263578	11/21/18 14:04	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1			264192	11/28/18 18:40	WTR	TAL PIT
Instrument ID: M										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25278/20-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			1.000 g	50 mL	25278	11/12/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			25767	11/28/18 11:20	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25320/20-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	25320	11/13/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	25357	11/14/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			25503	11/17/18 10:07	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25362/20-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	25362	11/14/18 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	25392	11/15/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			25503	11/17/18 12:12	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
 Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25394/20-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	25394	11/15/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	25444	11/16/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			25554	11/19/18 12:58	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25447/20-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	25447	11/16/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	25493	11/17/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			25554	11/19/18 15:04	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25494/20-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	25494	11/19/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	25553	11/20/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			25679	11/26/18 10:44	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25574/20-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	25574	11/20/18 09:43	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			25679	11/26/18 12:52	KNC	TAL KNX
Instrument ID: DUO										

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 140-25604/20-A

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	25604	11/21/18 07:44	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			25767	11/28/18 11:05	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Client Sample ID: BH-02 (41-45)

Lab Sample ID: 140-13229-5 DU

Date Collected: 10/28/18 15:50

Matrix: Solid

Date Received: 11/01/18 12:00

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			25110	11/06/18 08:29	BKD	TAL KNX

Instrument ID: W3

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Method Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL PIT
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 = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: Golder Associates Inc.
Project/Site: Rush Island Energy Center - Soil & Speci

TestAmerica Job ID: 140-13229-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-13229-1	BH-03 (30-32)	Solid	10/27/18 08:30	11/01/18 12:00
140-13229-2	BH-03 (70-75)	Solid	10/27/18 12:15	11/01/18 12:00
140-13229-3	BH-03 (110-115)	Solid	10/27/18 16:20	11/01/18 12:00
140-13229-4	DUP-1	Solid	10/27/18 00:00	11/01/18 12:00
140-13229-5	BH-02 (41-45)	Solid	10/28/18 15:50	11/01/18 12:00
140-13229-6	BH-02 (72-75)	Solid	10/28/18 16:50	11/01/18 12:00
140-13229-7	BH-02 (70-72)	Solid	10/28/18 17:00	11/01/18 12:00
140-13229-8	BH-02 (125-130)	Solid	10/29/18 12:05	11/01/18 12:00
140-13229-9	BH-01 (26-31)	Solid	10/30/18 08:00	11/01/18 12:00
140-13229-10	BH-01 (75-80)	Solid	10/30/18 10:50	11/01/18 12:00
140-13229-11	BH-01 (130-135)	Solid	10/30/18 16:50	11/01/18 12:00



Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

TestAmerica Laboratories, Inc.
COC No: 140-5757-1985.1

Project Manager: Walker Wasmund, Terry
Regulatory Program: DW NPDES RCRA Other:

Site Contact: Jeffrey Ingram
Date: 10/31/2018
Lab Contact: Walker Wasmund, Terry
Carrier: Fedex

Sampler: Jeffrey Ingram
For Lab Use Only:
Walk-in Client:
Lab Sampling:

Job / SDG No.:

Sample Specific Notes:

Filtered Sample (Y/N)

Perform MS / MSD (Y/N)

Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
TAT if different from Below

Sample Date

Sample Time

Sample Type (C-Comp, G-Grab)

Matrix

of Cont.

BH-03 (30-32)

BH-03 (70-75)

BH-03 (110-115)

DUP-1

BH-02 (41-45)

BH-02 (72-75)

BH-02 (70-72)

BH-02 (125-130)

BH-01 (26-31)

BH-01 (75-80)

BH-01 (130-35)

140-13229 Chain of Custody

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:

Return to Client Archive for _____ Months Disposal by Lab

Cooler Temp. (°C): Obs'd: _____

Therm ID No.:

Relinquished by: Jeff Ingram

Company: Coler

Date/Time: 10/31/18

Relinquished by:

Company:

Date/Time:

Relinquished by:

Company:

Date/Time:

Knoxville, TN 37921-5947
phone 865.291.3000 fax 865.584.4315

TestAmerica Laboratories, Inc.
COC No: 140-5757-1985.1

Regulatory Program: DW RCRA NPDES Other: _____
 Project Manager: Walker Wasmund, Terry
 Site Contact: Jeffrey Ingram
 Lab Contact: Walker Wasmund, Terry
 Date: 10/31/2018
 Carrier: Fedex

Tel/Fax: _____
 Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below
 2 weeks
 1 week
 2 days
 1 day

Project Name: Soil and Speciation Testing
 Site: Rush Island Energy Center
 P O # _____

Sampler: Jeffrey Ingram
 For Lab Use Only:
 Walk-in Client:
 Lab Sampling:
 Job / SDG No.:

Sample Specific Notes:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)
BH-03 (30-32)	10/27/2018	830	G	Soil	1		
BH-03 (70-75)	10/27/2018	1215	G	Soil	1		
BH-03 (110-115)	10/27/2018	1620	G	Soil	1		
DUP-1	10/27/2018	NA	G	Soil	1		
BH-02 (41-45)	10/28/18	1550	G	Soil	1		
BH-02 (72-75)	10/28/18	1650	G	Soil	1		
BH-02 (70-72)	10/28/18	1700	G	Soil	1		
BH-02 (125-130)	10/29/18	1205	G	Soil	1		
BH-01 (26-31)	10/30/18	0800	G	Soil	1		
BH-01 (75-80)	10/30/18	1050	G	Soil	1		
BH-01 (130-35)	10/30/18	1650	G	Soil	1		

Preservation Used: 1=Ice, 2=HC1, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: Yes No
 Relinquished by: *J Ingram*
 Relinquished by: _____
 Relinquished by: _____

Custody Seal No.: _____
 Company: *TestAmerica*
 Company: _____
 Company: _____

Received by: *Walker Wasmund*
 Received by: _____
 Received in Laboratory by: _____

Company: *TestAmerica*
 Company: _____
 Company: _____

Date/Time: 10/31/18 16:00
 Date/Time: _____
 Date/Time: _____

Therm ID No.: _____
 Date/Time: 11-1-18 12:00
 Date/Time: _____
 Date/Time: _____



TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Review Items	Yes	No	NA	If No, what was the problem?	Comments/Actions Taken
1. Are the shipping containers intact?	/			<input type="checkbox"/> Containers, Broken	<p>84-01 (130-35) LABEL LIST 84-01 (130-35)</p> <p>WILL DO PER LABEL</p>
2. Were ambient air containers received intact?		/		<input type="checkbox"/> Checked in lab	
3. The coolers/containers custody seal if present, is it intact?	/			<input type="checkbox"/> Yes <input type="checkbox"/> NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : <u>5668</u> Correction factor: <u>+0.1c</u>	/			<input type="checkbox"/> Cooler Out of Temp, Client Contacted, Proceed/Cancel <input type="checkbox"/> Cooler Out of Temp, Same Day Receipt	
5. Were all of the sample containers received intact?	/			<input type="checkbox"/> Containers, Broken	
6. Were samples received in appropriate containers?	/			<input type="checkbox"/> Containers, Improper; Client Contacted; Proceed/Cancel	
7. Do sample container labels match COC? (IDs, Dates, Times)	/	/		<input checked="" type="checkbox"/> COC & Samples Do Not Match <input type="checkbox"/> COC Incorrect/Incomplete <input type="checkbox"/> COC Not Received	
8. Were all of the samples listed on the COC received?	/			<input type="checkbox"/> Sample Received, Not on COC <input type="checkbox"/> Sample on COC, Not Received	
9. Is the date/time of sample collection noted?	/			<input type="checkbox"/> COC; No Date/Time; Client Contacted	
10. Was the sampler identified on the COC?	/			<input type="checkbox"/> Sampler Not Listed on COC	
11. Is the client and project name/# identified?	/			<input type="checkbox"/> COC Incorrect/Incomplete	
12. Are tests/parameters listed for each sample?	/			<input type="checkbox"/> COC No tests on COC	
13. Is the matrix of the samples noted?	/			<input type="checkbox"/> COC Incorrect/Incomplete	
14. Was COC relinquished? (Signed/Dated/Timed)	/			<input type="checkbox"/> COC Incorrect/Incomplete	
15. Were samples received within holding time?	/			<input type="checkbox"/> Holding Time - Receipt	
16. Were samples received with correct chemical preservative (excluding Encore)?		/		<input type="checkbox"/> pH Adjusted, pH Included (See box 16A) <input type="checkbox"/> Incorrect Preservative	
17. Were VOA samples received without headspace? (e.g. 1613B, 1668)		/		<input type="checkbox"/> Headspace (VOA only) <input type="checkbox"/> Residual Chlorine	
18. Did you check for residual chlorine, if necessary? Chlorine test strip lot number:		/		<input type="checkbox"/> If no, lab will adjust	
19. For 1613B water samples is pH<9?		/		<input type="checkbox"/> Project missing info	
20. For rad samples was sample activity info. Provided?		/			
Project #: <u>1400-1911</u> PM Instructions: <u>NA</u>					
Sample Receiving Associate: <u>[Signature]</u> Date: <u>11-1-18</u>					



Chain of Custody Record



LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab) Company: TestAmerica Laboratories, Inc. Address: 301 Alpha Drive, RIDC Park, Pittsburgh, PA, 15238 Phone: 412-963-7058(Tel) 412-963-2468(Fax) Email: Project Name: Rush Island Energy Center - Soil & Speci Site:		Sampler: Walker Wasmund, Terr Lab PM: E-Mail: terry.wasmund@testamericainc.com Phone: Accreditations Required (See note):									
Due Date Requested: 11/30/2018 TAT Requested (days): PO #: WO #: Project #: 14004916 SSOW#:		Job #: 140-13229-1 Page 1 of 2									
Sample Identification - Client ID (Lab ID)	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)	6020A/3050B (MOD) TAL Metals by ICP/MS	Analysis Requested	Preservation Codes:	Total Number of Containers	Special Instructions/Note:
BH-03 (30-32) (140-13229-1)	10/27/18	08:30 Central	Solid	Solid	X	X			A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)	1	
BH-03 (70-75) (140-13229-2)	10/27/18	12:15 Central	Solid	Solid	X	X				1	
BH-03 (110-115) (140-13229-3)	10/27/18	16:20 Central	Solid	Solid	X	X				1	
DUP-1 (140-13229-4)	10/27/18	Central	Solid	Solid	X	X				1	
BH-02 (41-45) (140-13229-5)	10/28/18	15:50 Central	Solid	Solid	X	X				1	
BH-02 (72-75) (140-13229-6)	10/28/18	16:50 Central	Solid	Solid	X	X				1	
BH-02 (70-72) (140-13229-7)	10/28/18	17:00 Central	Solid	Solid	X	X				1	
BH-02 (125-130) (140-13229-8)	10/29/18	12:05 Central	Solid	Solid	X	X				1	
BH-01 (26-31) (140-13229-9)	10/30/18	08:00 Central	Solid	Solid	X	X				1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/testing/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2
 Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: *James Coates* Date: 11-19-18 15:45
 Relinquished by: *JAL Deu* Date: 11/20/18 9:30
 Relinquished by: _____ Date: _____
 Relinquished by: _____ Date: _____
 Custody Seals Intact: _____
 Custody Seal No.: _____
 Cooler Temperature(s) °C and Other Remarks: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements: _____



Chain of Custody Record

Client Information (Sub Contract Lab)	Sampler: Walker Wasmund, Terry	Lab PM: Walker Wasmund, Terry	Carrier Tracking No(s): 280-463129.2
Client Contact: terry.wasmund@testamericainc.com	Phone: terry.wasmund@testamericainc.com	E-Mail: terry.wasmund@testamericainc.com	State of Origin: Missouri
Company: TestAmerica Laboratories, Inc.	Accreditations Required (See note):		Page: Page 2 of 2 Job # 140-13229-1
Address: 301 Alpha Drive, RIDC Park, Pittsburgh, PA, 15238	Due Date Requested: 11/30/2018	Analysis Requested:	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Arniclor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:
PO #: 412-963-7058(Tel) 412-963-2468(Fax)	TAT Requested (days):		M - Hexane N - None O - AsNaO2 P - Na2O/S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)
Project #: 14004916	PO #:		
Site: Rush Island Energy Center - Soil & Speci	WO #:		
	Project #:		
	SSOW#:		

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=water/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A/3050B (MOD) TAL Metals by ICP/MS	Total Number of Containers	Special Instructions/Note:
BH-01 (75-80) (140-13229-10)	10/30/18	10:50 Central	Solid	Solid	X	X	X	1	
BH-01 (130-135) (140-13229-11)	10/30/18	16:50 Central	Solid	Solid	X	X	X	1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. I

Possible Hazard Identification
 Unconfirmed
 Deliverable Requested: I, II, III, IV, Other (specify) _____ Primary Deliverable Rank: 2

Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: Diana Coates Date: 11-19-18 1545 Company: TAL Denver
 Relinquished by: _____ Date: _____ Company: _____
 Relinquished by: _____ Date: _____ Company: _____

Custody Seals Intact: Yes No
 Custody Seal No.: _____ Cooler Temperature(s) °C and Other Remarks: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements: _____

Received by: _____ Date: 11/20/18 750 Company: MPI
 Received by: _____ Date: _____ Company: _____
 Received by: _____ Date: _____ Company: _____



Chain of Custody Record



Client Information (Sub Contract Lab) Client Contact: Walker Wasmund, Terry Shipping/Receiving: terry.wasmund@testamericainc.com Company: TestAmerica Laboratories, Inc. Address: 4955 Yarrow Street, City: Arvada State, Zip: CO, 80002 Phone: 303-736-0100(Tel) 303-431-7171(Fax) Email: Project Name: Rush Island Energy Center - Soil & Speci Site:		Lab PM: Walker Wasmund, Terry E-Mail: terry.wasmund@testamericainc.com Accreditations Required (See note):		Carrier Tracking No(s): State of Origin: Missouri Page 1 of 2 Job #: 140-13229-1		COC No: 140-4558.1	
Due Date Requested: 11/6/2018 TAT Requested (days):		Analysis Requested:		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2OAS Q - NaZSO3 R - NaZSO4 S - HZSO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 X - EDTA Y - EDA Z - other (specify) Other:		Total Number of Containers:	
PO #: 14004916 W/O #: 550W#		Matrix (Water, Solid, On-waste/soil, BT-Tissue, AVAL)		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	
Sample Identification - Client ID (Lab ID)		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
BH-03 (30-32) (140-13229-1) BH-03 (70-75) (140-13229-2) BH-03 (110-115) (140-13229-3) DUP-1 (140-13229-4) BH-02 (41-45) (140-13229-5) BH-02 (72-75) (140-13229-6) BH-02 (70-72) (140-13229-7) BH-02 (125-130) (140-13229-8) BH-01 (26-31) (140-13229-9)		10/27/18 10/27/18 10/27/18 10/27/18 10/28/18 10/28/18 10/29/18 10/30/18		08:30 Central 12:15 Central 16:20 Central Central Central 15:50 Central 16:50 Central 17:00 Central Central Central 08:00 Central		Solid Solid Solid Solid Solid Solid Solid Solid	
Special Instructions/Note: 6020/3050B (MOD) Pick a reference price Moisture - 11-5-18		Special Instructions/Note: 6020/3050B (MOD) Pick a reference price Moisture - 11-5-18		Total Number of Containers:		Total Number of Containers:	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Special Instructions/QC Requirements:		Method of Shipment:		Primary Deliverable Rank: 2	
Relinquished by: [Signature] Date: 11-5-18 10:50 Company: TA-KVX		Relinquished by: [Signature] Date: 11/6/18 08:55 Company: [Signature]		Relinquished by: [Signature] Date: [Signature]		Relinquished by: [Signature] Date: [Signature]	
Custody Seals Intact: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:		Custody Seal No.:		Ver: 09/20/2016	



Login Sample Receipt Checklist

Client: Golder Associates Inc.

Job Number: 140-13229-1

Login Number: 13229
List Number: 4
Creator: Say, Thomas C

List Source: TestAmerica Pittsburgh
List Creation: 11/20/18 01:55 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



MEMORANDUM**DATE** January 21, 2019**Project No.** 1531406**TO** Project File
Golder Associates**CC****FROM** Tommy Goodwin**EMAIL** tgoodwin@golder.com**DATA VALIDATION SUMMARY: AMEREN – RUSH ISLAND ENERGY CENTER – SOIL BOREHOLE SAMPLING – DATA PACKAGE 140-13229**

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the MDL and less than the PQL the results were recorded at the PQL value and qualified as non-detects (U). When a compound was detected in a blank (i.e. method, field, rinsate), and the sample results were greater than the PQL and less than ten times the blank results the results were recorded at the result value and qualified as estimates (J).
- When a sample or field duplicate RPD was not met, associated samples were qualified as estimates (J). If the results were less than the MDL or detected in a blank below the PQL the results were qualified as non-detects and estimates (UJ).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
 Project Name: Ameren - RIEC - BHS - SEP
 Reviewer: T Goodwin

Project Manager: J Ingram
 Project Number: 1531406
 Validation Date: 1/2/19

Laboratory: Test America SDG #: 170-13229
 Analytical Method (type and no.): 6010B SEP ; 6010B, EPA 6020A

Matrix: Air Soil/Sed. Water Waste
 Sample Names BH-03(30-32), BH-03(70-75), BH-03(110-115), DUP-1, BH-02(41-45), BH-02(72-75), BH-02(70-72),
BH-02(125-130), BH-01(26-31), BH-01(75-80), BH-01(130-135)

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>10/27-30/18</u>
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>JK</u>
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Composite</u>
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
h) Field Calibration within control limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
i) Notations of unacceptable field conditions/performance from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note Deficiencies: _____				

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Σ4} As (0.473), Σ5} Li (4.52), Σ7} Fe (5.08)</u>
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were analytes detected in the equipment blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
d) Were analytes detected in the trip blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
b) Were the proper analytes included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
c) Was the LCS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>All verified by SEP steps by TA</u>

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>Dup-1@ BH-03(110-115)</u>
b) Were field dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>FB-1@ N/A</u>
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<u>See Notes</u>
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
b) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Recovery could not be calculated since sample contained high concentration of analyte?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
c) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Comments/Notes:

DUP-1: Σ2} Al(35), Fe(28)

Σ3} Fe(28), Mo(64)

Σ4} Al(24), As(36), Fe(36), Fe(21), Mo(58)

Σ5} Li(29)

Σ6} Pb(28)

Σ7} Al(20), Fe(45), Mo(200)

Σ8-7} Mo(42)

Σ Total} As(35), Mo(29)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
BH-03(30-32)-#4	Arsenic (As)	1.9	J	Detected in Method Blank (MB); 10xMB > Result > RL ; > Result > MDL ; 10xMB > Result > RL ; > Result > MDL ; 10xMB > Result > RL ; > Result > MDL RPD exceeded limits; Result > MDL ; MDL > Result ; Result > MDL MB; 10xMB > Result > RL ; RL > Result > MDL
┆ #5	Lithium (Li)	43	U	
BH-03(70-75)-#4	As	0.65	J	
┆ #5	Li	45	U	
BH-03(110-115)-#4	As	0.66	J	
┆ #5	Li	44	U	
┆ #3	Iron (Fe)	440	J	
┆ #4	Molybdenum (Mo)	0.67	J	
┆ #4	Aluminum (Al)	290	J	
┆ #6	Fe	1300	J	
┆ #6	Mo	0.41	J	
┆ #6	Lead (Pb)	0.57	J	
┆ #7	Al	33000	J	
┆ #7	Fe	4900	J	
┆ #7	Mo	0.19	J	
┆ #7	Mo	1.3	J	
┆ #Tot	As	4.3	J	
┆ #Tot	Mo	1.8	J	
DUP-1 -#3	Fe	580	J	
┆ #3	Mo	1.3	J	
┆ #4	Al	370	J	
┆ #4	Fe	1600	J	
┆ #4	Mo	0.68	J	
┆ #6	Pb	0.43	J	
┆ #7	Al	27000	J	
┆ #7	Fe	3100	J	
┆ #7	Mo	0.098	UJ	
┆ #7	Mo	2.0	J	
┆ #Tot	As	3.0	J	
┆ #Tot	Mo	2.4	J	
┆ #4	As	0.95	J	
┆ #5	Li	45	U	

Signature: Continue on Page 4

Date: _____

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
BH-02(41-45)-#4	As	1.2	J	MB; 10xMB > Result > RL
┆ -#5	Li	45	U	┆ RL > Result > MDL
BH-02(72-75)-#4	As	0.80	J	┆ 10xMB > Result > RL
┆ -#5	Li	43	U	┆ RL > Result > MDL
BH-02(70-72)-#4	As	1.7	J	┆ 10xMB > Result > RL
┆ -#5	Li	49	U	┆ RL > Result > MDL
BH-02(125-130)-#4	As	0.76	J	┆ 10xMB > Result > RL
┆ -#5	Li	45	U	┆ RL > Result > MDL
BH-01(26-31)-#4	As	0.98	J	┆ 10xMB > Result > RL
┆ -#5	Li	45	U	┆ RL > Result > MDL
BH-01(75-80)-#4	As	0.64	J	┆ 10xMB > Result > RL
BH-01(130-135)-#4	As	0.70	J	┆
┆ -#5	Li	47	U	┆ RL > Result > MDL
<div style="position: absolute; top: 0; left: 0; bottom: 0; right: 0; border: 1px solid black; transform: rotate(45deg); transform-origin: center;"></div>				

Signature: Tommy J. ...

Date: 1/21/19



Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for: Golder Associates

Project Number/ LIMS No. CA20I-00000-211-17012-01 / MI7012-NOV18

Sample Receipt: November 6, 2018

Sample Analysis: November 28, 2018

Reporting Date: November 30, 2018

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: HighScore Plus software using Crystallography Open Database (COD) and Joint Committee on Powder Diffraction Standards -International Center for Diffraction Data (JCPDS-ICDD).

Detection Limit: 0.5-2%. Strongly dependent on crystallinity.

Contents:

- 1) Method Summary
- 2) Summary of Mineral Assemblages
- 3) Quantitative XRD Results
- 4) XRD Pattern(s)

Lain Glossop H.B.Sc
Senior Mineralogist

Sarah Prout, Ph.D.
Senior Mineralogist



Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involve matching the diffraction pattern of a test sample material to patterns of single-phase reference materials. The reference patterns from the Crystallography Open Database (COD) and the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD).

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:

Panalytical Highscore Plus software was used to perform the quantitative Rietveld Analysis. This software uses a graphics based profile analysis program built around a non-linear least squares fitting system, to quantitatively 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 (shown as a blue pattern in the analyses plots) until it matches the obtained experimental patterns (shown as the coloured pattern in the analyses plots).

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 0.5 wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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Member of the SGS Group (SGS SA)

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	Sample ID 01	Sample ID 02	Sample ID 03	Sample ID 04	Sample ID 05	Sample ID 06
	DUP-1	BH-01 (28.5-31)	BH-01 (75-80)	BH-01 (130-35)	BH-02 (41-45)	BH-02 (70-72)
	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	74.3	61.2	77.8	75.0	72.5	61.3
Plagioclase	19.4	22.8	17.4	17.8	20.9	26.0
K-Feldspar	3.7	15.4	4.2	5.8	4.5	8.8
Chlorite	0.0	0.0	-	0.0	0.0	1.1
Amphibole	0.0	0.0	0.0	0.0	0.0	-
Calcite	1.4	0.0	0.0	0.0	0.1	0.4
Dolomite	0.3	0.7	0.5	0.6	1.2	0.6
Muscovite	0.9	0.0	0.1	0.8	0.8	1.6
Vermiculite	-	-	-	-	-	0.4
TOTAL	100	100	100	100	100	100

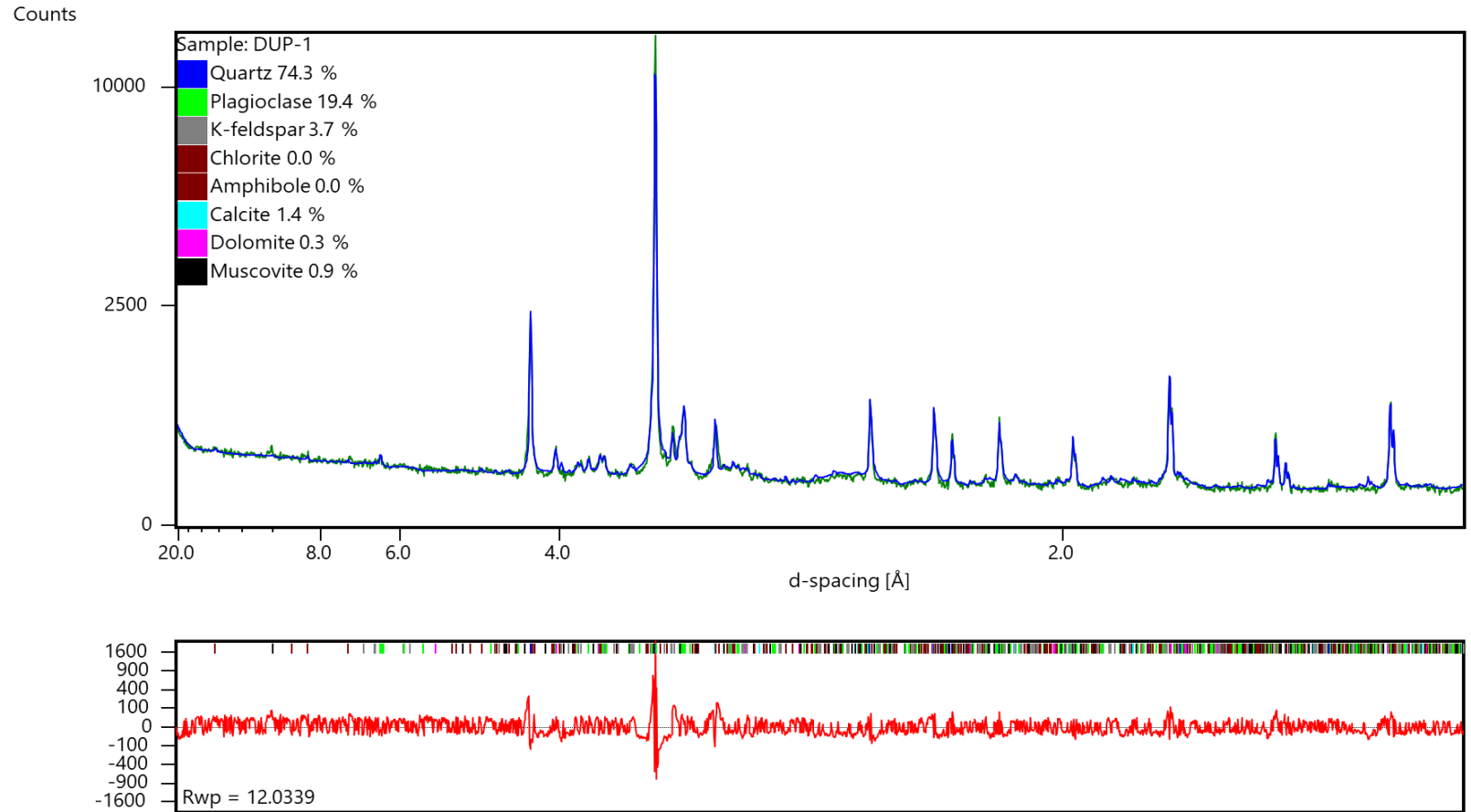
Mineral/Compound	Sample ID 07	Sample ID 08	Sample ID 09	Sample ID 10	Sample ID 11
	BH-02 (72-75)	BH-02 (125-130)	BH-03 (30-32)	BH-03 (70-75)	BH-03 (110-115)
	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)
Quartz	70.6	74.0	67.4	76.8	71.4
Plagioclase	20.7	18.4	21.7	14.5	17.6
K-Feldspar	8.1	7.1	10.6	8.7	8.4
Chlorite	0.0	0.0	-	-	0.0
Amphibole	0.0	-	0.0	-	0.0
Calcite	0.0	-	0.0	-	2.3
Dolomite	-	-	0.1	-	0.3
Muscovite	0.6	0.5	0.2	0.0	0.0
Vermiculite	-	-	-	-	-
TOTAL	100	100	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

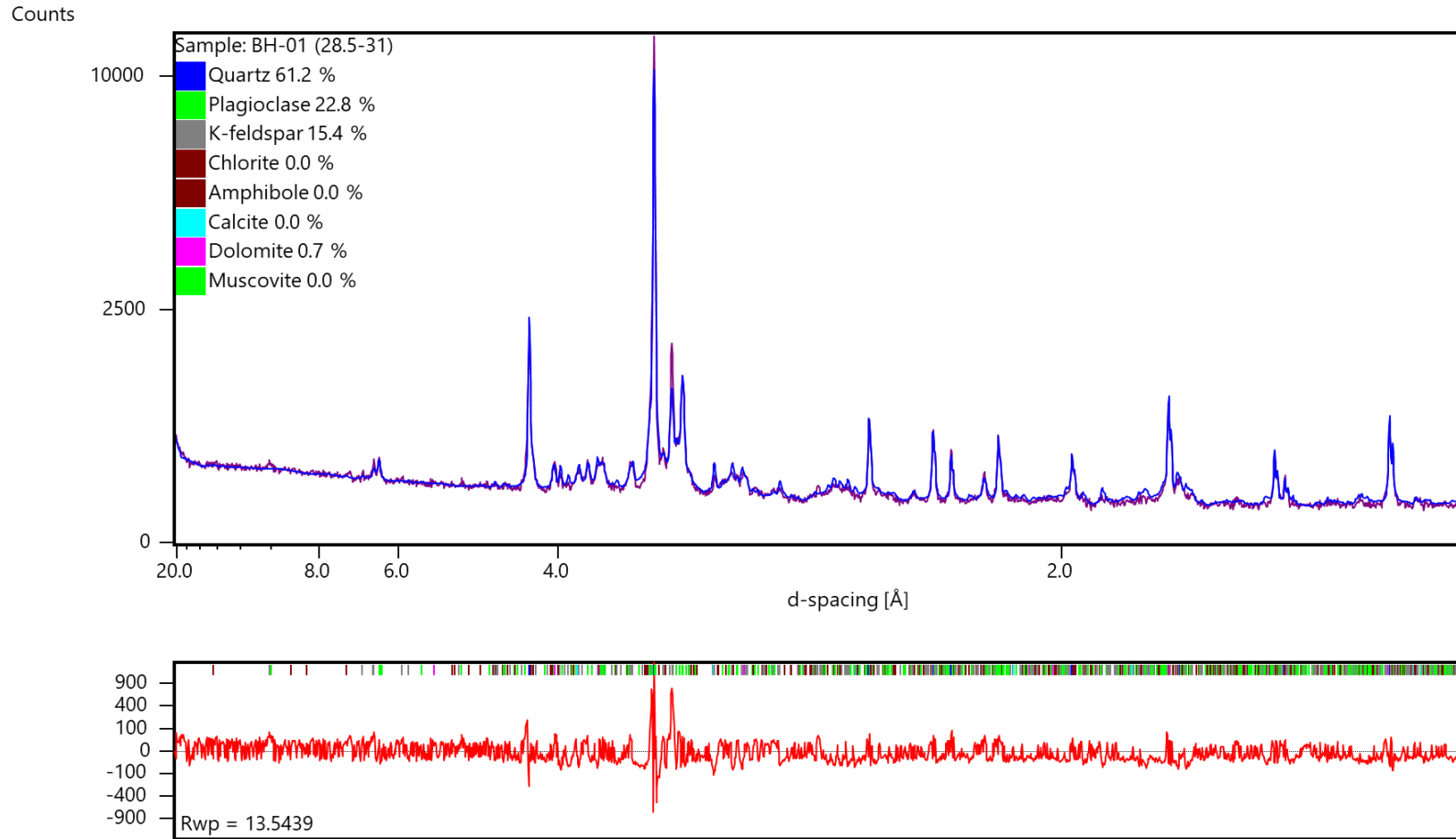
Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

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

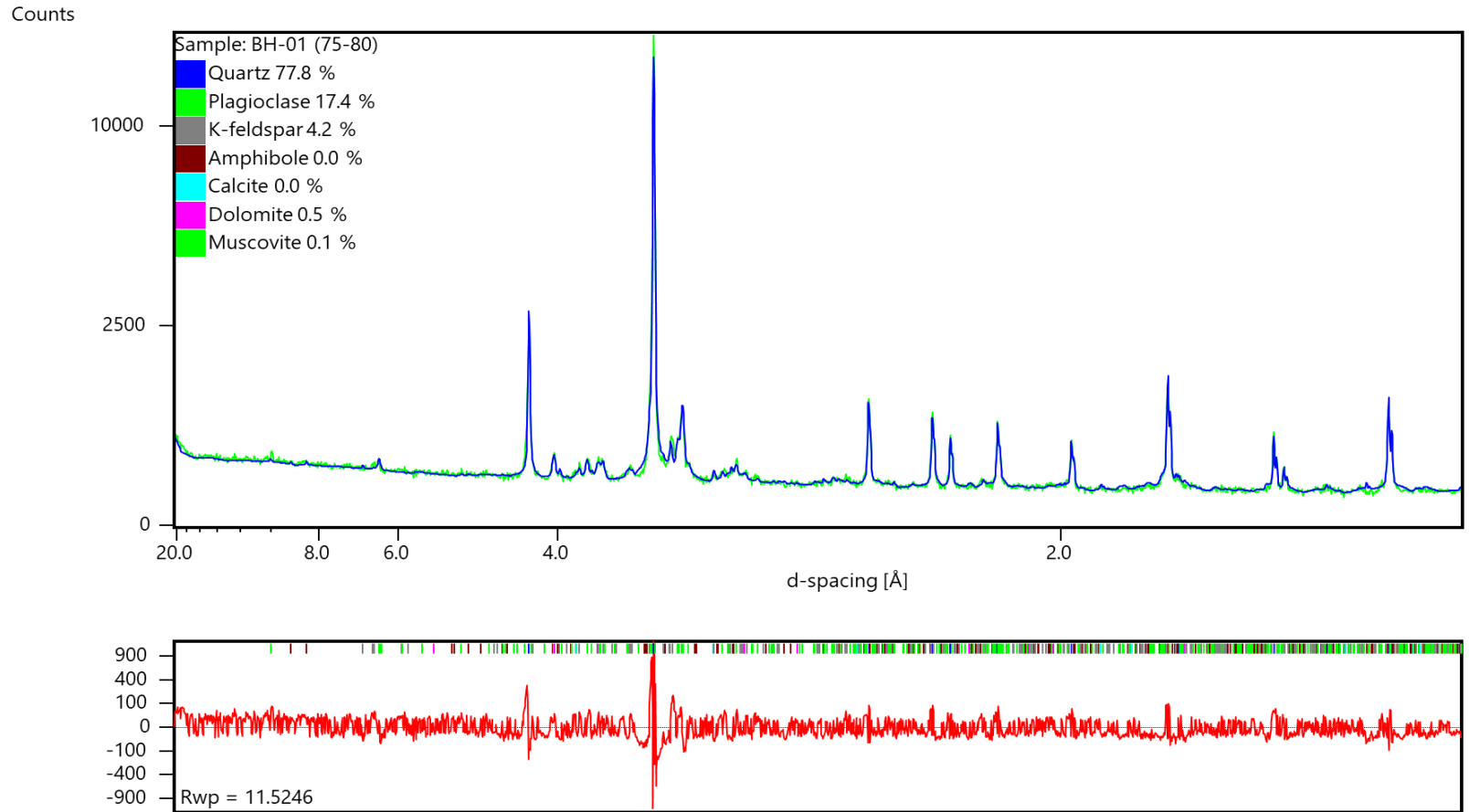
Mineral/Compound	Approximate Formula
Quartz	SiO ₂
Plagioclase	(Ca,Na)(Al,Si) ₄ O ₈
K-Feldspar	KAlSi ₃ O ₈
Chlorite	(Mg,Fe ²⁺) ₅ Al ₂ Si ₃ O ₁₀ (OH) ₈
Amphibole	(Ca,Na) ₂₋₃ (Mg,Fe,Al) ₅ (Al,Si) ₈ O ₂₂ (OH,F) ₂
Calcite	CaCO ₃
Dolomite	CaMg(CO ₃) ₂
Muscovite	KAl ₂ (AlSi ₃ O ₁₀)(FOH) ₂
Vermiculite	(Mg,Fe) ₃ (OH) ₂ ·4H ₂ O



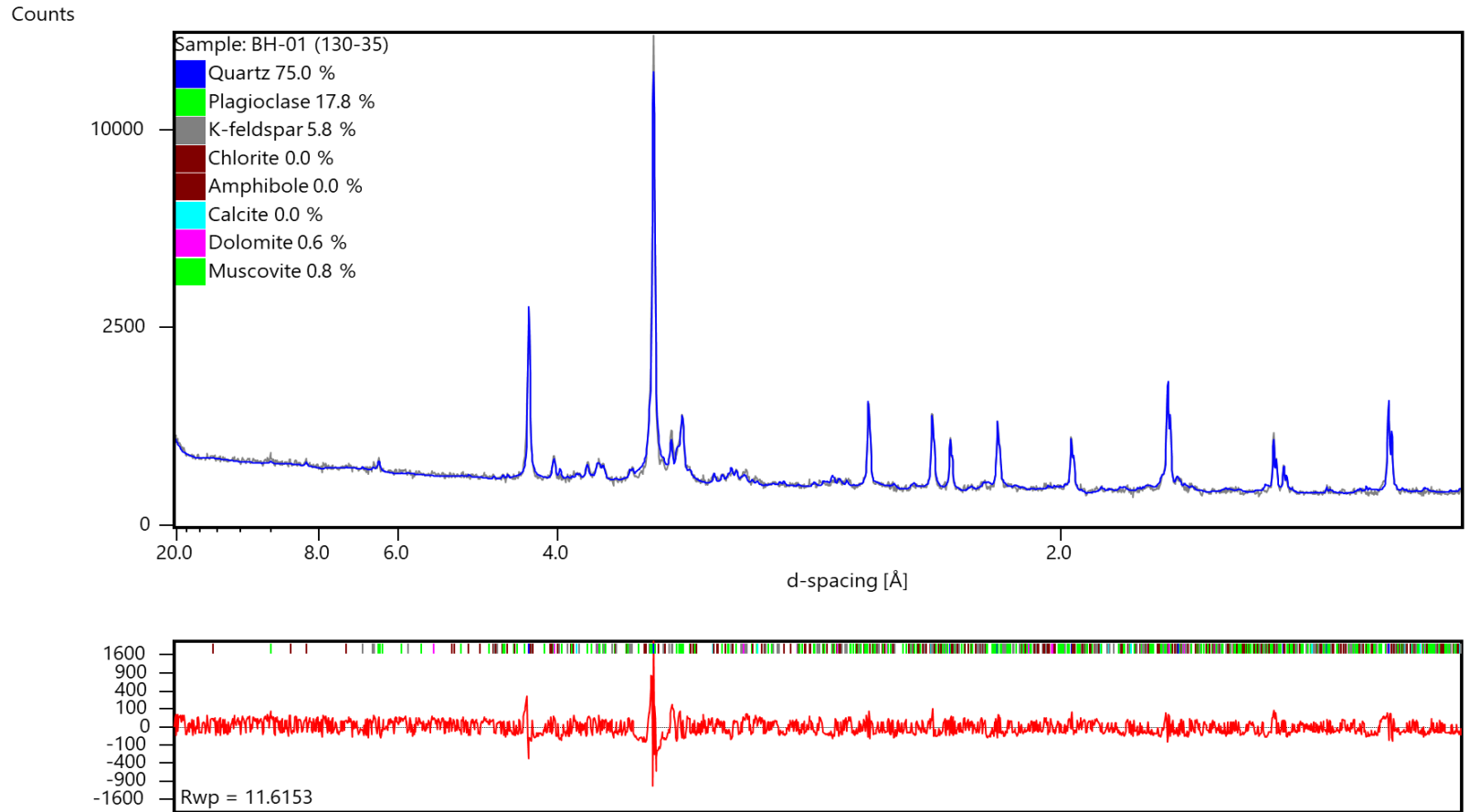
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).



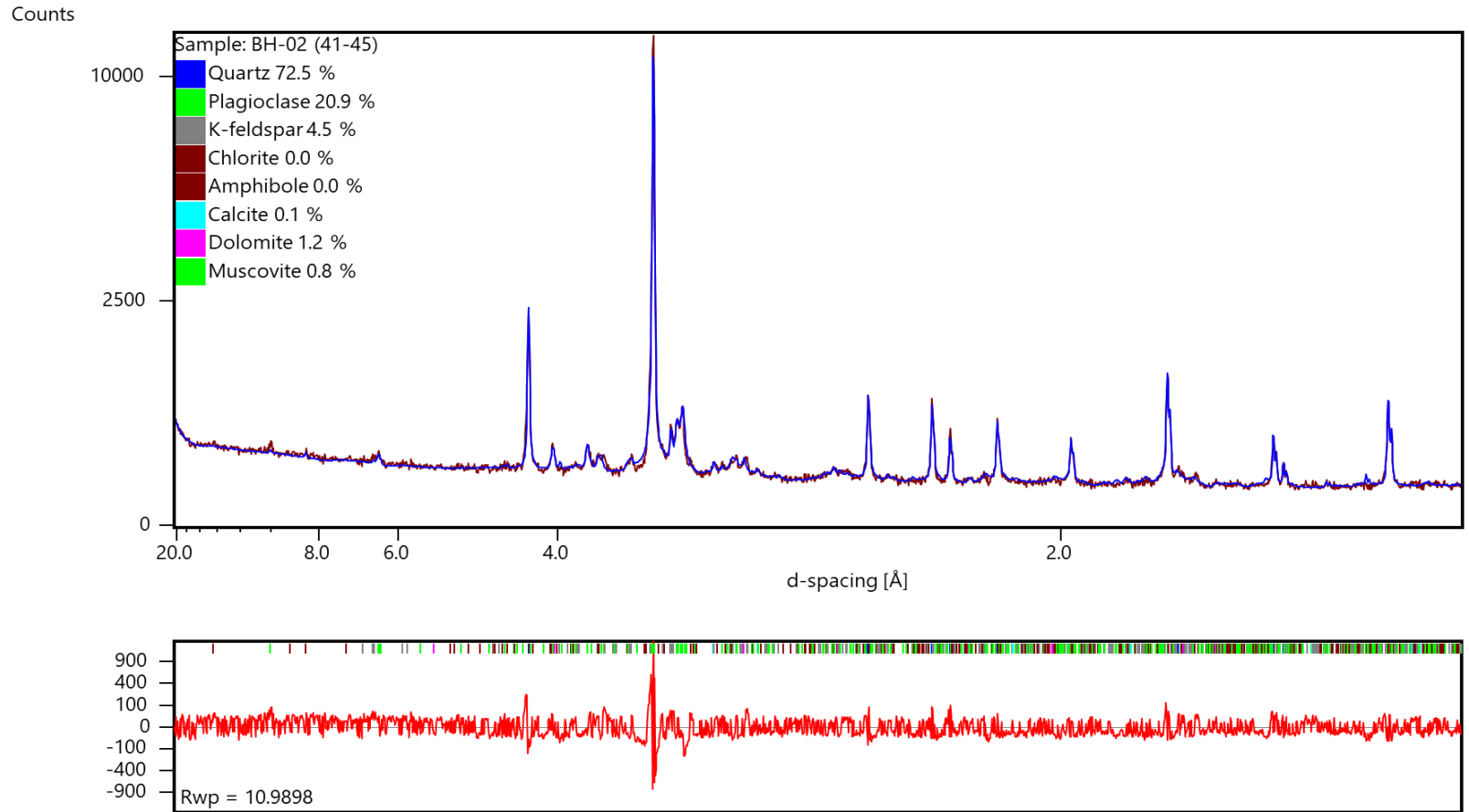
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).



X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).

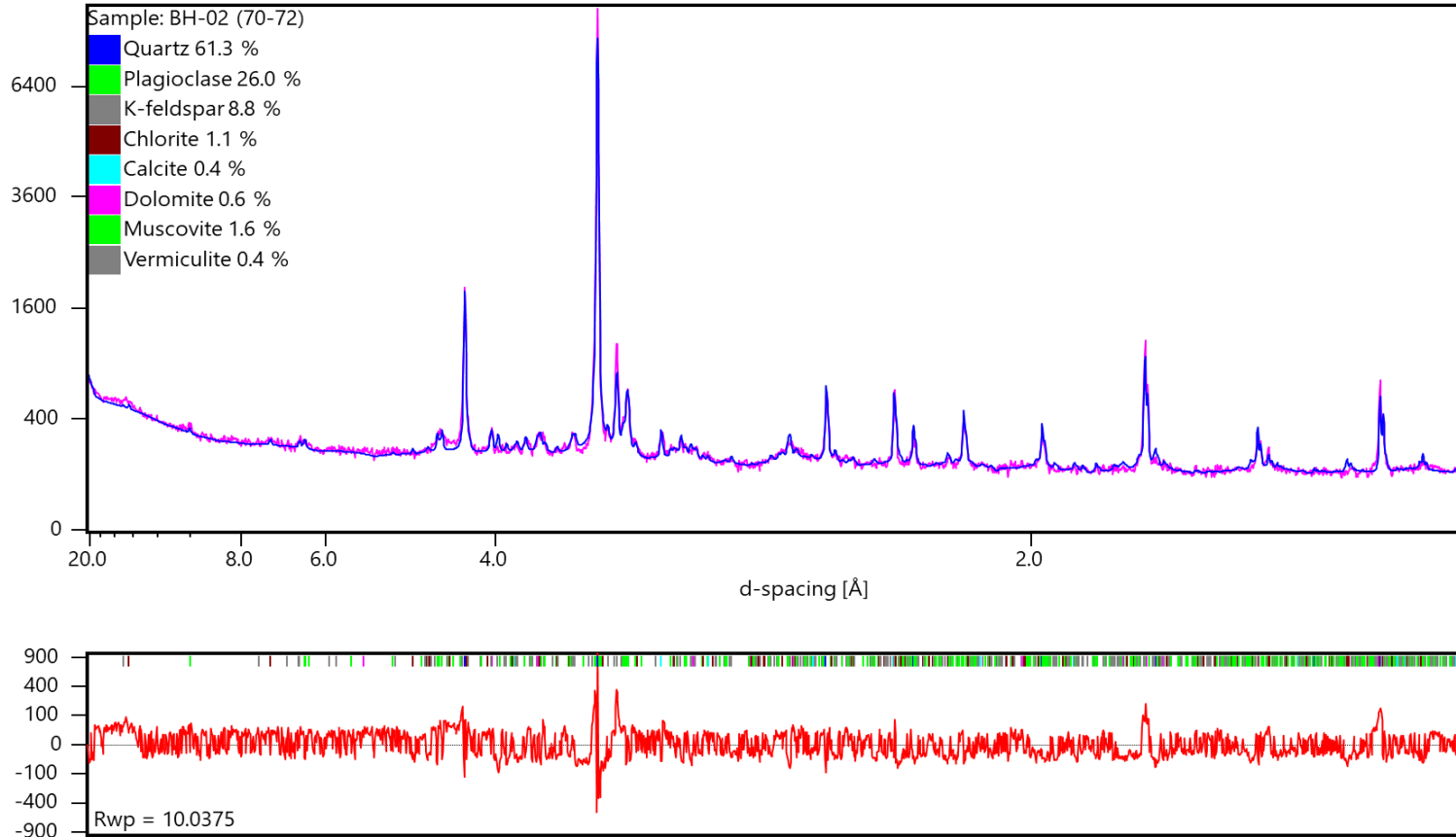


X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).

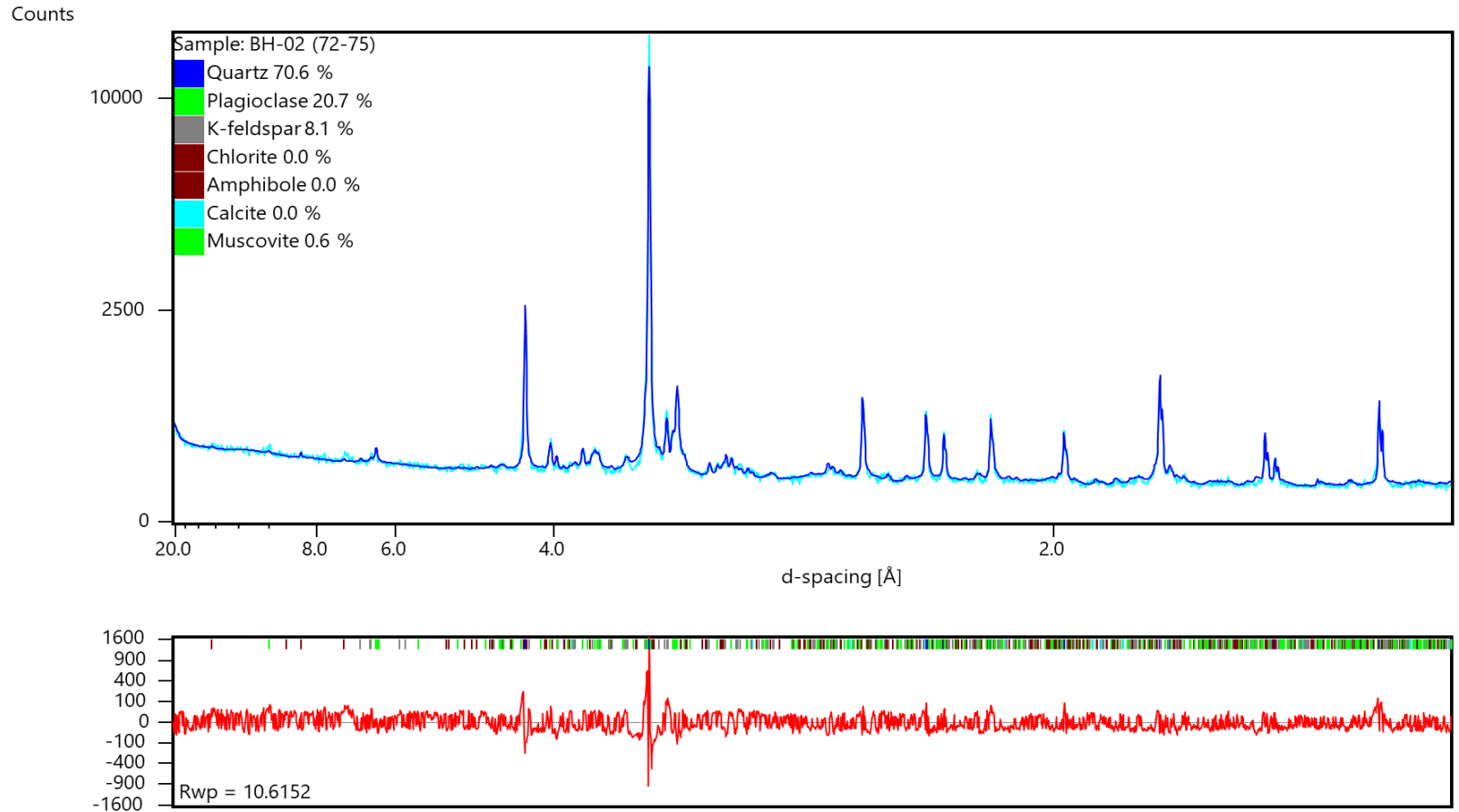


X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).

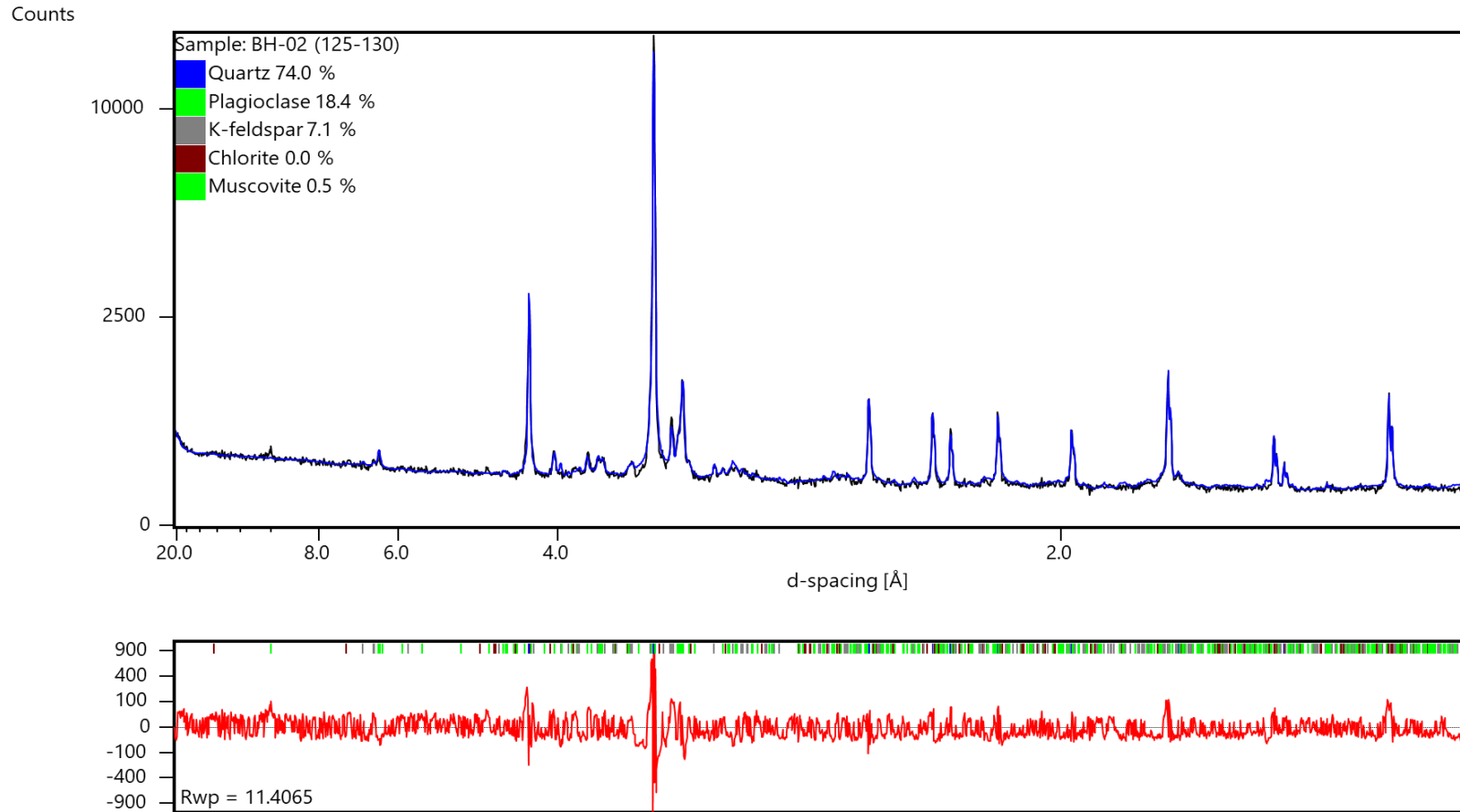
Counts



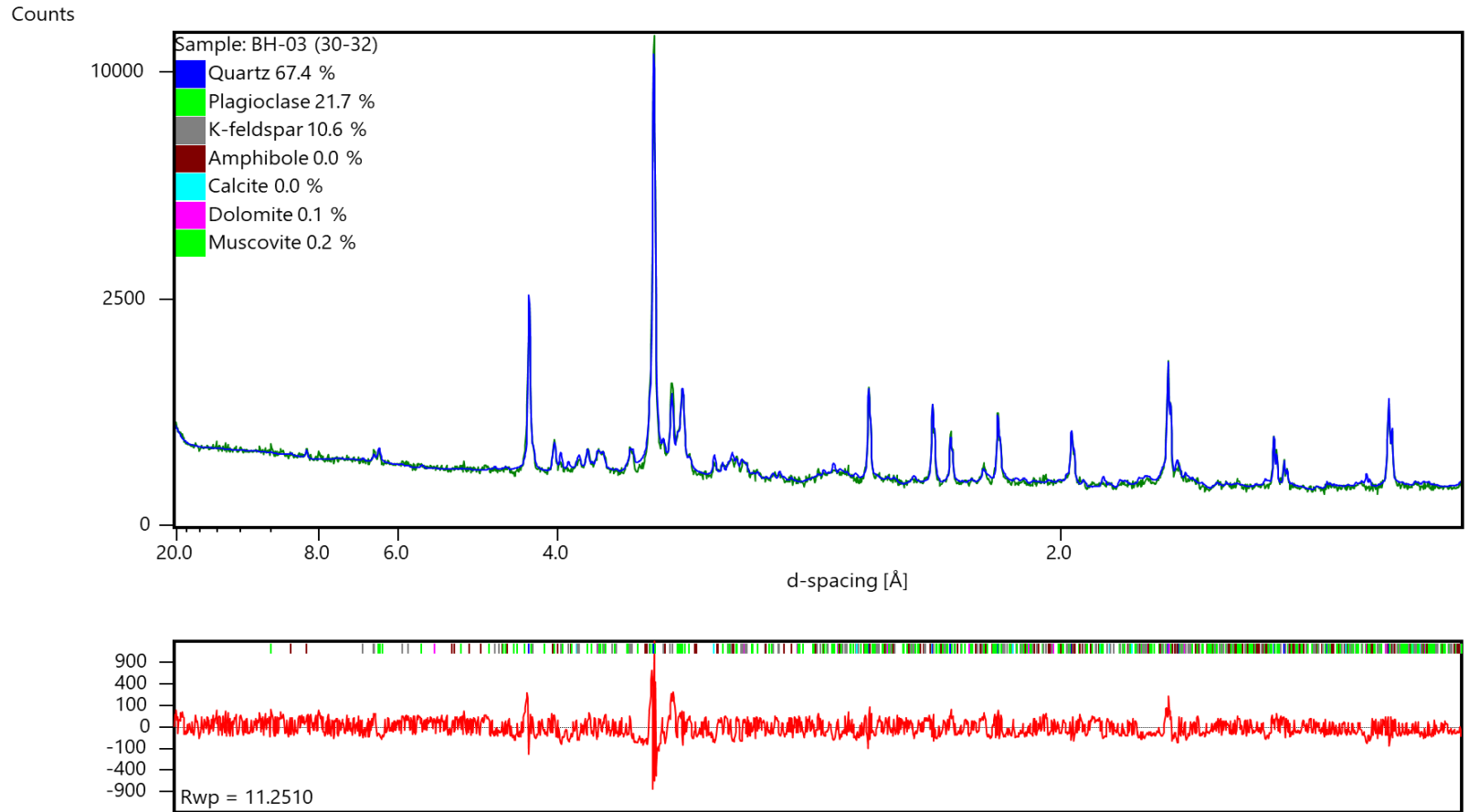
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).



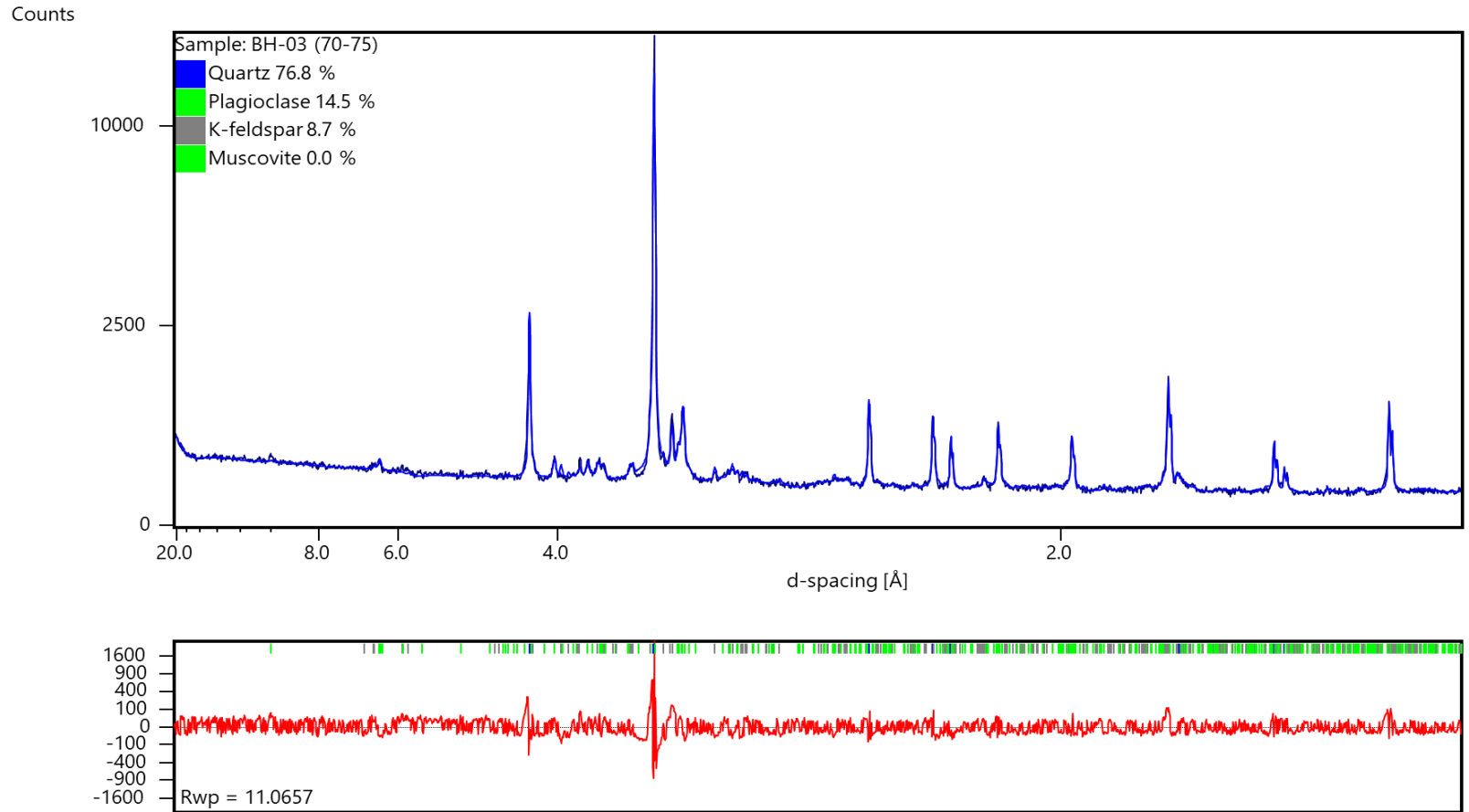
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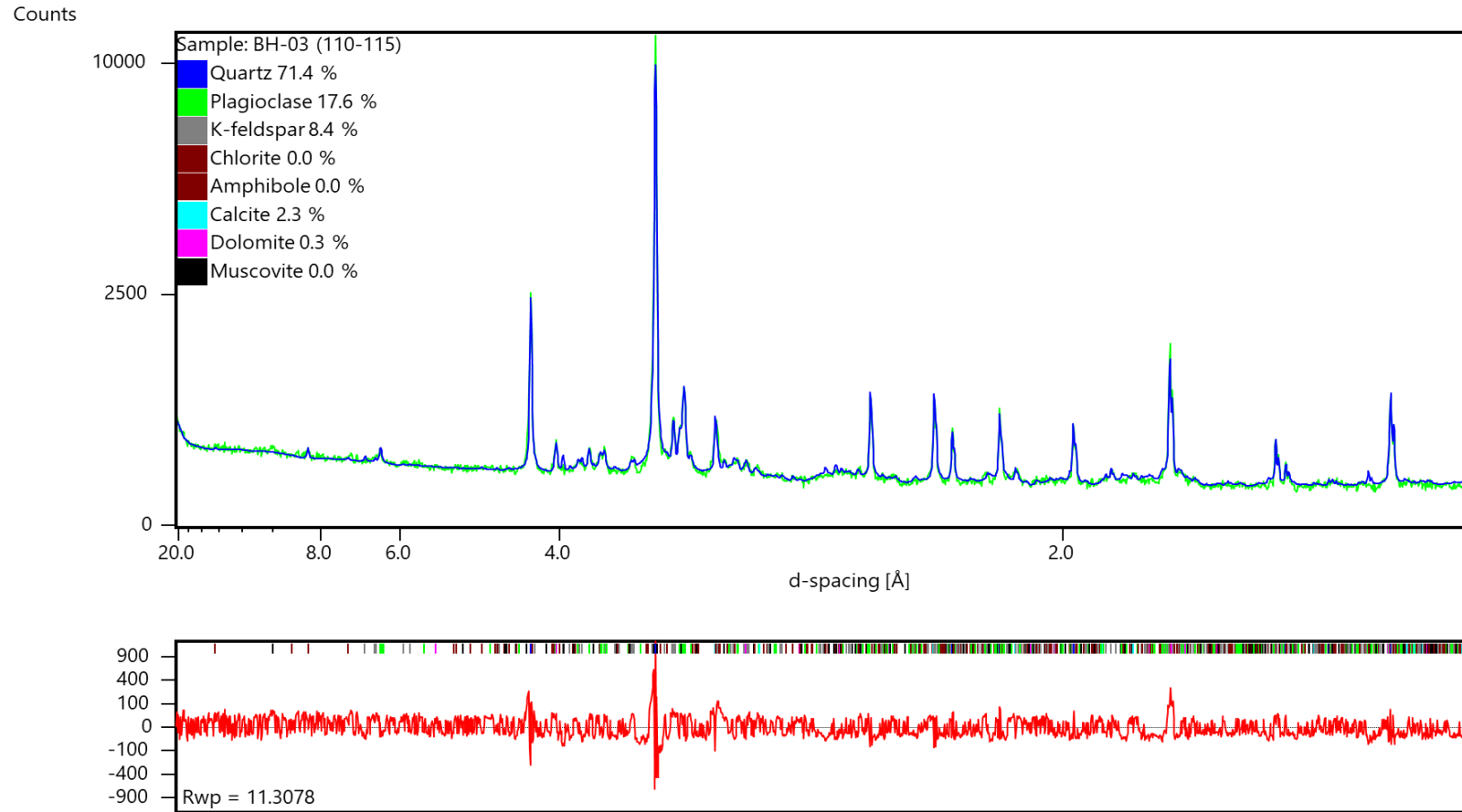
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X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement. The lower red curve is the difference plot with the weighted R profile value (Rwp).



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