REPORT

CCR ASSESSMENT OF CORRECTIVE MEASURES

Oak Grove Steam Electric Station - FGD Ponds
Robertson County, Texas

Submitted to:

Oak Grove Management Company LLC

Submitted by:

Golder Associates Inc.
2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664

+1 512 671-3434

19121403

September 2019

Table of Contents

1.0 INTRODUCTION 1

2.0 REGIONAL AND SITE SETTING 3

2.1 Regional Geology 3

2.2 Regional Hydrogeology 3

2.3 Site Hydrogeology and CCR Monitoring Well Network 3

3.0 NATURE AND EXTENT EVALUATION 5

3.1 Groundwater Monitoring Summary 5

3.2 Assessment Monitoring SSL Evaluation 5

3.3 Field Investigation 7

3.3.1 General 7

3.3.2 Soil Sample Collection 7

3.3.3 Monitoring Well Installation 8

3.3.4 Groundwater Sampling 8

3.4 Evaluation of Groundwater Data 8

3.4.1 Geochemical Modeling Approach 8

3.4.2 Summary of Groundwater Results 9

3.5 Evaluation of Soil 10

3.5.1 Mineralogical Composition 10

3.5.2 Chemical Composition and Sequential Extraction 10

3.6 Summary of Site Characterization 11

4.0 ASSESSMENT OF CORRECTIVE MEASURES 13

4.1 Corrective Measures Objectives and Evaluation Criteria 13

4.2 Potential Source Control Response Technologies 13

4.3 Potential Groundwater Response Technologies 14

4.3.1 Monitored Natural Attenuation 14

4.3.2 Groundwater Extraction and Treatment 15

4.3.3 Vertical Hydraulic Barrier 16
4.3.4 Permeable Reactive Barrier 17
4.3.5 In-situ Chemical Treatment 18
4.3.6 Phytoremediation 18
4.3.7 Screening of Potential Groundwater Response Technologies 19
4.4 Potential Corrective Measures Alternatives 19
4.5 Remedy Selection 19
5.0 REFERENCES 20

TABLES

Table 1 Appendix IV Groundwater Analytical Data Summary
Table 2 Screening of Potential Groundwater Response Technologies
Table 3 Evaluation of Corrective Measures Alternatives

FIGURES

Figure 1 Site Location Map
Figure 2 Detailed Site Plan
Figure 3 Geologic Cross Section A-A’
Figure 4 Geologic Cross Section B-B’
Figure 5 Geologic Cross Section C-C’
Figure 6 Potentiometric Surface Map – May 16-17, 2019
Figure 7 Extent of Appendix IV Constituents Detected at SSLs above GWPSs
Figure 8a General Groundwater Relative Ion Abundance in Groundwater
Figure 8b Select Ion Ratios (Magnesium, Sodium, and Sulfate) in Groundwater
Figure 9a Historical Trends of Cobalt in Monitoring Wells
Figure 9b Historical Trends of Lithium in Monitoring Wells

APPENDICES

Appendix A Boring Logs
Appendix B Laboratory Analytical Reports
Appendix C Groundwater Sampling Records

1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this assessment of corrective measures (ACM) report on behalf of Oak Grove Management Company LLC (Luminant) for FGD-A Pond, FGD-B Pond, and FGD-C Pond (collectively referred to as the "FGD Ponds") located at the Oak Grove Steam Electric Station (OGSES) in Robertson County, Texas (hereafter, the "Site"). The ACM was prepared in accordance with §257.96 of the Coal Combustion Residual (CCR) Rule and was required due to the presence of concentrations of selected Appendix IV constituents in the uppermost Site aquifer at statistically significant levels (SSLs) above the groundwater protection standards (GWPS) established for the constituents at the Site. This ACM Report will be placed in the OGSES operating record in accordance with §257.105(h)(10).

This report also incorporates the results of a site investigation conducted at the FGD Ponds in May and June 2019. The objectives of the site investigation were:

- delineate the nature and extent of the selected Appendix IV constituents to their respective GWPS;
- update the statistical evaluations of the Appendix IV constituents to include data collected during 2019 to confirm that SSL exceedances continue to occur at the Site;
- collect data to evaluate potential future alternate source demonstrations (ASDs) for the Appendix IV constituents; and
- assess the potential for monitored natural attenuation (MNA) to be successful at the Site for the Appendix IV constituents.

The OGSES is located approximately 10 miles north of the city of Franklin in Robertson County, Texas (Figure 1). Construction of the OGSES began in the mid-1980s; however, plant construction was suspended in the mid-1980s prior to completion. OGSES construction resumed in 2007 and the plant was commissioned in 2010. The OGSES is expected to remain in operation for the foreseeable future, depending on future power demands.

The FGD Ponds are located approximately 2,500 feet northwest of the OGSES power generation units (Figure 2). FGD-A Pond construction began in the mid-1980s, but pond construction stopped when construction of the OGSES as suspended (Golder 2016a). FGD-A construction resumed in 2007 and was completed in 2008. The FGD-A Pond covers an area of approximately 9.5 acres and stores CCR and other wastes generated from the OGSES prior to recycling or disposal in OGSES Ash Landfill 1. FGD-A is lined with a 3-foot thick compacted clay liner (Golder 2016b). FGD-A was formerly considered a lined CCR surface impoundment in accordance with §257.71(a)(1)(i) of the CCR Rule; however, the pond is now considered an unlined impoundment based on the August 2018 DC Circuit Court Ruling.

Construction began on the FGD-B Pond in the mid-1980s during the initial OGSES construction phase for use as a storm water retention pond. Pond construction was halted in the 1980s when construction of the OGSES was suspended. The former retention pond was reconstructed in 2012 as FGD-B Pond for use in management of CCR and other wastes (Golder 2016a). FGD-B covers an area of approximately 12 acres in size and receives CCR and other wastes generated from the OGSES similar to the FGD-A Pond. FGD-B is constructed with a composite liner consisting of a minimum 2-foot thick compacted clay liner, overlain be a 60-mil HDPE geomembrane liner, overlain by a 1-foot thick layer of protective soil. (Golder 2016b). The composite liner system in FGD-B complies with the requirements of §257.71(a)(1)(ii) of the CCR Rule and the pond is considered a lined surface impoundment under the CCR Rule.

FGD-C Pond construction commenced in 2015 and was completed in 2016 (Golder 2016a). FGD-C Pond is approximately 25 acres in size and receives CCR and other wastes generated from the OGSES, similar to the FGD-A and FGD-B Ponds. FGD-C is constructed with a composite liner consisting of a minimum 2-foot thick compacted clay liner, overlain by a 60-mil HDPE geomembrane liner, overlain by a 2-foot thick soil/ash protective layer (Golder 2016b). The composite liner system in FGD-C complies with the requirements of §257.71(a)(1)(ii) of the CCR Rule and the pond is considered a lined surface impoundment under the CCR Rule.

2.0 REGIONAL AND SITE SETTING

2.1 Regional Geology

The Site is located in the outcrop area of the Eocene-aged Wilcox Group (Barnes 1970), which is divided into three formations in the region: the Calvert Bluff, Simsboro, and Hooper Formations (in order from youngest to oldest). The FGD Ponds are completed in the Calvert Bluff Formation, which consists mostly of unconsolidated to moderately consolidated clay and silt, with various amounts of interbedded sand and lignite. The depositional environment of the Calvert Bluff Formation is associated with fluvial-deltaic processes such as inter-channel crevasse splays, overbank deposits, and localized channel fills. The Simsboro Formation, which underlies the Calvert Bluff Formation, consists mostly of sand (locally indurated) with some clay, mudstone, and mudstone conglomerates. The Hooper Formation, which underlies the Simsboro Formation, consists mostly of mudstone with various amounts of sandstone and minor amounts of lignite.

2.2 Regional Hydrogeology

Groundwater wells completed in the channel sands of the Calvert Bluff Formation are typically used for domestic and stock watering purposes. Groundwater within the upper 100 feet below ground surface (bgs) in the region typically flows under unconfined to semi-confined conditions. The direction and rate of groundwater movement in the Calvert Bluff Formation are affected by a number of physical features, including topography, surface drainage, and geology. The natural groundwater potentiometric surface in these shallow flow systems is generally a subdued replica of topography. In general, groundwater flow occurs from high potentiometric areas (recharge zones) toward valleys (discharge zones). Groundwater divides generally coincide with surface drainage divides.

2.3 Site Hydrogeology and CCR Monitoring Well Network

The CCR groundwater monitoring well network at the FGD Ponds was established in 2015 using pre-existing Site monitoring wells (FGD-1, FGD-2, FGD-3, FGD-4, FGD-5, FGD-6, FGD-8, FGD-11, and FGD-12), which are each screened in the uppermost groundwater-bearing unit (GWBU) of the Calvert Bluff Formation (Figure 2). Pre-existing monitoring well FGD-14 and newly installed monitoring wells FGD-15 and FGD-16 were also monitored in 2019 as part of the nature and extent evaluation. Boring logs for the CCR monitoring wells and nature and extent wells are provided in Appendix A. Based on soil borings completed at the Site, the geology near the unit generally consists of an upper zone of relatively thick, interbedded sand and clay strata, which is underlain by a lower zone of interbedded silty to clayey sand and well sorted sand. The uppermost GWBU occurs under unconfined conditions within the shallow sand units at the Site. Geologic cross sections of the FGD Ponds are presented on Figures 3, 4, and 5.

Groundwater elevations are generally highest near the western side of the OGSES Ash Landfill I, which is located southeast of the FGD Ponds at the Site. A groundwater potentiometric map constructed using groundwater elevation data collected in May 2019 from the CCR monitoring networks for the FGD Ponds and Ash Landfill I is presented on Figure 6. Since CCR monitoring began in 2015, the inferred groundwater flow direction at the Site has been to the east-northeast. The groundwater gradient in the area of the FGD Ponds is relatively flat. Based on the inferred groundwater flow direction and the timing of pond construction, the location of each CCR monitoring well relative to the FGD Ponds is as follows:

Upgradient/Background Wells	Downgradient Wells
FGD-8 FGD-11	FGD-1 FGD-2 FGD-3 FGD-4 FGD-5 FGD-6 FGD-12

Rising- and falling-head aquifer tests (i.e., slug tests) were conducted in 2015 at monitoring wells FGD-5, FGD-11, and FGD-12 to evaluate lateral groundwater flow velocities of the uppermost GWBU. The test methods and results were documented in the CCR Groundwater System Certification Report for the Site (PBW 2017a). Based on the test results, the uppermost GWBU has an estimated horizontal hydraulic conductivity value of 4.2E-04 cm/sec and an estimated lateral groundwater flow velocity of about 2 feet per year.

Golder performed a survey of water supply wells located in the vicinity of the FGD Ponds in May 2019 as part of a Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) assessment of the Site. A Drinking Water Survey Report (Golder, 2019) documenting the water well survey activities and findings was approved by the TCEQ in a letter dated August 12, 2019. No imminent threats to water wells or potentially affected drinking water wells were identified.

3.0 NATURE AND EXTENT EVALUATION

3.1 Groundwater Monitoring Summary

Background monitoring of groundwater in the vicinity of the FGD Ponds began in November 2015 and was completed in December 2016. Samples collected during this period were analyzed for Appendix III and Appendix IV constituents to establish background concentrations pursuant to §257.94(b).

A detection monitoring program in accordance with §257.94 was initiated in September 2017. The evaluation of those data was completed in 2018 using procedures described in the Statistical Analysis Plan (PBW 2017b) to identify statistically significant increases (SSIs) of Appendix III parameters above background concentrations. Based on the identification of SSIs for one or more Appendix III parameters, an assessment monitoring program was established pursuant to §257.94(e)(1).

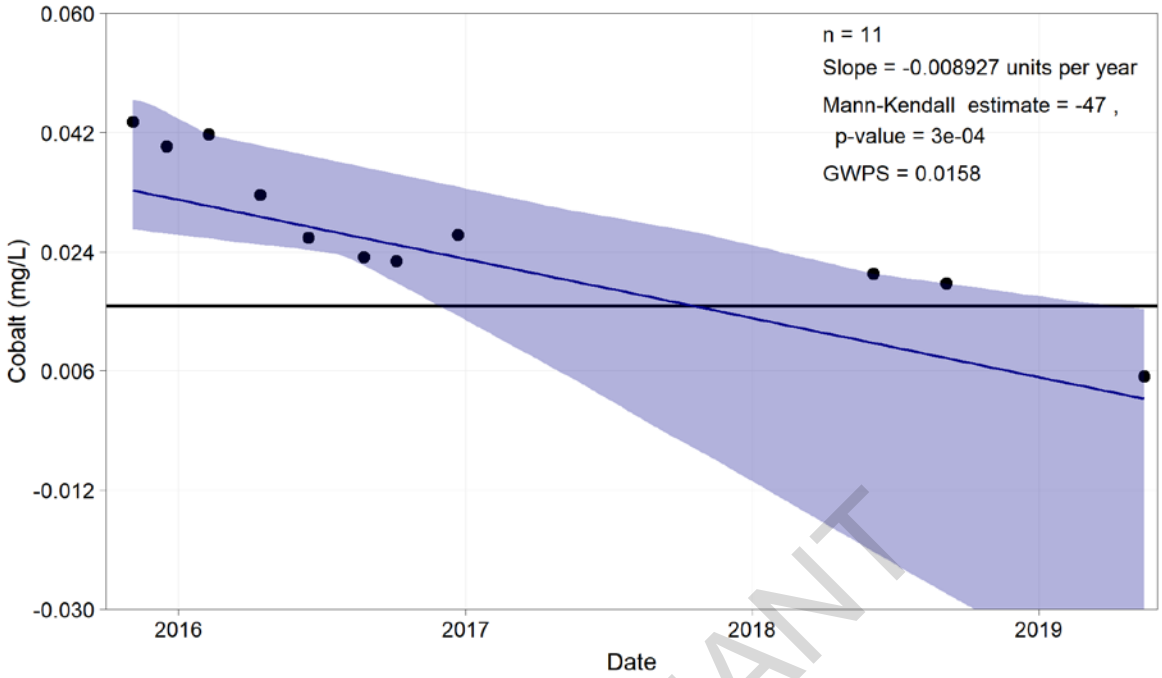
The initial assessment monitoring event was conducted in June 2018 and a subsequent semi-annual assessment monitoring event was conducted in September 2018 in accordance with §257.95(a) and §257.95(d). Using the Appendix IV data collected during the assessment monitoring period through September 2018, SSLs above GWPSs were initially identified in January 2019 for cobalt and lithium in downgradient monitoring wells FGD-3 for cobalt and FGD-5 for lithium (Figure 7); therefore, an ACM was initiated on April 8, 2019 pursuant to §257.95(g). A justification letter for a 60-day extension due to site-specific circumstances that delayed work on the ACM was certified on July 3, 2019 in accordance with §257.96(a). Based on the extension, the deadline for completing the ACM is September 5, 2019.

3.2 Assessment Monitoring SSL Evaluation

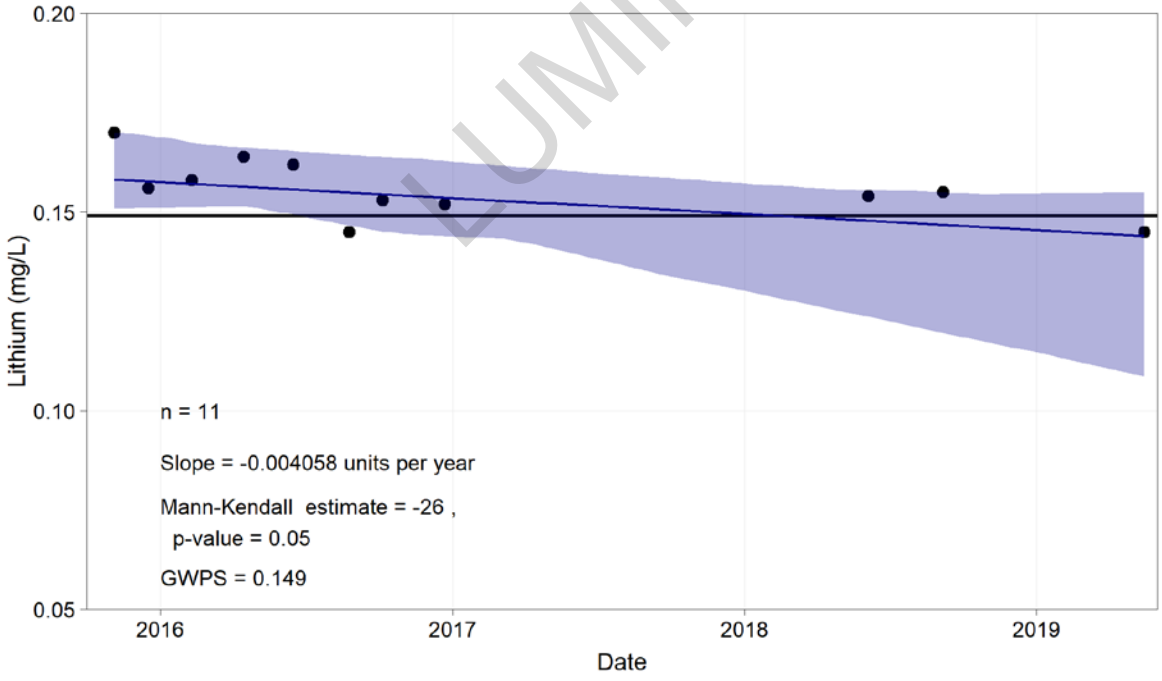
An additional assessment monitoring event was performed in May 2019. Groundwater sampling analytical results for all Appendix IV parameters from 2015 through 2019 are presented in Table 1. An updated statistical analysis of the Appendix IV results from downgradient CCR monitoring wells was performed including the May 2019 data to evaluate if constituent concentrations detected in the samples remained at SSLs relative to the GWPSs. The updated statistical analysis was performed in accordance with the Statistical Analysis Plan for CCR Groundwater Monitoring (PBW 2017b) and the USEPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities-Unified Guidance (USEPA 2009). The GWPS for cobalt and lithium were set at 0.0158 mg/L and 0.149 mg/L, respectively, based on background concentrations in wells FGD-8 and FGD-11.

The previous statistical analysis indicated concentrations of cobalt and lithium at SSLs above their respective GWPSs as identified in the February 2019 SSL notification; however, the updated statistical analysis concluded that no Appendix IV parameters were present at concentrations above their GWPSs, including cobalt and lithium. A Sen's slope analysis with 95% confidence intervals was conducted for cobalt and lithium to evaluate concentration trends for these parameters since they historically had more than one occurrence of values higher than the GWPS. Plots of the Sen's slope analysis with 95% confidence intervals are provided below:

Sen's Slope analysis for Cobalt at FGD-3



Sen's Slope analysis for Lithium at FGD-5



The Sen's slope analysis, in accordance with the USEPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities-Unified Guidance, indicated that cobalt and lithium concentrations in FGD-3 and FGD-5 were not present at SSLs above GWPSs. However, cobalt and lithium concentrations in these wells will continue to be

monitored to confirm that cobalt and lithium concentrations will remain below SSLs in the future in accordance with the CCR Rule. For the purposes of this ACM evaluation, cobalt and lithium concentrations are conservatively assumed to be present at SSLs above their respective GWPSs in wells FGD-3 (cobalt) and FGD-5 (lithium) based on the February 2019 SSL notification.

3.3 Field Investigation

3.3.1 General

Field investigation activities conducted as part of the ACM included collection of soil samples for a mineralogical assessment and chemical analysis, nature and extent monitoring well installation and development, groundwater-level measurements, and groundwater sampling and analysis. Figure 2 presents the locations of soil borings and monitoring wells installed and sampled as part of the field investigation.

3.3.2 Soil Sample Collection

Soil borings were completed in June 2019 at proposed nature and extent monitoring well locations FGD-15 and FGD-16, and from a location near well FGD-3 (soil boring FGD-2019-1). Soil samples were collected within the target GWBU in each of the soil borings. Soil samples were submitted under chain-of-custody for laboratory analysis of the following parameters:

- Mineralogical composition: The purpose of the mineralogical analysis was to identify and quantify the crystalline mineral phases in each sample. This information is required for geochemical modeling as the release or attenuation of constituents of interest is influenced by the mineral phase(s) present in the aquifer (Hem 1985). The mineralogical testing laboratory (SGS Minerals Services) performed the analysis using quantitative (Rietveld) X-ray diffraction (XRD) (ME-LR-MIN-MET-MN-DO5) and a Bruker AXS D8 Advance Diffractometer.
- Total metals: Analysis of total metals was conducted to quantify the chemical composition of soil materials. The total mass of metals, in combination with the results of sequential extraction testing, can be used to determine the provenance of metals and verify sequential extraction results.
- Sequential extraction (SEP): This test consists of a seven-step metals extraction from solids as per Tessier et al. (1979) to identify the provenance of constituents of interest (i.e. the operationally-defined fraction that contains the metal)[1] and determine their potential environmental mobility. For instance, metals bound in the carbonate fraction, or that are exchangeable, are much more likely to become mobile due to changes in groundwater conditions than metals bound within a sulfide or silicate fraction. The total concentration of a

[1] Sequential extraction of metals from soil samples consisted of seven discrete steps for this investigation:
Step 1 - Exchangeable Fraction: This extraction includes trace elements that are reversibly adsorbed to soil minerals, amorphous solids, and/or organic material by electrostatic forces.

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

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

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

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

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

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

metal measured from all seven steps can be compared to the concentration determined from the total metal analysis for compositional accountability.

3.3.3 Monitoring Well Installation

Two new nature and extent monitoring wells were completed at FGD-15 and FGD-16 to total depths of 35 feet bgs and 40 feet bgs, respectively. The wells were constructed of 2-inch diameter, schedule 40 PVC casing and 0.010-inch slotted screen. Annular materials consisted of a sand/gravel pack around the screened interval, a bentonite seal above the sand/gravel pack, and grout or bentonite chips to ground surface. Surface completions consisted of a concrete pad, protective steel casing stickup, and guard posts. The monitoring wells were developed by surging the wells several times and purging the wells using an electric submersible pump to remove fine-sized particles and to establish a hydraulic connection between the well and the formation.

An existing monitoring well not previously part of the CCR monitoring program (FGD-14) was used as a third nature and extent well.

3.3.4 Groundwater Sampling

Groundwater samples were collected from the CCR monitoring network in May 2019 and from the nature and extent wells in May and June 2019. Laboratory analytical reports are provided in Appendix B and groundwater sampling records, which include field-measured parameters, are provided in Appendix C.

Chemical/geochemical analysis of groundwater samples included field parameters and radionuclides, nutrients, and major cations and anions. The rationale and methods used are as follows:

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

3.4 Evaluation of Groundwater Data

3.4.1 Geochemical Modeling Approach

Geochemical modeling was conducted to evaluate general groundwater quality, determine the potential for precipitation of sorbent media, evaluate the potential for mineral precipitation or adsorption in the aquifer, and determine the speciation of metals of interest. The geochemical computer code developed by the United States Geological Survey (USGS), PHREEQC, was used for these simulations (Parkhurst and Appelo 2013). PHREEQC version 3.4 is a general-purpose geochemical modeling code used to simulate reactions in water and between water and solid mineral phases (e.g., rocks and sediments). Reactions include aqueous equilibria, mineral dissolution and precipitation, ion exchange, surface complexation, solid solutions, gas-water equilibrium, and kinetic biogeochemical reactions. The widely-accepted thermodynamic database Minteq.v4, 2017 edition, was used as a basis for the thermodynamic constants required for modeling.

The Geochemist's Workbench Version 12 (Bethke 2015) was used to generate graphical representations of geochemical modeling outputs in the form of predominance, or Pourbaix diagrams (also known as Eh-pH diagrams) for the species of interest (i.e. cobalt and lithium) and trilinear plots (also known as Piper plots) displaying the relative abundance of major ions. The Minteq.v4 database was used as the basis for the Pourbaix diagrams.

3.4.2 Summary of Groundwater Results

Groundwater quality data from background wells FGD-8 and FGD-11; monitoring wells FGD-1, FGD-2, FGD-3, FGD-4, FGD-5, FGD-6, and FGD-12; and nature and extent monitoring wells FGD-14, FGD-15, and FGD-16 were used for this evaluation. The water quality monitoring data are presented in Appendices B and C and can be summarized as follows:

General Chemistry Parameters

- pH: The pH of groundwater samples collected from monitoring and nature and extent wells ranged from 6.46 to 6.86 across the site in May and June 2019. Historically, pH was lowest in June of 2018, at 5.58 in FGD-1 and the highest pH measured in groundwater was 7.12 in FGD-6 in February 2016. No geographical trend in pH was discernable in groundwater samples.
- ORP (Redox): Field-measured redox values in May and June 2019, corrected to Eh (+200mV), ranged from +144 to +181 mV in the groundwater samples in the CCR monitoring well network. The Eh of groundwater in the nature and extent monitoring wells ranged from +168 mV to +193 mV, indicating that redox conditions were similar to those in the CCR monitoring network wells.
- Total Dissolved Solids (TDS): Groundwater TDS concentrations were variable in May 2019 in the CCR monitoring and nature and extent well network. The lowest TDS concentrations (140 mg/L) occurred in groundwater at CCR monitoring well FGD-12. The highest measured TDS in groundwater (3970 mg/L) was observed in CCR monitoring well FGD-8. The TDS in groundwater of the nature and extent network ranged from 325 mg/L to 2880 mg/L in wells FGD-16 and FGD-15, respectively. Geographically, the highest TDS wells, FGD-8 and FGD-15 are located on opposite sides of the FGD Pond area.
- Major ion chemistry: A Piper plot was generated for groundwater samples to facilitate the identification of water types and source contributions (Figure 8a). Generally speaking, background, downgradient, and nature and extent wells plotted in a region of the trilinear plot separate from the FGD Pond water samples. Upon further investigation of three specific ions (sulfate, magnesium, and sodium) (Figure 8b), the difference between groundwater from CCR monitoring wells and nature and extent wells and FGD Pond water becomes more apparent. Based on the molar ratios of these ions, it is apparent that the groundwater in downgradient and nature and extent wells is similar to that of upgradient, background locations.

Constituents Identified in February 2019 SSL Notification

- Cobalt: Cobalt concentrations in groundwater samples from nature and extent wells or CCR monitoring network wells did not exceed the GWPS for cobalt in May and June 2019. The cobalt concentration in groundwater collected from the downgradient nature and extent monitoring well FGD-14 was non-detect (<0.003 mg/L) in May 2019. Cobalt in groundwater across the entire monitoring network was lowest in downgradient wells; the highest concentration was measured at 0.0132 mg/L in FGD-6 in May 2019. The highest cobalt in groundwater measured in May to June 2019 was in FGD-8, an upgradient background well,

at 0.0146 mg/L, but still below the GWPS. The cobalt concentration in FGD-3, where previous exceedances of the GWPS occurred, was below the GWPS in the latest samples (Figure 9a).

- Lithium: Lithium concentrations in groundwater samples collected from the nature and extent and CCR monitoring well networks were all below the GWPS in May and June 2019. Lithium levels in nature and extent wells ranged from 0.0056 mg/L to 0.0768 mg/L in FGD-14 and FGD-15, respectively. The lithium concentration in groundwater from well FGD-14, which is the nature and extent well downgradient closest to the FGD Ponds, was just above detection limit of 0.005 mg/L at 0.0056 mg/L, and over an order of magnitude below the GWPS. The concentration in FGD-5, where historical GWPS occurrences occurred, was below the GWPS during the May 2019 sampling (Figure 9b).

Recent groundwater data at the Site indicate that all Appendix IV parameters are currently below their respective GWPS. Although, as discussed previously in Section 3,2, cobalt and lithium have historically been detected at concentrations above their respective GWPSs, it is considered highly likely that the cobalt and lithium originated from a natural source, rather than the FGD Pond based on major ion chemistry.

3.5 Evaluation of Soil

3.5.1 Mineralogical Composition

Quantitative X-ray diffraction (XRD) with Rietveld refinement was used to identify and quantify minerals in three overburden samples collected during the drilling activities - one sample from each of the soil borings completed in June 2019 (FGD-15, FGD-16, and FGD-2019-1). These samples were obtained to better understand the mineralogical composition of the aquifer system and identify any minerals that would potentially influence attenuation of constituents of interest. In contrast, the presence of certain minerals could also indicate a potential for naturally-occurring release of metals into groundwater, for instance due to oxidation of sulfide minerals.

The mineralogical analysis identified the materials in boreholes samples at the FGD Ponds predominately consist of quartz with varying amounts of the silicate minerals K-feldspar, plagioclase, and muscovite. A trace amount of magnesite [$MgCO_3$] was encountered in one sample. Analytical reports for the XRD samples are provided in Appendix B.

3.5.2 Chemical Composition and Sequential Extraction

Chemical analysis and sequential extractions were used to determine the chemical composition of the soil and the distribution of constituents of interest over various operationally-defined fractions comprising the soil. Testing was completed as described in Section 3.3.2 on soil samples obtained from three borehole locations (Figure 2) and the analytical reports for the soil analyses are provided in Appendix B.

Soil sample locations were chosen to gain a better understanding of the underlying geological conditions of the area surrounding the FGD Ponds, mostly adjacent to or downgradient of a CCR monitoring well. In addition, this information allows for a better understanding of naturally-occurring metal contributions to groundwater or the potential for sequestration of constituents from groundwater.

A description of the individual fractions determined by sequential extraction is presented in Section 3.3.2. Metals extracted in steps 1 through 5 are considered environmentally available, whereas metals extracted in steps 6 and 7 are present in refractory fractions and are not expected to be released under conditions typically encountered in aquifers (Tessier et al. 1979). Total metal quantities from the sequential extraction are expressed as “SEP Total”

in Appendix B. The sum of the sequential extraction steps is also presented for comparison but does not represent an analytically-determined value.

The results from the chemical analysis and sequential extraction presented in Appendix B are summarized as follows:

General Chemistry Parameters

- Aluminum: Aluminum is not a constituent of interest (COI) at the site but it has been well studied as a sorbing medium in soils (e.g., Karamalidis and Dzombak 2011). Total aluminum in soils ranged from 29,890 mg/kg to 41,270 mg/kg, and the environmentally-available fraction ranged from just 690 mg/kg (FGD-15) to 1,927 mg/kg (FGD-2019-1). Aluminum in the soil at the site is, therefore, largely (~88% to 94%) present in the residual, or silicate-bound fraction. This fraction is likely at least partially represented by hydrous aluminum phyllosilicates minerals or clays intermixed in the silica sand matrix. Clays can represent an important sorptive reservoir for numerous trace metals and metalloids (Uddin 2017).
- Iron: While not a COI, iron and its minerals commonly represent one of most abundant reservoirs for metal/metalloid attenuation in soils (Dzombak and Morel 1990; Smith 1999). Iron was present in all three core samples analyzed, varying from 5,458 mg/kg (FGD-15) to 8,961 mg/kg (FGD-2019-1). In all samples, the sulfide and residual fractions accounted for the largest proportion of total iron (61% to 73%) and, as such, most of the iron is not environmentally available. However, the remainder of the iron in the samples is largely present in the metal hydroxide phase (+/-1%). This fraction, part of the labile fraction in steps 1 through 5, can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be used as a proxy to determine the potential for attenuation of cobalt and lithium, along with aluminum.

Constituents Identified in February 2019 SSL Notification

- Cobalt: Total cobalt in soil ranged from 1.8 mg/kg to 69.9 mg/kg while the environmentally-available fraction ranged from 1.0 mg/kg in FGD-15 to 67.6 mg/kg in FGD-2019-1, representing from 58% to 97% of total cobalt. Cobalt in FGD-2019-1 was well above the level that would be considered naturally occurring in typical soils and rock (Hem 1985), with almost all cobalt associated with the metal hydroxide and amorphous metal fractions. Although cobalt was present in the soil of FGD-2019-1 at higher level compared to other soils samples, cobalt concentrations in groundwater from FGD-3 and FGD-14, the closest wells next to and downgradient of FGD-2019-1, respectively, were non-detect, or just above the detection limit of 0.005 mg/L.
- Lithium: Total lithium in soil ranged from 8.74 mg/kg to 19.9 mg/kg, of which between 76% and 97% of the lithium occurred in the non-environmentally-available fraction. All lithium that was environmentally available (0.27 mg/kg to 4.7 mg/kg) was present in the amorphous metal and metal hydroxide fractions.

Based on the results from the soil analysis, there is a high likelihood of naturally occurring or alternate sources of the cobalt and lithium observed in groundwater at the Site, as represented by the non-environmentally-available fractions.

3.6 Summary of Site Characterization

Based on the above site characterization and nature and extent investigation, the following is concluded with respect to cobalt and lithium:

- Cobalt: Recent data indicates that cobalt concentrations in all CCR monitoring wells and nature and extent wells are currently below its GWPS. A Sen's slope analysis for FGD-3, where cobalt has historically exceeded the GWPS, confirms the decreasing trend in cobalt groundwater concentrations. Cobalt present in the non-environmentally available fraction of soils represents a likely alternate source of cobalt in groundwater. The presence of metal hydroxides in soils also supports a strong potential for cobalt attenuation (Smith 1999), which was confirmed by the sequential extraction results. Based on the data collected to date, cobalt concentrations are no longer considered to be present at an SSL above the GWPS; however, cobalt concentrations in groundwater will continue to be monitored to confirm that cobalt levels remain below the GWPS in the future. For the purposes of this ACM evaluation, cobalt concentrations are conservatively assumed to be present at an SSL above the GWPS in well FGD-3 based on the February 2019 SSL notification.
- Lithium: Based on recent data, the concentration of lithium statistically no longer exceeds the GWPS in groundwater at any monitoring well. A Sen's slope analysis confirms the decreasing trend in FGD-5 for lithium. Further, an abundance of lithium exists in soils in the non-environmentally-available fractions, indicating a likely alternate source of lithium. In addition, lithium in groundwater is limited in extent, and is potentially being attenuated by amorphous metals, metal hydroxides or in clays (Smith 1999), as confirmed by sequential extraction testing of soil samples. Based on the data collected to date, lithium concentrations are no longer considered to be present at an SSL above the GWPS; however, lithium concentrations in groundwater will continue to be monitored to confirm that lithium levels remain below the GWPS in the future. For the purposes of this ACM evaluation, lithium concentrations are conservatively assumed to be present at an SSL above the GWPS in well FGD-5 based on the February 2019 SSL notification.

4.0 ASSESSMENT OF CORRECTIVE MEASURES

In accordance with §257.96 and §257.97, an ACM was conducted for the FGD Ponds to address concentrations of the following Appendix IV constituents that are conservatively assumed to occur at SSLs above their respective GWPS based on the February 2019 SSL notification:

- cobalt concentrations in monitoring well FGD-3; and
- lithium concentrations in monitoring well FGD-5.

Potential response technologies were identified for Source Control (to reduce the potential for releases of constituents to groundwater) and Groundwater Response Actions (to reduce constituent concentrations below GWPS). The potential response technologies were then screened to identify options that are appropriate for further consideration in developing potential corrective measures alternatives for the Site. The results of the ACM are presented in this section.

4.1 Corrective Measures Objectives and Evaluation Criteria

As described in §257.96(a), the corrective measures must prevent further releases, remediate any releases and restore the affected area to original conditions. Potential corrective measures must meet the requirements specified in §257.97(b):

1) Be protective of human health and the environment;
2) Attain the groundwater protection standard as specified pursuant to § 257.95(h);
3) Control the source(s) of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment;
4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, considering factors such as avoiding inappropriate disturbance of sensitive ecosystems;
5) Comply with standards for management of wastes as specified in § 257.98(d).

In accordance with §257.96(c), the assessment of potential corrective measures alternatives must include an evaluation of the following:

1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination
2) The time required to begin and complete the remedy
3) Institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s).

4.2 Potential Source Control Response Technologies

As discussed in Section 3.5, there is a high likelihood of naturally-occurring or alternate sources of the cobalt and lithium observed in groundwater at the Site and the FGD Ponds are not the source of these constituents; however, for the purposes of this ACM, it is assumed that some degree of source control will be considered for

the FGD Ponds, since one of the listed objectives in §257.97(b) for the corrective measures is to control the source of releases of Appendix IV constituents to the environment from the CCR Unit. The OGSES FGD Ponds are an integral part of the CCR management system at the plant. As a result, potential source control technologies will be designed to keep the FGD Ponds in operation.

FGD-B and FGD-C are constructed with composite liner systems that comply with the requirements of §257.71(a)(1)(ii) of the CCR Rule and these ponds are considered lined surface impoundments under the Rule. Since the liner systems in these ponds comply with the CCR Rule, FGD-B and FGD-C provide an appropriate level of source control as currently constructed and no modifications are necessary to these ponds.

FGD-A is constructed with a clay liner and the pond is considered an unlined surface impoundment based on the August 2018 DC Circuit Court Ruling. As a result, FGD-A will be retrofitted with a new composite liner system that complies with the requirements of §257.71(a)(1)(ii) of the CCR Rule to improve the level of source control in the pond. The new liner system will be installed in general accordance with the following procedures:

- Water will be removed from the pond and transferred to FGD-B and FGD-C;
- Solids in the pond will be dewatered, removed and transported to the OGSES Ash Landfill 1 for disposal.
- A minimum of 2 feet of the existing compacted clay liner will be retained at the base of the pond;
- A 60-mil HDPE geomembrane liner will be installed over the 2 feet of compacted clay liner;
- A protective layer of soil or other material will be placed over the geomembrane liner.

Retrofitting FGD-A with a new composite liner system is assumed to serve as the source control component of the potential corrective measures for the FGD Ponds. The estimated time to retrofit FGD-A is estimated to be approximately 1 to 2 years, including design and construction.

4.3 Potential Groundwater Response Technologies

For the purposes of this ACM, cobalt and lithium are conservatively assumed to be present in groundwater at the Site at SSLs above their respective GWPS based on the February 2019 SSL notification. In this section, potential groundwater response technologies to address these constituents are identified and screened for further consideration in developing potential corrective measures alternatives for FGD Ponds.

4.3.1 Monitored Natural Attenuation

Monitored natural attenuation (MNA) refers to the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific groundwater remediation objectives within a time frame that is reasonable compared to that offered by more active remediation methods (USEPA 2007a). MNA relies on a range of natural processes, including dispersion, dilution, sorption, (co)precipitation, radioactive decay, and abiotic degradation/transformation to achieve remediation objectives (ITRC 2010). Routine groundwater monitoring would be required to verify MNA is occurring at the Site.

Where necessary, MNA processes can be enhanced through the use of low-energy, in-situ techniques to stimulate or increase the attenuation of contaminants or reduce contaminant loading (ITRC 2010). Enhancement options include increasing the attenuation capacity of the aquifer, decreasing the mobility of contaminants, and/or increasing the stability of immobilized contaminants by increasing the ability of aquifer solids to remove

contaminants from groundwater and/or manipulating the geochemistry to reduce remobilization of contaminants by desorption or dissolution of precipitates (ITRC 2010).

MNA has been demonstrated effective in reducing cobalt concentrations in groundwater (ITRC 2010; USEPA 2007b). Cobalt is removed through adsorption to iron hydroxides and/or amorphous metals and the level of effectiveness is dependent on iron hydroxide availability as well as pH, alkalinity, and calcium levels (ITRC 2010). The removal mechanisms for lithium are not identified in the professional literature; however, as described in Section 3.6 of this report, the Site is a good candidate for MNA, since natural attenuation of cobalt and lithium is ongoing at the Site.

MNA would be effective in remediating groundwater beneath and downgradient of the FGD Ponds. The estimated time to implement MNA is estimated to be approximately 2 to 3 years, including characterization, design, and construction. The estimated time to achieve GWPS for the target Appendix IV constituents is dependent on site-specific conditions and groundwater modelling is needed to evaluate remedial timeframes.

4.3.2 Groundwater Extraction and Treatment

Groundwater extraction and treatment is one of the most widely implemented groundwater remediation technologies and is used to provide 1) hydraulic containment and 2) treatment (USEPA 1996). A groundwater extraction and treatment system consists of the following major components:

- A series of extraction wells or trenches strategically located to modify/interrupt the natural flow of groundwater;
- Extraction pumps installed in each well/trench to pump groundwater from the subsurface;
- A treatment system to remove constituents of concern from the extracted groundwater; and
- A point of discharge for the treated groundwater (surface water, re-injection to groundwater, etc.).

For the FGD Ponds, a system of extraction wells would be installed along the downgradient edge of the ponds to provide hydraulic control of the Appendix IV constituent groundwater plumes. The extracted groundwater would be treated in an on-site treatment system and treated water would be discharged to Twin Oaks Reservoir or re-injected into the aquifer.

Potential groundwater treatment methods for the target Appendix IV constituents include the following:

- Cobalt - ion exchange, adsorptive media, activated carbon, and chemical treatment with membrane filtration (USEPA 2019a).
- Lithium - reverse osmosis, precipitation/co-precipitation, and ion exchange. (USACE 2010).

Treatment methods for these constituents would need to be bench/pilot tested to evaluate their effectiveness prior to designing a full-scale system. Treatment will generate residual material (sludge, regenerate brine, etc.) containing concentrated levels of the target Appendix IV constituents that must managed.

Groundwater extraction and treatment would be effective in reducing contaminant concentrations in groundwater downgradient of the FGD Ponds through hydraulic containment, but would have little effect on groundwater conditions beneath the ponds. The estimated time to implement groundwater extraction and treatment is estimated to be approximately 3 to 4 years, including testing, design, and construction. The estimated time to

achieve GWPS for the target Appendix IV constituents is dependent on site-specific conditions and groundwater modeling is needed to better evaluate remedial timeframes.

4.3.3 Vertical Hydraulic Barrier

A vertical, low permeability hydraulic barrier can be installed to provide a physical barrier to groundwater flow to contain the migration of contaminated groundwater. Vertical hydraulic barriers that have been demonstrated effective at controlling groundwater flow include the following (USEPA 1998):

- Slurry Wall. Slurry walls consist of a narrow, excavated trench that is filled with a soil-bentonite slurry mixture. The slurry shores and supports the trench walls and forms a low-permeability barrier in the trench. Key design considerations include wall depth, key depth, and material compatibility. Slurry trenches can be excavated to depths of 50 feet using standard excavators and over 80 feet using long-reach excavators or a crane mounted drag line/clamshell bucket. Geosynthetic materials can be placed in the trench in conjunction with the slurry wall to improve the hydraulic performance (decrease permeability) and chemical resistance.
- Soil-Mixed Wall. Soil-mixed walls form a hydraulic barrier through in-situ mixing of soil with amendments, such as bentonite and/or cement. Soil-mixed barrier walls can be installed to depths of over 100 feet. The walls are installed by sections or panels that overlap to achieve a continuous barrier.
- Grout Curtain. Grout curtain barriers are constructed by injecting grout into the subsurface in an overlapping injection pattern to form a continuous barrier. Grouted barriers can be installed using permeation grouting, jet grouting, or vibrating beam technologies. Grouted barriers must be designed and constructed to ensure hydrofracturing does not occur and the completed wall is effective at restricting groundwater flow.
- Sheet-pile Wall. Sheet-pile walls consist of steel, vinyl, or other materials driven into the subsurface using a hydraulic percussion hammer or vibratory hammer. Sheet-pile walls are common in civil engineering applications; however, their use in environmental applications has been more limited. One of the major concerns with sheet-walls in environmental applications is leakage through the vertical joints between piles; however, improvements in pile interlock designs have been made to improve joint sealing.

For a vertical hydraulic barrier to be effective, the bottom of the barrier must be “keyed” into a low-permeability confining layer. A detailed engineering analysis and design, likely including a bench/pilot test to identify most appropriate barrier materials, would be required for the construction of a vertical hydraulic barrier.

For the FGD Ponds, the vertical hydraulic barrier would be constructed along the downgradient edge of the ponds to provide hydraulic control of the cobalt and lithium groundwater plumes. A vertical hydraulic barrier physically interrupts the natural flow of groundwater; consequently, groundwater elevations upgradient of the barrier will rise, potentially to the point that groundwater could begin to flow around the edges of the barrier. To address this concern, a groundwater extraction and treatment system would be required upgradient of the barrier to control the groundwater levels. The groundwater extraction and treatment system used in conjunction with the vertical hydraulic barrier would be similar to the system described in Section 4.3.2; however, the required capacity of the system would be less since the rate of groundwater extraction would be limited to that required to control upgradient groundwater levels.

Construction of a vertical hydraulic barrier is expected to require significant effort and time. Prior to implementation of the barrier, pre-design field work, including site investigations and bench/pilot-scale barrier material testing would be required, followed by full-scale design and construction. The estimated time to implement a vertical hydraulic barrier with groundwater extraction and treatment is estimated to be approximately 5 to 8 years, including testing, design, and construction. The estimated time to achieve GWPS for the target Appendix IV constituents is dependent on site-specific conditions and groundwater modeling is needed to better evaluate remedial timeframes

4.3.4 Permeable Reactive Barrier

A permeable reactive barrier (PRB) is an in-situ, permeable treatment zone that contains reactive media designed to intercept impacted groundwater and either immobilize contaminants or transform the contaminants to a more desirable state (ITRC 2011). A PRB is a passive treatment system that acts as a barrier to groundwater contamination but not groundwater flow. The PRB must intercept the flow of impacted groundwater and must be designed and constructed such that impacted groundwater cannot bypass the reactive media by flowing over, under, or around the PRB. A PRB must include the appropriate reactive media and the residence time within the PRB needs to sufficient to allow for effective treatment. The effectiveness of the reactive media will be reduced over time and the media will likely have to be replaced periodically. Groundwater monitoring is used to evaluate the performance/effectiveness of a PRB system.

There are two primary PRB configurations: continuous and funnel-and-gate. A continuous PRB features permeable reactive media across the entire length of the barrier. A funnel-and -gate PRB uses sections of vertical hydraulic barriers to direct groundwater flow through permeable reactive media sections that allow the groundwater to pass through while treating contaminants. In both configurations, the permeability of the reactive media must be greater than the aquifer to ensure flow is not diverted around the PRB media. For FGD Ponds, PRB system would be constructed along the downgradient edge of the ponds to provide control of the cobalt and lithium groundwater plumes.

PRB systems are generally considered a proven technology, however, site conditions and the specific contaminants of interest affect the system performance. The potential applicability of a PRB system for the target Appendix IV constituents can be summarized as follows:

- Cobalt - potentially removed using sulfate-reducing media or combination of zero-valent iron (ZVI) and organic material (Ludwig 2002; ITRC 2011);
- Lithium – potentially precipitated as phosphate using appetite media, (Arnseth 2018).

Removal of the target Appendix IV constituents using a PRB system has not been consistently demonstrated under full-scale conditions and bench/pilot-scale testing would be required to confirm the effectiveness of a PRB system at the Site. A groundwater model would be needed to evaluate the remedial timeframes.

Similar to a vertical hydraulic barrier, construction of a PRB system is expected to require significant effort and time. Prior to implementation of the PRB, pre-design field work, including site investigations, groundwater modeling, and bench-scale soil mix testing would be required, followed by full-scale design and construction. The estimated time to implement a PRB system is estimated to be approximately 5 to 8 years, including testing, design, and construction. The estimated time to achieve GWPS for the target Appendix IV constituents is

dependent on site-specific conditions and groundwater modeling is needed to better evaluate remedial timeframes.

4.3.5 In-situ Chemical Treatment

In-situ Chemical Treatment (ICT) involves the injection of a chemical reagent or other material into the groundwater aquifer to adjust the geochemistry to enhance the direct precipitation, co-precipitation, or related adsorption/precipitation of the target contaminants (USEPA 2019c). Direct precipitation occurs when a constituent exceeds its solubility in water and precipitates out of solution. Co-precipitation refers to the removal of a constituent through adsorption onto the precipitate of another chemical reaction.

Cobalt has the potential to be removed through adsorption and/or coprecipitation under reducing groundwater conditions (Goldemund and Robb 2018). Lithium has the potential to be precipitated as a phosphate under appropriate geochemical conditions (Arnseth 2018).

Injection wells would be installed into the aquifer along the downgradient edge of the FGD Ponds and the chemical reagents would be injected to provide control of the target Appendix IV constituent groundwater plume.

ICT is considered an emerging remediation technology for the target Appendix IV constituents and the effectiveness of the technology on most of the constituents is uncertain. Bench/pilot-scale testing would be required to confirm the effectiveness of an ICT system at the Site. The estimated time to implement an ICT system is estimated to be approximately 5 to 8 years, including testing, design, and construction. The estimated time to achieve GWPS for the target Appendix IV constituents is dependent on site-specific conditions and groundwater modeling is needed to better evaluate remedial timeframes.

4.3.6 Phytoremediation

Phytoremediation refers to the use of plants to partially or substantially remediate selected contaminants in contaminated soil, sludge, sediment, ground water, surface water, and wastewater (USEPA 2001). The process utilizes a variety of plant biological processes and plant physical characteristics to aid in remediation; however, the primary plant process potentially applicable to the target Appendix IV constituents at the Site is phytoextraction, which is the uptake and accumulation of contaminants within aboveground portions of a plant. The contaminants are removed from the Site when the plants are harvested and managed off-site. No information concerning the effectiveness of phytoremediation for lithium removal was identified.

Phytoextraction occurs in the root zone of plants, which is typically relatively shallow, with the bulk of roots at shallower rather than deeper depths. This would limit the effectiveness of phytoextraction at the Site due to the depth of groundwater. Phytoremediation for cobalt removal from groundwater has not been demonstrated under full-scale conditions and no information concerning the effectiveness of phytoremediation for lithium removal was identified (USEPA 2001).

Implementation of a phytoremediation process at the Site would involve planting appropriate vegetation at intervals along the downgradient edge of the FGD Ponds and across the affected groundwater plume area. A comprehensive bench/pilot testing program would be required to select the most appropriate plants for removal of the target Appendix IV constituents from groundwater at the Site. Since the target Appendix IV constituents would likely accumulate in the plants, management of harvested plants in accordance with RCRA could be required. The estimated time to implement an ICT system is estimated to be approximately 15 to 20 years, based on the success and rate of vegetation growth. The estimated time to achieve GWPS for the target Appendix IV

constituents is dependent on site-specific conditions and groundwater modeling is needed to better evaluate remedial timeframes.

4.3.7 Screening of Potential Groundwater Response Technologies

Following identification of potential groundwater response technologies, Golder screened the potential options for further consideration in developing potential corrective measures alternatives for the FGD Ponds. The screening results for each potential source technology are summarized in Table 2. Based on the initial screening, the following potential groundwater response technologies were retained for future evaluation as part of the corrective measures alternatives for the FGD Ponds:

- Monitored Natural Attenuation
- Groundwater Extraction and Treatment
- Vertical Hydraulic Barrier

4.4 Potential Corrective Measures Alternatives

Based on the response technology screening discussed above, Golder assembled the following potential corrective measures alternatives that could be both effective and implementable at the Site:

- Retrofit Liner in FGD-A with Monitored Natural Attenuation
- Retrofit Liner in FGD-A with Groundwater Extraction and Treatment
- Retrofit Liner in FGD-A with Vertical Hydraulic Barrier

A summary of the corrective measure alternatives, including an assessment of each alternative against the evaluation criteria presented in §257.96(c) is provided in Table 3.

4.5 Remedy Selection

The corrective measure alternative proposed as the remedy for the FGD Ponds will be selected in accordance with §257.97 a minimum of 30 days after the public meeting required under §257.96(e) has been completed.

It should also be noted that, for the purposes of this ACM, cobalt and lithium concentrations were conservatively assumed to be present at SSLs above their respective GWPSs based on the February 2019 SSL notification. However, as discussed in Sections 3.4-3.6, all CCR monitoring wells and nature and extent wells currently exhibit cobalt and lithium concentrations below GWPSs, cobalt and lithium concentrations are no longer considered to be present at SSLs above the GWPSs based on recent data, and naturally occurring sources of cobalt and lithium exist in the vicinity of the FGD Ponds. Cobalt and lithium concentrations in groundwater will continue to be monitored in accordance with the CCR rule to confirm that the concentrations of these constituents remain below the GWPSs in the future. These monitoring results, along with updated statistical analysis and alternate source demonstrations (if applicable), will be considered as part of the remedy selection process.

5.0 REFERENCES

Barnes, Virgil E., 1970. Geologic Atlas of Texas, Waco Sheet. Texas Bureau of Economic Geology.

Bethke, C., 2015. Geochemist's Workbench: Release 12.0 - Aqueous Solutions, LLC.

Code of Federal Regulations, 2015 April. Chapter 40, Part 257, Subpart D.

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

Goldemund, H and Robb, C, 2018. Current Overview of Groundwater Remediation Options for CCR Units, Proceedings of 2018 World of Coal Ash Conference.

Golder, 2016a. History of Construction – CCR Surface Impoundments, Oak Grove Steam Electric Station. October.

Golder, 2016b. Certification of Lined Construction – CCR Surface Impoundments, Oak Grove Steam Electric Station. October.

Golder, 2019. Drinking Water Survey Report – Revision No. 1, Oak Grove Steam Electric Station – FGD Ponds and Ash Landfill I, Robertson County, Texas. July 25.

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

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

ITRC. 2011. Permeable Reactive Barrier: Technology Update. PRB-5. June 2011.

Karamalidis, A. and Dzombak, D., 2011. Surface complexation modeling: gibbsite. John Wiley & Sons.

Ludwig, R, et. al., 2002. A Permeable Reactive Barrier for Treatment of Heavy Metals in Ground Water 40(1):59-66, January 2002

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.

Pastor, Behling & Wheeler, LLC (PBW), 2017a. Coal Combustion Residual Rule Groundwater Monitoring System Certification, Oak Grove Steam Electric Station, FGD Pond Area, Robertson County, Texas. October 16, 2017.

PBW, 2017b. Coal Combustion Residual Rule Statistical Analysis Plan, Big Brown Steam Electric Station, Ash Disposal Area II, Freestone County, Texas. October 11, 2017.

Smith, K., 1999. Metal sorption on mineral surfaces: an overview with examples relating to mineral deposits. The Environmental Geochemistry of Mineral Deposits. Part B: Case Studies and Research Topics, 6, pp.161-182.

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

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

US Army Corps of Engineers (USACE), 2010. Maywood Chemical Company Superfund Site, Groundwater Feasibility Study Report, September

USEPA, 1996. Pump-and-Treat Ground-Water Remediation: A Guide for Decision Makers and Practitioners. EPA/625/R-95/005. July 1996.

USEPA. 1998. Evaluation of Subsurface Engineered Barriers at Waste Sites, EPA-542-R-98-005, July 1998.

USEPA. 2001. Phytoremediation of Contaminated Soil and Ground Water at Hazardous Waste Sites, EPA/540-S-01/500. February 2001.

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

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

USEPA, 2009. Unified Guidance Document: Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, EPA 530-R-09-007, March 2009.

USEPA, 2014. Reference Guide to Treatment Technologies for Mining-Influenced Water. March 2014.

USEPA, 2015. 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. April 17, 2015.

USEPA, 2015. Use of Monitored Natural Attenuation for Inorganic Contaminants in Groundwater at Superfund Sites. U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response Directive 9283.1-36. August 2015.

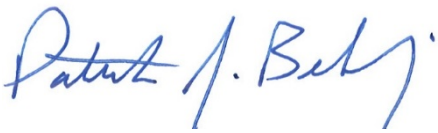
USEPA, 2019a. Drinking Water Treatability Database – Cobalt . Retrieved from https://oaspub.epa.gov/tdb/pages/general/home.do

USEPA, 2019b. Permeable Reactive Barriers. CLU-IN. Retrieved from https://clu-in.org/techfocus/default.focus/sec/Permeable_Reactive_Barriers%2C_Permeable_Treatment_Zones%2C_and_Application_of_Zero-Valent_Iron/cat/Overview/

USEPA, 2019c. In Situ Chemical Reduction. CLU-IN. Retrieved from https://clu-in.org/techfocus/default.focus/sec/In_Situ_Chemical_Reduction/cat/Overview/

Signature Page

Golder Associates Inc.



Patrick J. Behling, P.E.
Principal Engineer

William F. Vienne, P.G.
Senior Hydrogeologist

https://golderassociates.sharepoint.com/sites/114142/project files/5 technical work/phase 4000 - og fgd ponds/ccr asssessment of corrective measures report - ogses fgd ponds_9-5-19_redline.docx

TABLES

TABLE 1
APPENDIX IV GROUNDWATER ANALYTICAL DATA SUMMARY
FGD PONDS
OAK GROVE STEAM ELECTRIC STATION

Sample Location	Date Sampled	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Fl (mg/L)	Pb (mg/L)	Li (mg/L)	Hg (mg/L)	Mo (mg/L)	Se (mg/L)	Tl (mg/L)	Ra 226 (pCi/L)	Ra 228 (pCi/L)	Ra 226/228 Combined^ (pCi/L)
GWPS:		0.006	0.0146	2	0.004	0.005	0.1	0.0158	4	0.015	0.149	0.002	0.1	0.05	0.002	--	--	11.2
Upgradient Wells																		
FGD-8	11/04/15	<0.0008	<0.002	0.119	<0.0003	<0.0003	0.00542	<0.003	0.173 J	<0.0003	0.149	<0.00008	0.0261	<0.002	<0.0005	0.671	1.38	2.05
	12/17/15	<0.0008	<0.002	0.179	<0.0003	<0.0003	0.00373 J	0.00646	0.361 J	<0.0003	0.116	<0.00008	0.00404 J	<0.002	<0.0005	<0.609	1.32	1.93
	02/09/16	<0.0008	0.0115	0.892	<0.0003	<0.0003	0.00234 J	0.00609	0.331 J	0.000406 J	0.0104	<0.00008	<0.002	0.00231 J	<0.0005	1.77	3.55	5.32
	04/14/16	<0.0008	0.0146	0.965	<0.0003	<0.0003	0.00202 J	0.00876	0.218 J	0.0016	0.016	<0.00008	<0.002	0.00211 J	<0.0005	0.973	8.34	9.31
	06/14/16	<0.0008	0.00639	0.792	<0.0003	<0.0003	<0.002	0.0158	<0.100	0.00137	0.015	<0.00008	<0.002	<0.002	<0.0005	1.93	2.30	4.23
	08/24/16	<0.0008	<0.002	0.102	0.000417 J	<0.0003	0.0107	0.015	0.186 J	0.00381	0.0265	<0.00008	<0.002	<0.002	<0.0005	0.778	<0.491	1.27
	10/05/16	<0.0008	0.00661	0.753	<0.0003	<0.0003	0.00672	0.00899	0.413	0.000908 J	0.0224	<0.00008	<0.002	<0.002	<0.0005	1.35	5.96	7.31
	12/23/16	<0.0008	0.0119	0.894	<0.0003	<0.0003	0.00259 J	0.00745	<0.100	0.00228	0.0185	<0.00008	<0.002	0.00217 J	<0.0005	2.17	3.70	5.87
	06/05/18	<0.0008	0.00839	0.834	<0.0003	<0.0003	<0.002	0.0193	<0.100	0.00039 J	0.0128	<0.00008	<0.002	<0.002	<0.0005	1.5	5.13	6.63
	09/06/18	NA	0.0137	0.635	<0.0003	<0.0003	<0.002	0.0243	0.362 J	<0.0003	0.009 J	NA	<0.002	0.0025 J	<0.0005	0.349	1.4	1.75
	05/16/19	<0.0008	0.0126	0.864	<0.0003	<0.0003	0.003 J	0.0146	<0.100	<0.00194	0.009 J	<0.00008	<0.002	0.0027 J	<0.0005	3.14	5.27	8.41
FGD-11	11/04/15	<0.0008	<0.002	0.0527	<0.0003	<0.0003	<0.002	<0.003	<0.1	0.000727 J	0.0144	<0.00008	<0.002	<0.002	<0.0005	0.928	<1.41	2.34
	12/17/15	<0.0008	<0.002	0.0676	0.000303 J	<0.0003	<0.002	<0.003	0.13 J	0.000987 J	0.016	<0.00008	<0.002	<0.002	<0.0005	0.786	<1.63	2.42
	02/09/16	<0.0008	<0.002	0.271	<0.0003	<0.0003	<0.002	<0.003	0.548	<0.0003	0.011	<0.00008	<0.002	<0.002	<0.0005	1.39	2.64	4.03
	04/14/16	<0.0008	<0.002	0.26	<0.0003	<0.0003	0.00222 J	<0.003	0.671	0.0012	0.011	<0.00008	<0.002	<0.002	<0.0005	1.69	2.43	4.12
	06/15/16	<0.0008	<0.002	0.216	<0.0003	<0.0003	<0.002	<0.003	0.331 J	0.000407 J	0.0126	<0.00008	0.00238 J	<0.002	<0.0005	2.34	2.06	4.40
	08/25/16	<0.0008	<0.002	0.439	<0.0003	<0.0003	0.00465 J	<0.003	0.128 J	0.00179	0.011	<0.00008	<0.002	<0.002	<0.0005	4.23	3.58	7.81
	10/04/16	<0.0008	<0.002	0.55	<0.0003	<0.0003	<0.002	<0.003	0.579	0.000618 J	0.0124	<0.00008	<0.002	<0.002	<0.0005	1.73	2.53	4.26
	12/22/16	<0.0008	<0.002	0.734	<0.0003	<0.0003	0.00258 J	<0.003	0.127 J	0.000635 J	0.0124	<0.00008	<0.002	<0.002	<0.0005	3.94	5.09	9.03
	06/05/18	<0.0008	<0.002	0.520	<0.0003	<0.0003	0.0372	0.007	0.836	0.00891 J	0.0102	<0.00008	0.00266 J	<0.002	<0.0005	4.64	4.22	8.86
	09/06/18	NA	<0.002	0.702	<0.0003	<0.0003	0.0039 J	<0.003	1.09	<0.0003	0.0121	NA	<0.002	<0.002	<0.0005	6.24	6.47	12.71
	05/16/19	<0.0008	<0.002	0.347	<0.0003	<0.0003	0.028	<0.003	0.38 J	0.000576 J	0.0145	<0.00008	0.00358 J	<0.002	<0.0005	2.39	2.75	5.14
Downgradient Wells																		
FGD-1	11/03/15	<0.0008	<0.002	0.0311	<0.0003	<0.0003	<0.002	<0.003	0.363 J	<0.0003	0.034	<0.00008	<0.002	<0.002	<0.0005	0.718	<1.40	2.12
	12/17/15	<0.0008	<0.002	0.0263	<0.0003	<0.0003	<0.002	<0.003	0.384 J	<0.0003	0.0306	<0.00008	<0.002	<0.002	<0.0005	0.919	<1.43	2.35
	02/09/16	<0.0008	<0.002	0.0315	<0.0003	<0.0003	0.00437 J	0.0033 J	0.383 J	0.000379 J	0.0314	<0.00008	<0.002	<0.002	<0.0005	<0.318	1.42	1.74
	04/14/16	<0.0008	<0.002	0.0296	<0.0003	<0.0003	<0.002	<0.003	0.229 J	<0.0003	0.0338	<0.00008	<0.002	<0.002	<0.0005	<0.439	<1.28	<1.719
	06/15/16	<0.0008	<0.002	0.0276	<0.0003	<0.0003	<0.002	<0.003	0.302 J	<0.0003	0.0321	<0.00008	<0.002	<0.002	<0.0005	<0.258	1.66	1.92
	08/24/16	<0.0008	<0.002	0.0294	<0.0003	<0.0003	<0.002	<0.003	0.225 J	<0.0003	0.033	<0.00008	<0.002	<0.002	<0.0005	0.188	2.24	2.43
	10/05/16	<0.0008	<0.002	0.0319	<0.0003	<0.0003	<0.002	0.00447 J	0.483	<0.0003	0.0331	<0.00008	<0.002	<0.002	<0.0005	0.430	0.507	0.94
	12/22/16	<0.0008	<0.002	0.0418	<0.0003	<0.0003	<0.002	<0.003	0.326 J	<0.0003	0.0385	<0.00008	<0.002	<0.002	<0.0005	<0.273	<0.645	<0.918
	06/05/18	<0.0008	<0.002	0.0422	<0.0003	<0.0003	<0.002	<0.003	0.206 J	<0.0003	0.0426	<0.00008	<0.002	<0.002	<0.0005	0.194	<0.7680	0.962
	09/06/18	NA	<0.002	0.0417	<0.0003	<0.0003	<0.002	0.0033 J	0.228 J	<0.0003	0.0436	NA	<0.002	<0.002	0.0005	0.209	<0.53	0.739
	05/16/19	<0.0008	<0.002	0.0485	<0.0003	<0.0003	<0.002	<0.003	0.362 J	<0.0003	0.0442	<0.00008	<0.002	<0.002	<0.0005	0.33	<0.59	0.923
FGD-2	11/03/15	<0.0008	<0.002	0.146	<0.0003	<0.0003	0.00244 J	<0.003	0.224 J	<0.0003	0.0224	<0.00008	<0.002	0.0203	<0.0005	<0.249	1.97	2.22
	12/17/15	<0.0008	<0.002	0.103	<0.0003	<0.0003	0.00386 J	<0.003	0.347 J	0.00145	0.0183	<0.00008	<0.002	0.0127	<0.0005	1.030	<1.24	2.27
	02/09/16	<0.0008	<0.002	0.133	<0.0003	<0.0003	0.00426 J	<0.003	0.315 J	<0.0003	0.0221	<0.00008	<0.002	0.0181	<0.0005	0.669	1.81	2.48
	04/14/16	<0.0008	<0.002	0.129	<0.0003	<0.0003	<0.002	<0.003	0.192 J	<0.0003	0.0196	<0.00008	<0.002	0.0166	<0.0005	0.198	<2.03	2.23
	06/14/16	<0.0008	<0.002	0.091	<0.0003	<0.0003	<0.002	<0.003	0.122 J	<0.0003	0.0243	<0.00008	<0.002	0.0189	<0.0005	0.275	1.66	1.94
	08/24/16	<0.0008	<0.002	0.144	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.019	<0.00008	<0.002	0.0185	<0.0005	2.47	0.769	3.24
	10/05/16	<0.0008	<0.002	0.129	<0.0003	<0.0003	0.00549	<0.003	0.243 J	0.000693 J	0.0199	<0.00008	<0.002	0.0176	<0.0005	0.716	1.70	2.42
	12/22/16	<0.0008	<0.002	0.158	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0217	<0.00008	<0.002	0.022	<0.0005	0.345	1.79	2.14
	06/05/18	<0.0008	<0.002	0.108	<0.0003	<0.0003	<0.002	<0.003	0.185 J	<0.0003	0.0226	<0.00008	<0.002	0.0185	<0.0005	0.505	1.12	1.63
	09/06/18	NA	<0.002	0.125	<0.0003	<0.0003	<0.002	<0.003	0.32 J	<0.0003	0.0253	NA	<0.002	0.0204	<0.0005	0.641	0.822	1.46
	05/16/19	<0.0008	<0.002	0.0993	<0.0003	<0.0003	0.003 J	<0.003	0.383 J	<0.0003	0.0228	0.00008	<0.002	0.0214	<0.0005	0.648	0.588	1.24

TABLE 1
APPENDIX IV GROUNDWATER ANALYTICAL DATA SUMMARY
FGD PONDS
OAK GROVE STEAM ELECTRIC STATION

Sample Location	Date Sampled	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Fl (mg/L)	Pb (mg/L)	Li (mg/L)	Hg (mg/L)	Mo (mg/L)	Se (mg/L)	Tl (mg/L)	Ra 226 (pCi/L)	Ra 228 (pCi/L)	Ra 226/228 Combined^ (pCi/L)
GWPS:		0.006	0.0146	2	0.004	0.005	0.1	0.0158	4	0.015	0.149	0.002	0.1	0.05	0.002	--	--	11.2
FGD-3	11/03/15	<0.0008	0.00226 J	0.0417	<0.0003	0.00492	<0.002	0.0436	0.505	<0.0003	0.176	<0.00008	<0.002	0.0881	0.0017	0.930	3.18	4.11
	12/17/15	<0.0008	0.00215 J	0.0371	0.000475 J	0.00372	<0.002	0.0399	<0.1	<0.0003	0.14	<0.00008	<0.002	0.0798	0.0016	1.70	2.66	4.36
	02/09/16	<0.0008	0.00206 J	0.0407	<0.0003	0.00343	<0.002	0.0417	0.74	0.000438 J	0.13	<0.00008	<0.002	0.0907	0.0015 J	1.04	3.37	4.41
	04/14/16	<0.0008	0.00218 J	0.0371	<0.0003	0.00212	<0.002	0.0326	0.69	<0.0003	0.119	<0.00008	<0.002	0.064	0.00137 J	<0.276	<1.35	<1.626
	06/14/16	<0.0008	0.00205 J	0.0392	<0.0003	0.00156	<0.002	0.0261	0.173 J	<0.0003	0.107	<0.00008	<0.002	0.0447	0.00126 J	0.754	1.56	2.31
	08/24/16	<0.0008	0.00221 J	0.0387	<0.0003	0.00146	<0.002	0.0232	0.463	<0.0003	0.0974	<0.00008	<0.002	0.0272	0.00123 J	0.416	2.60	3.02
	10/05/16	<0.0008	0.00225 J	0.039	<0.0003	0.00152	<0.002	0.0226	0.723	<0.0003	0.113	<0.00008	<0.002	0.0276	0.00114 J	0.455	2.44	2.90
	12/22/16	<0.0008	0.00226 J	0.0437	<0.0003	0.00173	<0.002	0.0266	1.32	<0.0003	0.11	<0.00008	<0.002	0.0245	0.00124 J	<0.352	2.46	2.81
	06/05/18	<0.0008	0.00236 J	0.0391	<0.0003	0.00152	<0.002	0.0207	1.06	<0.0003	0.0975	<0.00008	0.00212 J	0.0192	0.000985 J	0.528	2.19	2.72
	09/05/18	NA	0.00208 J	0.0379	<0.0003	0.00146	<0.002	0.0192	1.03	<0.0003	0.0955	NA	0.0021 J	0.0213	0.000925 J	<0.323	0.704	1.03
	05/16/19	<0.0008	0.0023 J	0.051	<0.0003	<0.0003	<0.002	0.0052	0.776	<0.0003	0.057	<0.00008	0.0031 J	0.0423	0.0006 J	<0.403	<0.638	<1.041
FGD-4	11/03/15	<0.0008	<0.002	0.126	<0.0003	<0.0003	<0.002	<0.003	0.294 J	<0.0003	0.0433	<0.00008	<0.002	<0.002	<0.0005	1.01	<1.39	2.40
	12/17/15	<0.0008	<0.002	0.105	<0.0003	<0.0003	<0.002	<0.003	0.295 J	<0.0003	0.0436	0.000229	0.00211 J	0.00214 J	<0.0005	<0.361	<1.73	<2.091
	02/09/16	<0.0008	<0.002	0.113	<0.0003	<0.0003	<0.002	<0.003	0.32 J	<0.0003	0.0419	0.000288	<0.002	<0.002	<0.0005	<0.332	<1.11	<1.442
	04/14/16	<0.0008	<0.002	0.12	<0.0003	<0.0003	0.00208 J	<0.003	0.323 J	0.0271	0.0357	0.000232	<0.002	<0.002	<0.0005	0.560	<1.21	1.77
	06/14/16	<0.0008	<0.002	0.128	<0.0003	0.00056 J	<0.002	<0.003	<0.1	<0.0003	0.0477	<0.00008	<0.002	<0.002	<0.0005	0.437	<0.975	1.41
	08/24/16	<0.0008	<0.002	0.111	<0.0003	<0.0003	<0.002	<0.003	0.148 J	0.000578 J	0.0383	<0.00008	<0.002	<0.002	<0.0005	<0.199	0.625	0.82
	10/05/16	<0.0008	<0.002	0.106	<0.0003	<0.0003	<0.002	<0.003	0.376 J	0.000489 J	0.0353	<0.00008	<0.002	<0.002	<0.0005	0.308	1.30	1.61
	12/22/16	<0.0008	<0.002	0.114	<0.0003	<0.0003	0.0023 J	<0.003	0.251 J	<0.0003	0.0273	<0.00008	<0.002	<0.002	<0.0005	0.227	<0.667	0.89
	06/04/18	<0.0008	<0.002	0.119	<0.0003	<0.0003	<0.002	<0.003	0.297 J	<0.0003	0.0265	<0.00008	<0.002	<0.002	<0.0005	0.261	<0.923	1.184
	09/05/18	NA	<0.002	0.108	<0.0003	<0.0003	<0.002	<0.003	0.353 J	<0.0003	0.0199	NA	<0.002	<0.002	<0.0005	<0.39	0.673	1.063
	05/16/19	<0.0008	<0.002	0.117	<0.0003	<0.0003	<0.002	<0.003	0.327 J	<0.0003	0.0325	<0.00008	<0.002	<0.002	<0.0005	0.627	0.745	1.372
FGD-5	11/04/15	<0.0008	<0.002	0.13	<0.0003	0.000557 J	0.0121	<0.003	0.227 J	<0.0003	0.17	<0.00008	0.0445	<0.002	<0.0005	0.449	1.52	1.97
	12/17/15	<0.0008	<0.002	0.237	<0.0003	0.000593 J	0.0391	0.0164	0.469	0.000369 J	0.156	<0.00008	0.0203	<0.002	<0.0005	1.23	3.63	4.86
	02/09/16	<0.0008	<0.002	0.261	<0.0003	<0.0003	<0.002	0.00441 J	0.495	<0.0003	0.158	<0.00008	<0.002	<0.002	<0.0005	1.99	1.50	3.49
	04/14/16	<0.0008	<0.002	0.224	<0.0003	0.000392 J	0.00477 J	<0.003	0.491	<0.0003	0.164	<0.00008	0.0183	<0.002	<0.0005	0.951	<1.24	2.19
	06/15/16	<0.0008	<0.002	0.174	<0.0003	<0.0003	0.00599	<0.003	0.284 J	<0.0003	0.162	<0.00008	0.0144	<0.002	<0.0005	0.429	1.25	1.68
	08/24/16	<0.0008	<0.002	0.173	<0.0003	<0.0003	0.0189	<0.003	0.168 J	0.00045 J	0.145	<0.00008	0.00814	<0.002	<0.0005	0.398	<0.643	1.04
	10/05/16	<0.0008	<0.002	0.229	<0.0003	<0.0003	0.00304 J	<0.003	0.38 J	<0.0003	0.153	<0.00008	0.00355 J	<0.002	<0.0005	0.877	1.16	2.04
	12/22/16	<0.0008	<0.002	0.261	<0.0003	<0.0003	<0.002	0.00471 J	0.291 J	<0.0003	0.152	<0.00008	<0.002	<0.002	<0.0005	0.579	<0.76	1.34
	06/05/18	<0.0008	<0.002	0.136	<0.0003	<0.0003	0.00935	<0.003	0.511	<0.0003	0.154	<0.00008	<0.002	<0.002	<0.0005	0.705	<0.765	1.47
	09/06/18	NA	<0.002	0.215	<0.0003	<0.0003	<0.002	<0.003	0.548	<0.0003	0.155	NA	<0.002	<0.002	<0.0005	0.535	1.31	1.845
	05/16/19	<0.0008	<0.002	0.0926	<0.0003	<0.0003	0.024	<0.003	0.579	<0.0003	0.145	<0.00008	0.003 J	<0.002	<0.0005	0.342	<0.506	0.848
FGD-6	11/03/15	<0.0008	<0.002	0.124	<0.0003	<0.0003	0.00253 J	<0.003	0.334 J	<0.0003	0.0112	<0.00008	<0.002	<0.002	<0.0005	0.470	<1.70	2.17
	12/17/15	<0.0008	<0.002	0.135	<0.0003	<0.0003	<0.002	<0.003	0.333 J	<0.0003	0.00964 J	<0.00008	<0.002	<0.002	<0.0005	1.03	<2.13	3.16
	02/09/16	<0.0008	<0.002	0.132	<0.0003	<0.0003	<0.002	<0.003	0.354 J	<0.0003	0.0105	<0.00008	<0.002	<0.002	<0.0005	0.801	<1.71	2.51
	04/14/16	<0.0008	<0.002	0.122	<0.0003	<0.0003	0.0568	<0.003	0.442	<0.0003	0.011	<0.00008	<0.002	<0.002	<0.0005	0.484	2.08	2.56
	06/14/16	<0.0008	<0.002	0.16	0.000309 J	0.0004 J	<0.002	0.00657	<0.1	0.00132	0.0092 J	<0.00008	<0.002	<0.002	<0.0005	1.31	2.16	3.47
	08/24/16	<0.0008	0.00725	0.127	<0.0003	<0.0003	0.00334 J	0.00399 J	0.147 J	0.000656 J	0.00885 J	<0.00008	0.00244 J	<0.002	<0.0005	0.465	0.896	1.36
	10/05/16	<0.0008	0.00536	0.117	<0.0003	<0.0003	0.00427 J	0.00414 J	0.364 J	<0.0003	0.00985 J	<0.00008	<0.002	<0.002	<0.0005	0.489	1.69	2.18
	12/22/16	<0.0008	0.00458 J	0.129	<0.0003	<0.0003	<0.002	0.00352 J	0.204 J	<0.0003	0.0102	<0.00008	<0.002	<0.002	<0.0005	0.349	0.917	1.27
	06/04/18	<0.0008	0.0021 J	0.0854	<0.0003	<0.0003	<0.002	<0.003	0.361 J	<0.0003	0.0098 J	<0.00008	<0.002	<0.002	<0.0005	<0.277	<0.964	<1.241
	09/05/18	NA	<0.002	0.0824	<0.0003	<0.0003	<0.002	<0.003	0.405	<0.0003	0.0094 J	NA	<0.002	<0.002	<0.0005	<0.336	<0.677	<1.013
	05/16/19	<0.0008	0.0294	0.107	<0.0003	<0.0003	<0.002	0.0132	0.669	<0.0003	0.0068 J	<0.00008	0.0077	<0.002	<0.0005	1.43	1.67	3.1

TABLE 1
APPENDIX IV GROUNDWATER ANALYTICAL DATA SUMMARY
FGD PONDS
OAK GROVE STEAM ELECTRIC STATION

Sample Location	Date Sampled	Sb (mg/L)	As (mg/L)	Ba (mg/L)	Be (mg/L)	Cd (mg/L)	Cr (mg/L)	Co (mg/L)	Fl (mg/L)	Pb (mg/L)	Li (mg/L)	Hg (mg/L)	Mo (mg/L)	Se (mg/L)	Tl (mg/L)	Ra 226 (pCi/L)	Ra 228 (pCi/L)	Ra 226/228 Combined^ (pCi/L)
GWPS:		0.006	0.0146	2	0.004	0.005	0.1	0.0158	4	0.015	0.149	0.002	0.1	0.05	0.002	--	--	11.2
FGD-12	11/04/15	<0.0008	<0.002	0.0884	<0.0003	<0.0003	0.0124	<0.003	<0.1	0.000678 J	0.0234	<0.00008	0.00221 J	<0.002	<0.0005	1.07	<1.55	2.62
	12/17/15	<0.0008	<0.002	0.0781	<0.0003	<0.0003	<0.002	<0.003	0.159 J	0.000775 J	0.022	<0.00008	<0.002	<0.002	<0.0005	1.32	<2.57	3.89
	2/9/2016	<0.0008	<0.002	0.0664	<0.0003	<0.0003	<0.002	<0.003	0.157 J	0.000339 J	0.0211	<0.00008	<0.002	<0.002	<0.0005	0.771	<1.53	2.30
	04/14/16	<0.0008	<0.002	0.104	<0.0003	<0.0003	0.00425 J	<0.003	0.109 J	0.00371	0.0255	<0.00008	<0.002	<0.002	<0.0005	0.560	1.46	2.02
	06/15/16	<0.0008	<0.002	0.107	0.00039 J	<0.0003	0.00269 J	0.00323 J	0.101 J	0.00513	0.0192	0.00013 J	<0.002	<0.002	<0.0005	2.01	2.06	4.07
	08/25/16	<0.0008	0.00451 J	0.262	0.000629 J	<0.0003	0.0135	0.00412 J	<0.1	0.00842	0.0204	<0.00008	<0.002	<0.002	<0.0005	1.59	1.84	3.43
	10/04/16	<0.0008	0.00402 J	0.122	0.00062 J	<0.0003	0.0133	0.00395 J	0.129 J	0.0084	0.0259	<0.00008	<0.002	0.00292 J	<0.0005	1.41	<0.76	2.17
	12/23/16	<0.0008	0.00938	0.557	<0.0003	<0.0003	0.00435 J	0.00609	0.112 J	0.00216	0.0755	<0.00008	<0.002	0.00786	<0.0005	1.89	3.54	5.43
	06/05/18	<0.0008	<0.002	0.0777	0.00031	<0.0003	0.00578	<0.003	0.137 J	0.0029	0.0213	<0.00008	<0.002	<0.002	<0.0005	1.68	<0.526	2.206
	09/06/18	NA	<0.002	0.0517	<0.0003	<0.0003	0.0024 J	<0.003	<0.10	0.0005 J	0.0188	NA	<0.002	<0.002	<0.0005	<0.304	<0.5450	<0.849
	05/16/19	0.0008	<0.002	0.0474	<0.0003	<0.0003	0.0030 J	<0.003	<0.10	0.0003 J	0.0221	<0.00008	<0.002	<0.002	<0.0005	0.385	1.43	1.815
FGD-14	05/17/19	NA	NA	NA	NA	NA	NA	<0.003	NA	NA	0.00564	NA	NA	<0.002	NA	NA	NA	NA
FGD-15	06/06/19	NA	NA	NA	NA	NA	NA	NA	0.622	NA	0.0768	NA	NA	NA	NA	NA	NA	NA
FGD-16	06/06/19	NA	NA	NA	NA	NA	NA	NA	0.164 J	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1. Abbreviations: GWPS - groundwater protection standard; mg/L - milligrams per liter; pCi/L - picocuries per liter.
2. ^ - Sum of Ra 226 and Ra 228 concentrations. Non-detect isotope results were assigned a value equal to the minimum detectable concentration.
3. J - result is an estimate.
4. NA - Not analyzed.

Table 2

Screening of Potential Groundwater Response Technologies
Oak Grove Steam Electric Station
FGD Ponds

Groundwater Response Technology	Description	Protective of Human Health and Environment	Attain Groundwater Protection Standard	Control Source of Release	Remove Contaminated Material From Environment	RCRA Compliance	Screening Comments	Retained for Further Evaluation
Monitored Natural Attenuation	Natural processes (dispersion, dilution, sorption, coprecipitation, degradation/transformation, etc.) remove CCR constituents from groundwater in-situ. Groundwater monitoring to verify MNA effectiveness.	Migration of CCR constituents in groundwater controlled and CCR concentrations in groundwater reduced.	CCR constituents removed through adsorption, precipitation or coprecipitation. CCR constituents removed from groundwater and retained in aquifer soil matrix to achieve GWPS below and downgradient of CCR Unit.	CCR constituents removed from groundwater below and downgradient of CCR Unit.	CCR constituents removed from groundwater and retained in aquifer soil matrix.	Purge water from groundwater monitoring requires management in accordance with applicable RCRA requirements.	Site is good MNA candidate for CCR constituents based on field MNA evaluation. Long-term groundwater monitoring required. Easy to implement. Groundwater modelling required to assess remediation timeframe.	Yes
Groundwater Extraction and Treatment	System of extraction wells along downgradient edge of ponds to provide hydraulic control of CCR constituent groundwater plumes. Extracted groundwater treated in an on-site treatment system and discharged to Twin Oaks Reservoir or re-injected into aquifer. Groundwater monitoring to verify system effectiveness.	Migration of CCR constituents in groundwater controlled.	GWPS attained downgradient of CCR Unit, but limited effect on concentrations beneath unit.	CCR groundwater constituents contained at edge of ponds.	CCR constituents removed from extracted groundwater by treatment system. Treatment residuals (sludge, regenerate brine, etc.) require management.	Treatment residuals (sludge, regenerate brine, etc.) require management in accordance with applicable RCRA requirements.	Regulatory authorization for treated water discharge required. Bench/pilot testing of treatment system required. Groundwater modelling required to assess remediation timeframe.	Yes
Vertical Hydraulic Barrier	Vertical, low permeability hydraulic barrier along downgradient edge of ponds to provide hydraulic control of CCR constituent groundwater plumes. Groundwater extraction and treatment required upgradient of barrier to control groundwater elevations. Groundwater monitoring to verify system effectiveness.	Migration of CCR constituents in groundwater controlled.	GWPS attained downgradient of CCR Unit, but limited effect on concentrations beneath unit.	CCR groundwater constituents contained at edge of ponds.	CCR constituents removed from extracted groundwater by treatment system. Treatment residuals (sludge, regenerate brine, etc.) require management.	Excavated soil generated from barrier installation requires testing and management as necessary. Treatment residuals (sludge, regenerate brine, etc.) require management in accordance with applicable RCRA requirements.	Bench/pilot test of barrier materials likely required. Regulatory authorization for treated water discharge required. Bench/pilot testing of treatment system required. Groundwater modelling required to assess remediation timeframe.	Yes

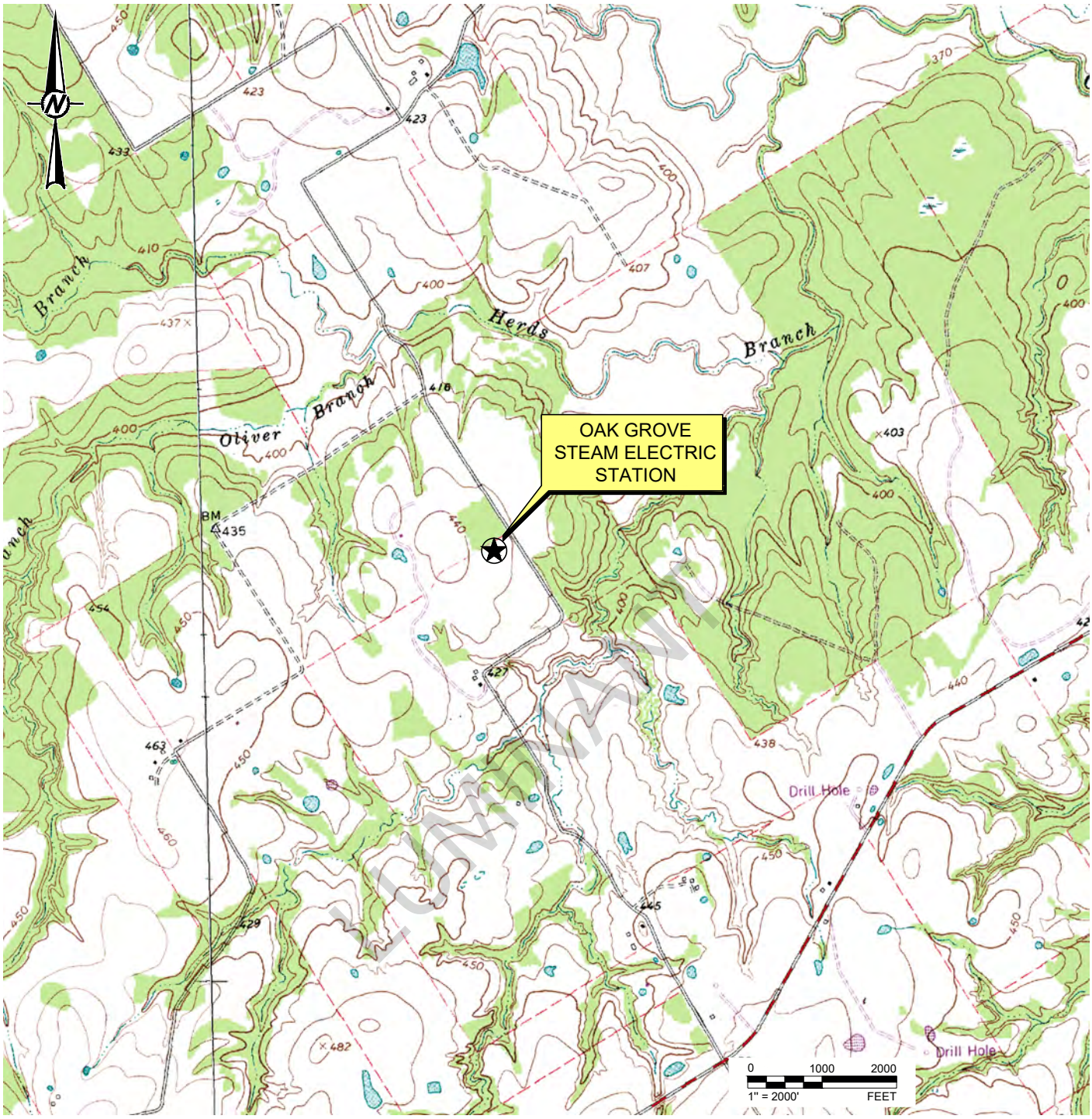
Groundwater Response Technology	Description	Protective of Human Health and Environment	Attain Groundwater Protection Standard	Control Source of Release	Remove Contaminated Material From Environment	RCRA Compliance	Screening Comments	Retained for Further Evaluation
Permeable Reactive Barrier	In-situ, passive, permeable treatment zone containing reactive media designed to intercept impacted groundwater and adjust geochemistry to immobilize CCR contaminants. CCR constituents removed from groundwater through adsorption and/or coprecipitation under reducing groundwater conditions. PRB acts as a barrier to groundwater contamination but not groundwater flow. Groundwater monitoring to verify system effectiveness.	Migration of CCR constituents in groundwater controlled.	GWPS attained downgradient of CCR Unit, but limited effect on concentrations beneath unit.	CCR groundwater constituents removed from groundwater downgradient of CCR Unit.	CCR constituents removed from groundwater and retained on reactive media or aquifer soil matrix.	Excavated soil generated from PRB installation requires testing and management as necessary.	CCR constituent removal using PRB possible but full-scale performance uncertain. Reactive media effectiveness reduced over time and media likely replaced periodically. Bench/pilot testing of PRB media/system required. Groundwater modelling required to assess remediation timeframe.	No
In-Situ Chemical Treatment	Injection of chemical/material into aquifer to adjust geochemistry and enhance precipitation, co-precipitation, or indirect adsorption of CCR constituents. CCR constituents potentially removed through adsorption, precipitation and/or coprecipitation. Groundwater monitoring to verify system effectiveness.	Migration of CCR constituents in groundwater controlled.	GWPS attained downgradient of CCR Unit, but limited effect on concentrations beneath unit.	CCR groundwater constituents removed from groundwater downgradient of CCR Unit.	CCR constituents removed from groundwater and retained on aquifer soil matrix.	No significant RCRA compliance issues anticipated.	ICT considered emerging remediation technology for CCr constituents - not demonstrated under full-scale conditions. Bench/pilot-scale testing of ICT system required. Groundwater modelling required to assess remediation timeframe.	No
Phytoremediation	Use of plants to remove CCR constituents through uptake and accumulation within above ground portions of the plant. Primary plant process for CCR constituent removal is phytoextraction (uptake/accumulation of contaminants within aboveground portions of a plant). Groundwater monitoring to verify system effectiveness.	Migration of CCR constituents in groundwater controlled.	GWPS attained downgradient of CCR Unit, but limited effect on concentrations beneath unit.	CCR groundwater constituents removed from groundwater downgradient of CCR Unit.	CCR constituents removed from groundwater and accumulates in plants.	Management of harvested plants in accordance with RCRA may be required if accumulated CCR constituent concentrations are high.	Phytoextraction occurs in shallow root zone of plants, which limits the effectiveness for the groundwater depths at the Site. Phytoremediation for CCR constituent removal from groundwater has not been demonstrated under full-scale conditions Bench/pilot-scale testing of phytoremediation system required. Groundwater modelling required to assess remediation timeframe.	No

Table 3

Evaluation of Corrective Measures Alternatives
Oak Grove Steam Electric Station
FGD Ponds

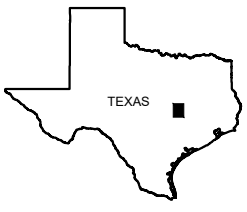
Corrective Measures Alternative	Description	Performance	Reliability	Ease of Implementation	Potential Impacts	Time Requirements	Institutional Requirements
Retrofit Liner in FGD-A with Monitored Natural Attenuation	New Liner in FGD-A. MNA to remove CCR constituents from groundwater and control migration. Groundwater monitoring to verify MNA effectiveness.	New FGD-A Liner and existing FGD-B and FGD-C liners isolate CCR material in pond and mitigate on-going source of CCR constituents to groundwater. Site is good MNA candidate for CCR constituents based on MNA field evaluation.	Liner construction is a common and effective source control technology. On-going attenuation of CCR constituents in groundwater demonstrated during MNA field evaluation. Groundwater monitoring used to verify long-term MNA effectiveness.	Readily implementable with common construction techniques.	Source controlled through pond liner systems. CCR constituents removed from groundwater beneath and downgradient of ponds.	Retrofit Implementation: 1-2 years. MNA Implementation: 2-3 years. Groundwater modelling required to assess remediation timeframe.	Minimal regulatory requirements.
Retrofit Liner in FGD-A with Groundwater Extraction and Treatment	New Liner in FGD-A. System of extraction wells along downgradient edge of ponds to provide hydraulic control of CCR constituents groundwater plumes. Extracted groundwater treated in an on-site treatment system and discharged to Twin Oaks Reservoir or re-injected into aquifer. Groundwater monitoring to verify system effectiveness.	New FGD-A Liner and existing FGD-B and FGD-C liners isolate CCR material in pond and mitigate on-going source of CCR constituents to groundwater. Migration of CCR constituents in groundwater controlled at pond boundaries by extraction wells.	Liner construction is a common and effective source control technology. Groundwater extraction and treatment is a common and effective hydraulic control technology. Treatment system operational reliability is key component of overall reliability.	Readily implementable with common construction techniques. Bench/pilot testing of treatment system required. Regulatory authorization for treated water discharge could be difficult to obtain.	Source controlled through pond liner systems. Control of CCR constituent migration downgradient of ponds by extraction wells. Extraction system does not address groundwater beneath ponds.	Retrofit Implementation: 1-2 years. GW Ext/Treatment Implementation: 3-4 years. Groundwater modelling required to assess remediation timeframe.	Regulatory authorization for treated water discharge required. Treatment system residuals (sludge, regenerate brine, etc.) require management.
Retrofit Liner in FGD-A with Vertical Hydraulic Barrier and Groundwater Extraction and Treatment	New Liner in FGD-A. Vertical, low permeability hydraulic barrier along downgradient edge of ponds to provide hydraulic control of CCR constituent groundwater plumes. Groundwater extraction and treatment required upgradient of barrier to control groundwater elevations. Groundwater monitoring to verify system effectiveness.	New FGD-A Liner and existing FGD-B and FGD-C liners isolate CCR material in pond and mitigate on-going source of CCR constituents to groundwater. Migration of CCR constituents in groundwater controlled at pond boundaries by vertical barrier. Groundwater elevations upgradient of barrier controlled by groundwater extraction.	Liner construction is a common and effective source control technology. Vertical hydraulic barrier must be keyed into lower impermeable layer. Groundwater extraction and treatment is a common and effective hydraulic control technology. Treatment system operational reliability is key component of overall reliability.	Readily implementable with common construction techniques. Bench/pilot testing of treatment system required. Regulatory authorization for treated water discharge could be difficult to obtain.	Source controlled through pond liner systems. Control of CCR constituent migration downgradient of pond by vertical barrier. Vertical barrier does not address groundwater beneath pond.	Retrofit Implementation: 1-2 years. Barrier and GW Ext/Treat Implementation: 5-8 years. Groundwater modelling required to assess remediation timeframe.	Regulatory authorization for treated water discharge required. Treatment system residuals (sludge, regenerate brine, etc.) require management.

FIGURES



REFERENCE(S)

BASE MAP TAKEN FROM WWW.TNRIS.GOV, BALD PRAIRIE, TX 7.5 MIN. USGS QUADRANGLE DATED 1965.



QUADRANGLE LOCATION

CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

TITLE
SITE LOCATION MAP

CONSULTANT
GOLDER

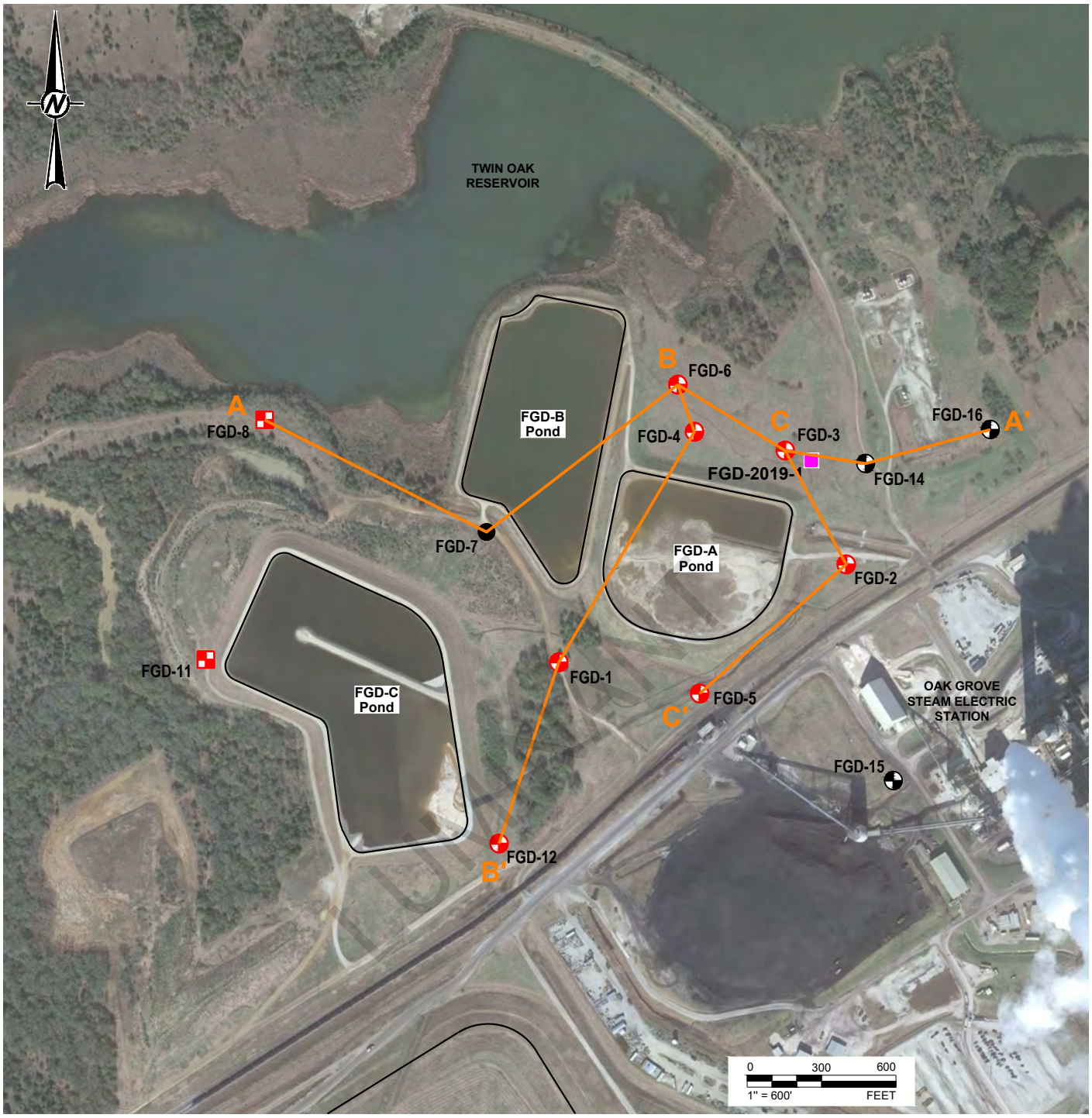
YYYY-MM-DD	2019-08-22
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19121403	0	1

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

0 1 in

Last Edited By: adiamond Date: 2019-08-22 Time:10:37:15 AM | Printed By: adiamond Date: 2019-08-22 Time:10:41:40 AM
Path: \\texarkanadata\Projects - Round Rock\19121403 - Luminant\Oak Grove\ | File Name: FIG 1 - Site Location Map.dwg



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- BACKGROUND CCR MONITORING WELL
- CCR DELINEATION WELL
- NON-CCR MONITORING WELL
- MNA SOIL BORING
- A — A' CROSS SECTION LOCATION

NOTE(S)

1. NATURE AND EXTENT EXTENT DELINEATION IS NOT NECESSARY BASED ON THE UPDATED STATISTICAL EVALUATION.

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/9/18.

CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

TITLE
DETAILED SITE PLAN - FGD POND AREA

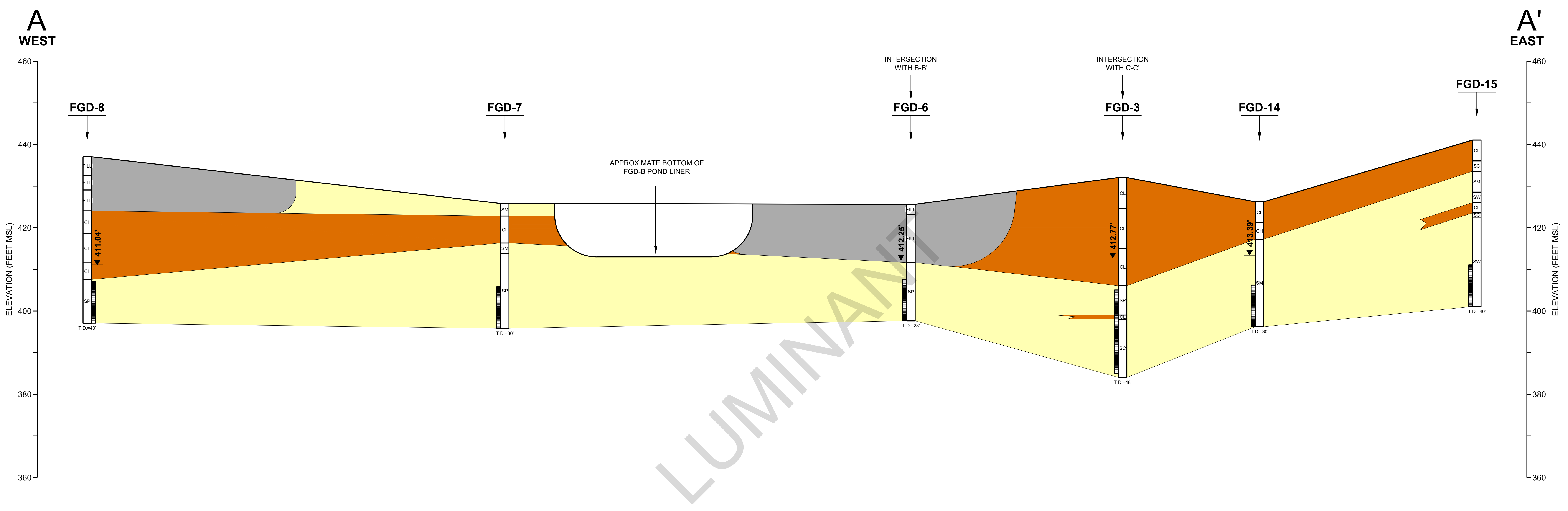
CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-28
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19121403 | REV. 0 | FIGURE 2

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

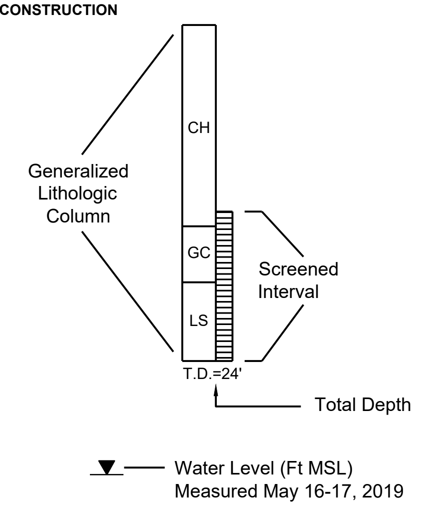
Last Edited By: adiamond Date: 2019-08-28 Time:3:55:26 PM | Printed By: adiamond Date: 2019-08-28 Time:3:55:46 PM
Path: \\texarkanadata\Projects - Round Rock\19121403 - Luminant\Oak Grove\ | File Name: FIG 2 - Detaile Site Plan (FGD Pond Area).dwg

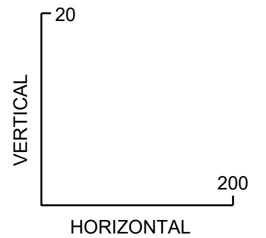


LEGEND

	SAND
	CLAY
	FILL

MONITORING WELL CONSTRUCTION





CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

TITLE
FGD POND AREA
GEOLOGIC CROSS SECTIONS A-A'

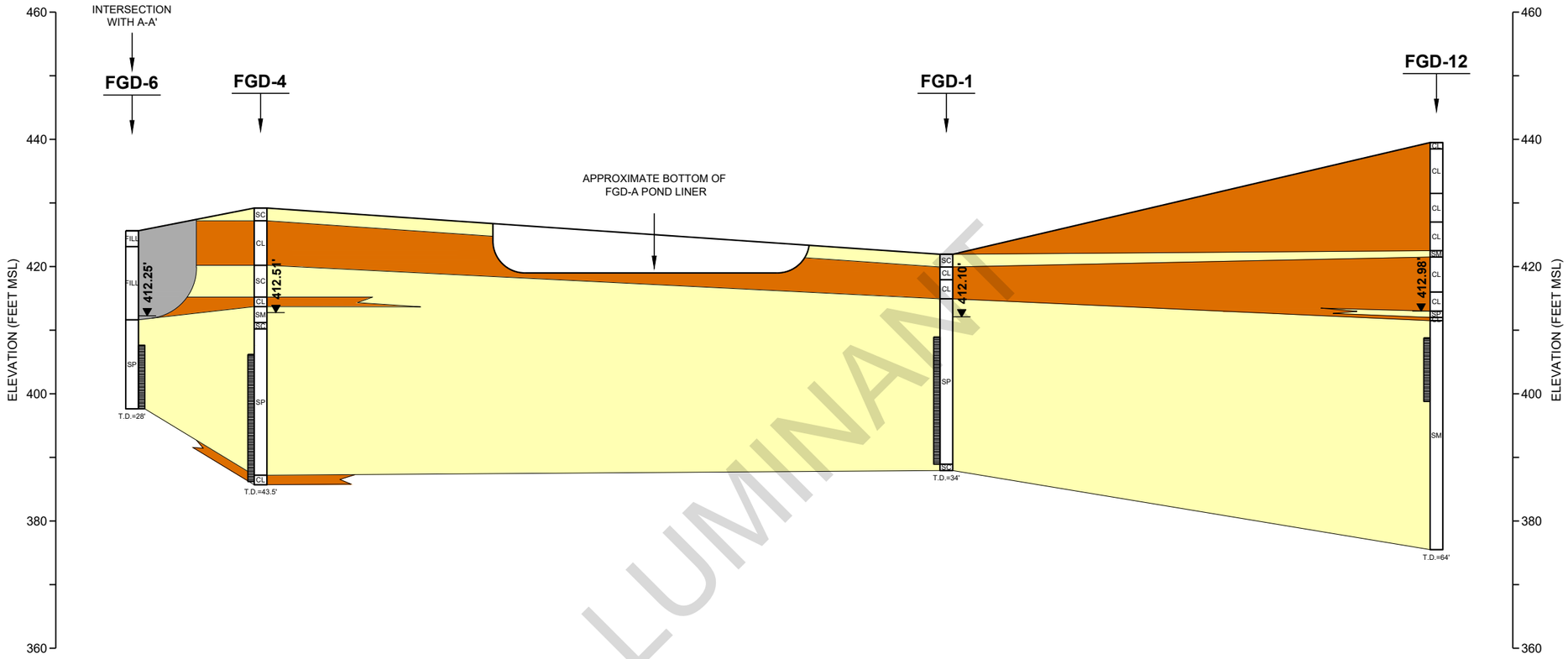
CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-28
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19121403	0	3

B
NORTH

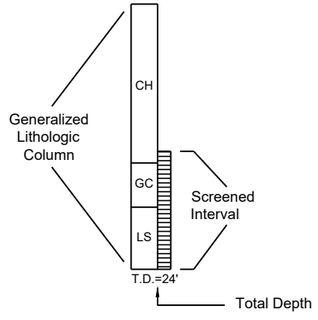
B'
SOUTH



LEGEND

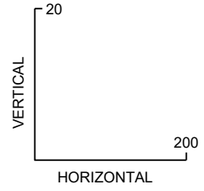
- SAND
- CLAY
- FILL

MONITORING WELL CONSTRUCTION



Water Level (Ft MSL)
Measured May 16-17, 2019

SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

TITLE
FGD POND AREA
GEOLOGIC CROSS SECTIONS B-B'

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-28
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19121403 | REV. 0 | FIGURE 4

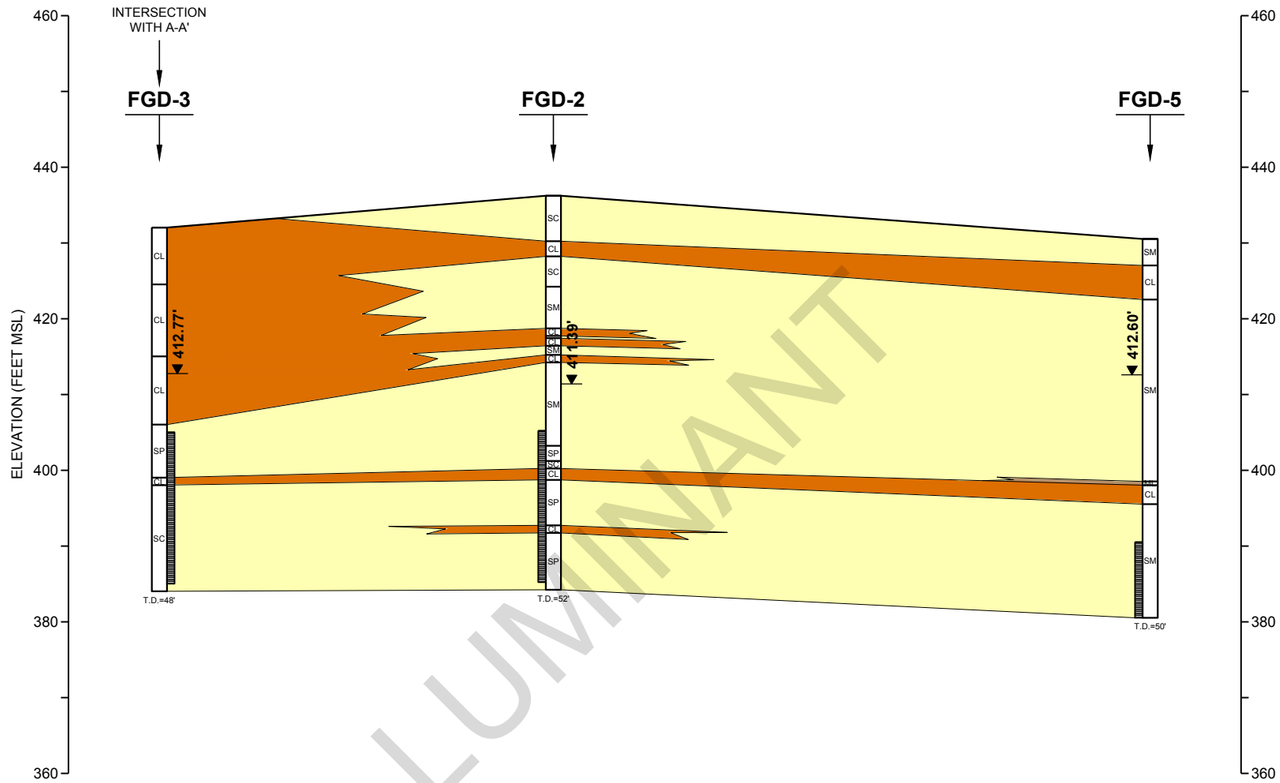
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0

Path: \\texarkana\data\Projects - Round Rock\19121403 - Luminant\Oak Grove\ | File Name: FIG 4-6 - Cross Sections (FGD Ponds).dwg | Last Edited By: adiamond Date: 2019-08-29 Time:8:35:49 AM | Printed By: adiamond Date: 2019-08-29 Time:8:37:35 AM

C
NORTH

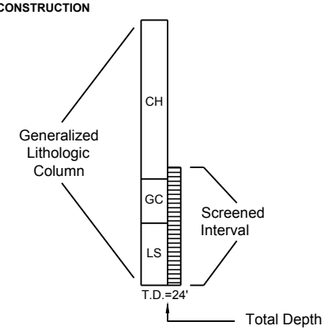
C'
SOUTH



LEGEND

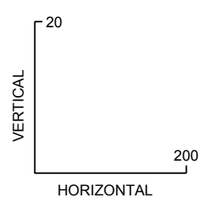
- SAND
- CLAY
- FILL

MONITORING WELL CONSTRUCTION



▼ Water Level (Ft MSL)
Measured May 16-17, 2019

SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

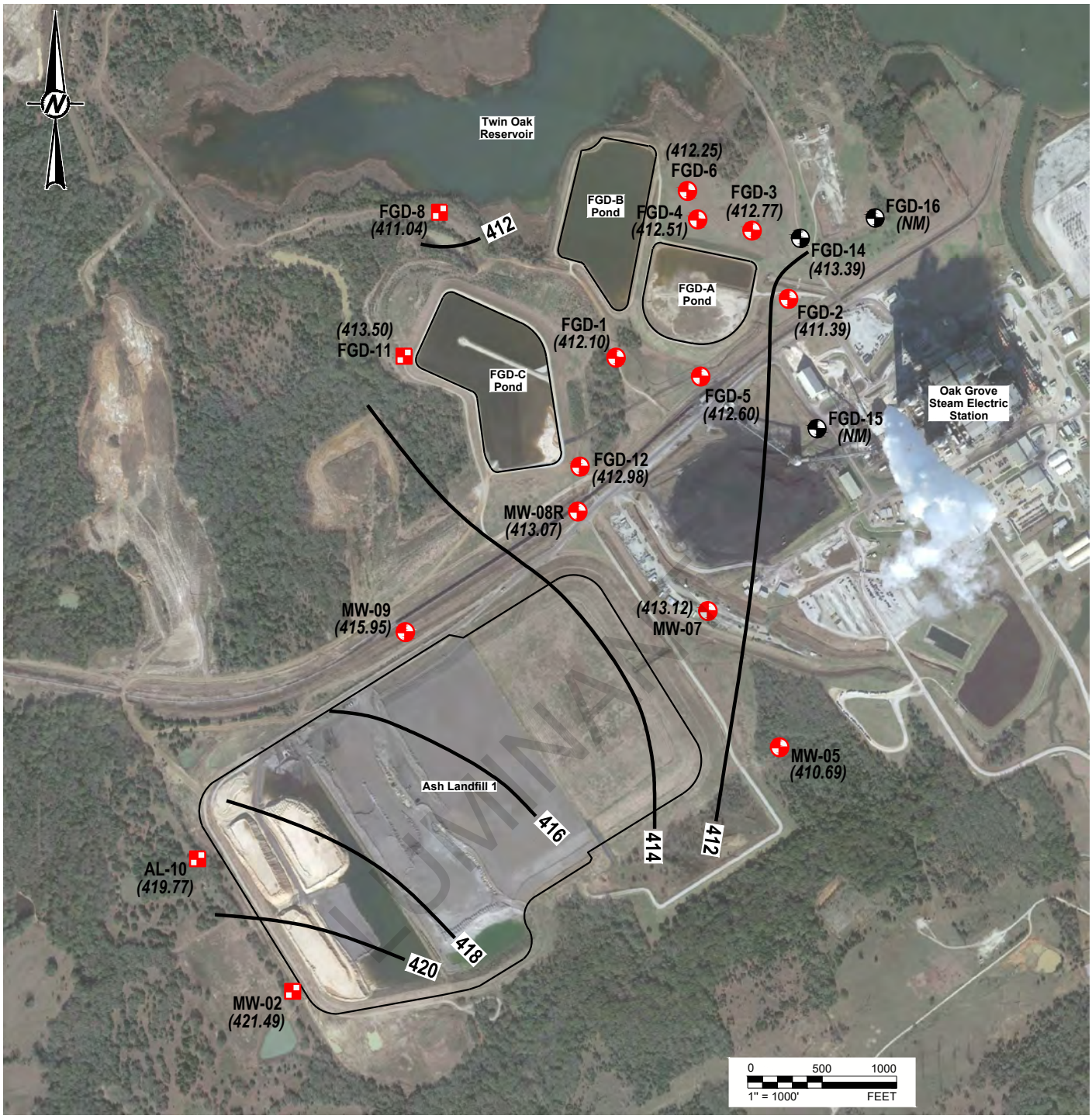
TITLE
FGD POND AREA
GEOLOGIC CROSS SECTIONS C-C'

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-28
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19121403 | REV. 0 | FIGURE 5

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



LEGEND

- CCR MONITORING WELL
- BACKGROUND CCR MONITORING WELL
- CCR DELINEATION WELL
- *(410.06)* GROUNDWATER POTENTIOMETRIC SURFACE (FT MSL)
- 400 GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR (C.I. = 2 FT)

NOTE(S)

1. NATURE AND EXTENT DELINEATION IS NOT NECESSARY BASED ON THE UPDATED STATISTICAL EVALUATION. .
2. CCR MONITORING WELLS MW-02, MW-05, MW-07, MW-08R, MW-09, AND AL-10 ARE ASSOCIATED WITH ASH LANDFILL 1 CCR UNIT, WHICH IS NOT SUBJECT TO THE ACM.

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/9/18.

CLIENT
LUMINANT

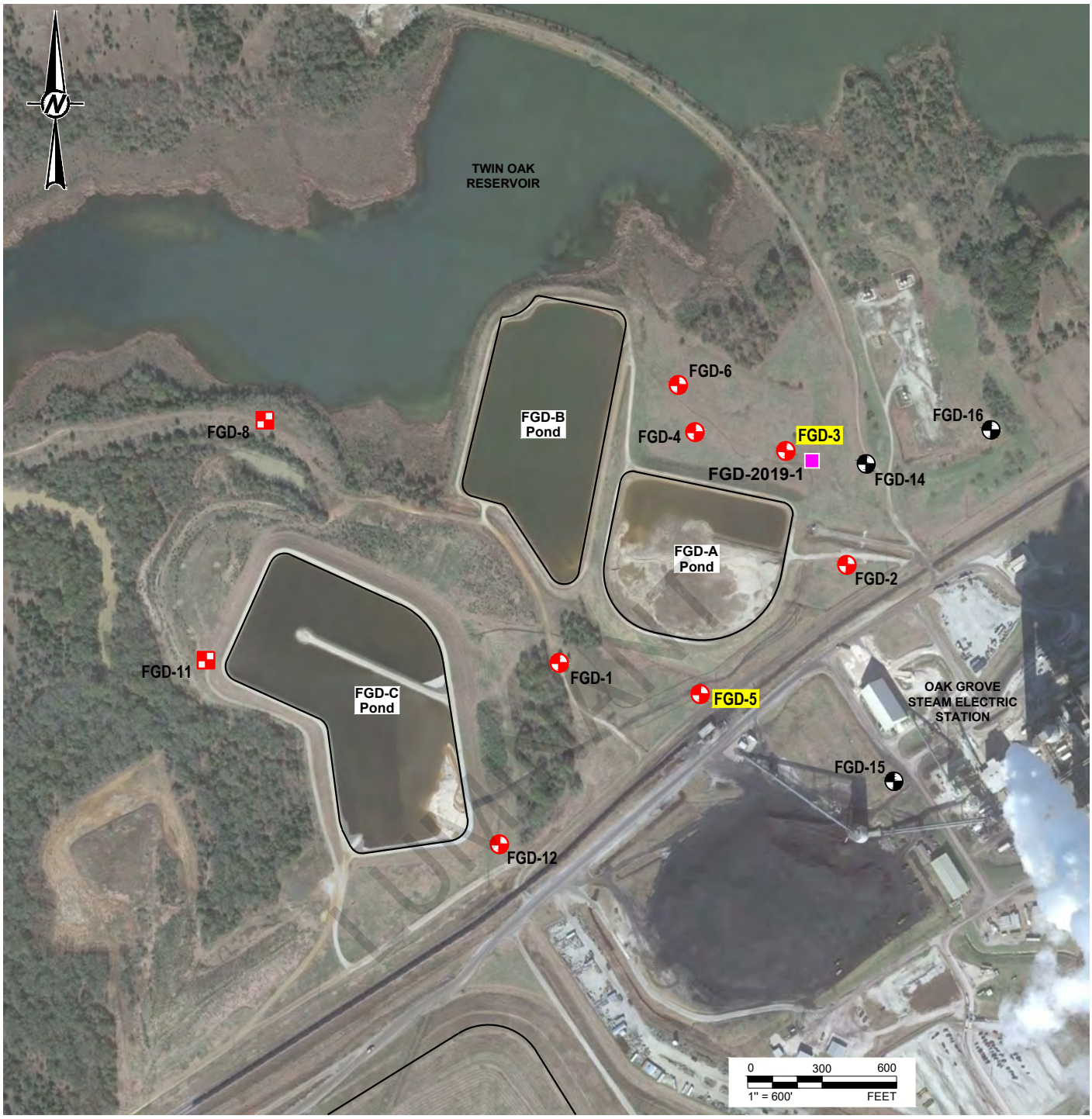
PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

TITLE
ASH LANDFILL AND FGD PONDS POTENTIOMETRIC SURFACE MAP MAY 16-17, 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-26
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19122449 | REV. 0 | FIGURE 6



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- BACKGROUND CCR MONITORING WELL
- CCR DELINEATION WELL
- MNA SOIL BORING
- SSLs FOR ONE OR MORE APPENDIX IV CONSTITUENTS IN DOWNGRADIENT WELLS BASED ON INITIAL STATISTICAL EVALUATION

NOTE(S)

1. NO SSLs WERE DETECTED BASED ON UPDATED STATISTICAL EVALUATION.

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 12/9/18.

CLIENT
LUMINANT

PROJECT
OAK GROVE STEAM ELECTRIC STATION
ROBERTSON COUNTY, TEXAS

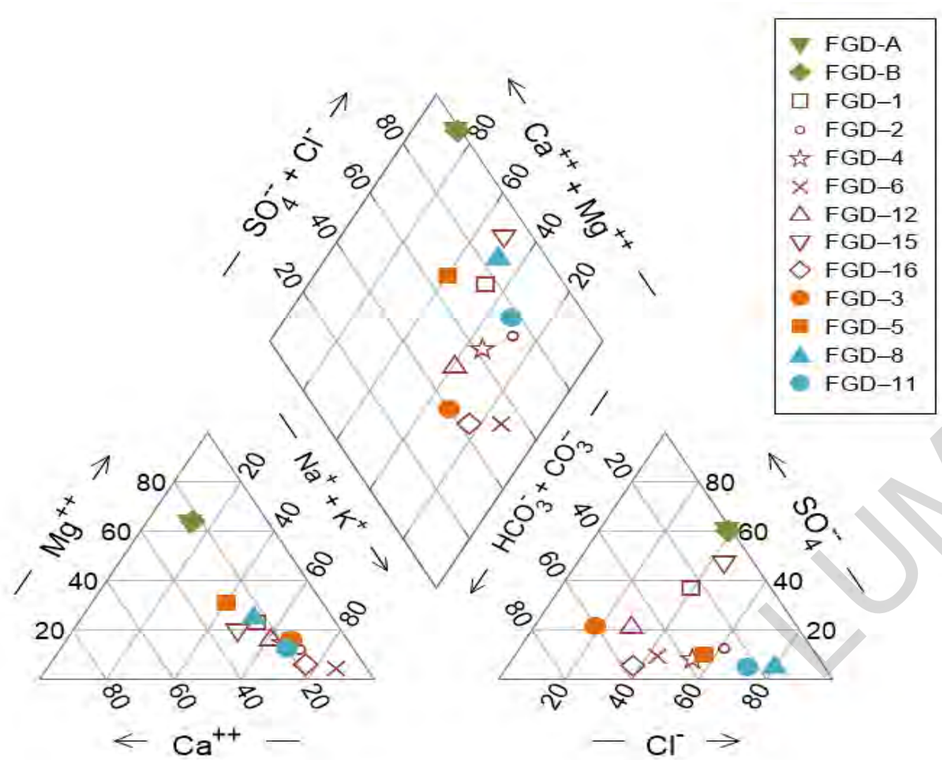
TITLE
FGD POND AREA
EXTENT OF APPENDIX IV CONSTITUENTS
DETECTED AT SSLs ABOVE GWPSs

CONSULTANT
GOLDER

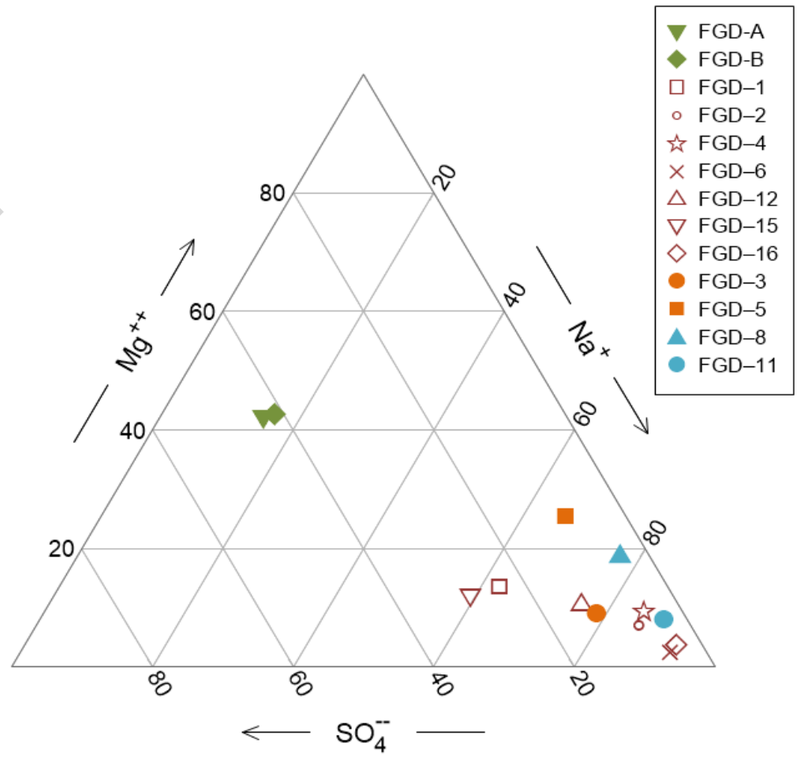
YYYY-MM-DD	2019-08-29
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO. 19121403 | REV. 0 | FIGURE 7

(a)



(b)



CLIENT
LUMINANT
OAK GROVE
FGD PONDS

CONSULTANT
GOLDER

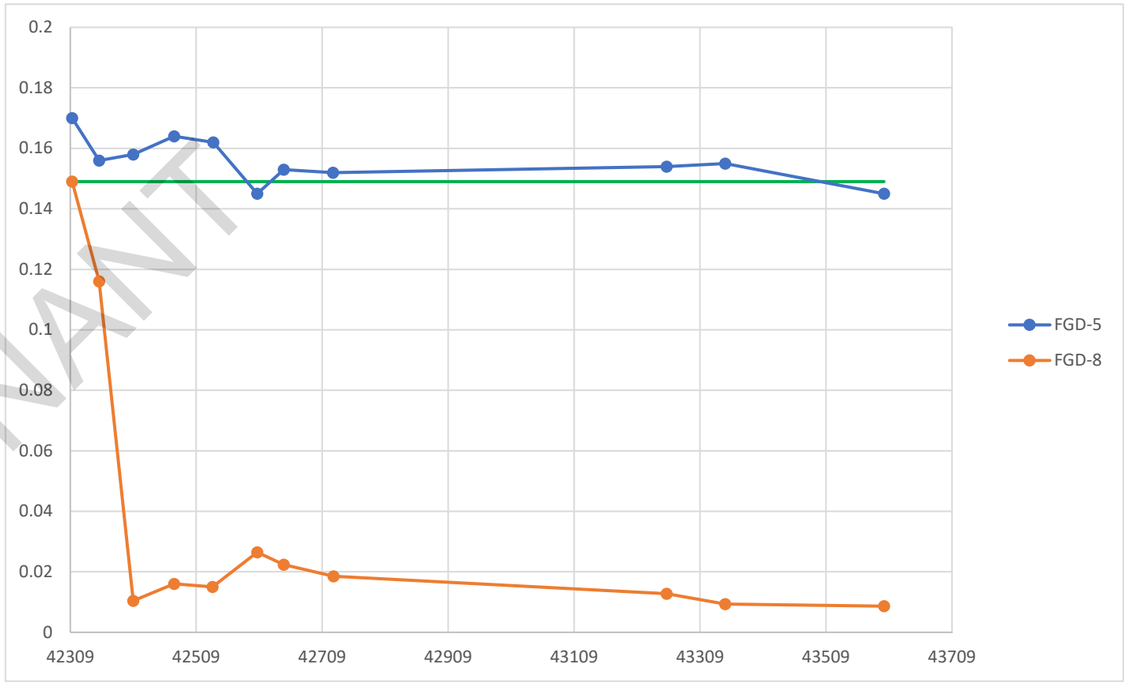
PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
GENEREAL GROUNDWATER RELATIVE ION ABUNDANCE (A) AND SELECT ION RATIOS (B) IN GROUNDWATER

PROJECT NO.	PHASE	REV.	FIGURE
19122434	A	1	8a-b

(a)

(b)



CLIENT
LUMINANT
OAK GROVE
FGD PONDS

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
HISTORICAL TRENDS OF COBALT (A)
AND LITHIUM (B) IN MONITORING WELLS

PROJECT NO.	PHASE	REV.	FIGURE
19122434	A	1	9a-b

APPENDIX A

BORING LOGS

RECORD OF BOREHOLE MW-FGD-01

SHEET 1 OF 2
DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 27-Aug-2008
BORING FINISHED: 27-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4549.42
EASTING (ft): 2454.41
ELEVATION (ft): 421.91

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL — W — LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		Muddy with vegetation										
		GROUND SURFACE		421.9								
0		Firm, brown to light brown, sandy CLAY, some vegetative presence, dry		0.0	SB-1		2 3 3 N6	40				
		trace red at 1.5'										
2		Hard, grayish brown with red, CLAY, with sand, dry		2.0	SB-2		8 20 32 N52	67				
4		Hard, gray, trace red, silty CLAY, dry		4.0	SB-3		10 14 18 N32	73				
6		red, some iron oxide at 6'			SB-4		7 13 14 N27	87				
		Compact, grayish brown, SAND, with silt, damp		7.0								
8		reddish brown, some clay at 8'			SB-5		6 7 8 N15	87				
10		trace red at 10'			SB-6		7 8 8 N16	87				
12					SB-7		3 10 13 N23	67				
14		wet at 14'			SB-8		7 9 9 N18	100				▼ 14' 08/27/2008
16					SB-9		1 10 12 N22	87				
18					SB-10		1 10 19 N29	93				
20		some yellowish brown at 19.5'										
		--- CONTINUED NEXT PAGE ---										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: BLT

RECORD OF BOREHOLE MW-FGD-01

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 27-Aug-2008
BORING FINISHED: 27-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4549.42
EASTING (ft): 2454.41
ELEVATION (ft): 421.91

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % (20 40 60 80 ★) / WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
20		very dense at 20'		20.0	SB-11		15 26 35 N61	87				
22		dense, grayish brown and mottled yellow at 22'			SB-12		17 21 27 N48	100				
24		very dense, moist at 24'			SB-13		18 25 35 N60	87				
26					SB-14		16 17 35 N52	93				
28					SB-15		20 35 36 N71	100				
30					SB-16		18 28 32 N60	87				
32												
		Very dense, dark brownish gray, clayey SAND, trace iron oxide, damp		33.0	SB-17		21 36 50/5"	93				
34		BORING TERMINATED AT 34'		34.0								
36												
38												
40												

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-02

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 22-Aug-2008
BORING FINISHED: 25-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4261.32
EASTING (ft): 3643.72
ELEVATION (ft): 436.24

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✪ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		Muddy										
		GROUND SURFACE		436.2								
0		Stiff, brown with some dark brown, sandy CLAY, some gravel, damp		0.0	SB-1		4 4 5 N9	27				
2		very stiff, dark brown at 2'			SB-2		4 7 16 N23	47				
4		very stiff, brown to yellowish brown, some iron oxide traces, possible lignite traces, dry at 4'			SB-3		7 10 13 N23	53				
6		Very stiff, mottled gray and brown, CLAY, some gravel, dry		6.0	SB-4		5 13 15 N28	67				
8		Very stiff, brown, yellow, and gray, mottled, sandy CLAY		8.0	SB-5		5 13 16 N29	53				
10		hard at 10'										
		gray at 11'			SB-6		7 13 20 N33	80				
12		Dense, light gray, fine, silty SAND, with a seam of clay, damp		12.0	SB-7		14 17 21 N38	87				
14					SB-8		10 19 27 N46	93				
16					SB-9		16 23 24 N47	87				
		seam of hard CLAY		17.5								
18		very dense at 18'										
				18.5								
		seam of very hard CLAY		18.8	SB-10		10 25 36 N61	87				
				19.8								
20		--- CONTINUED NEXT PAGE ---										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: BLT

RECORD OF BOREHOLE MW-FGD-02

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 22-Aug-2008
BORING FINISHED: 25-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

DATUM: LOCAL
NORTHING (ft): 4261.32
EASTING (ft): 3643.72
ELEVATION (ft): 436.24

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✪ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
20		dense at 20'		20.0	SB-11		14 19 27 N46	92				
		seam of hard CLAY		21.0								
22		very dense at 22'		22.0	SB-12		13 27 37 N64	100				
24					SB-13		17 29 28 N57	87				
26					SB-14		17 25 42 N67	67				
		yellow at 27.5'										
28					SB-15		20 39 50/5"	87				
30		gray at 30.5'			SB-16		25 45 24 N69	87				
32												▼ 32' 08/22/2008
		Very loose, brown, SAND, moist		33.0	SB-17		4 1 2 N3	80				
34					SB-18		7 14 14 N28	73				
		Very stiff, brown, sandy CLAY, moist		35.0								
36		Hard, brown, CLAY, with silt, moist		36.0	SB-19		8 25 50/4"	93				
		Very dense, brown, SAND		37.5								
38		gray and yellow, mottled at 39'			SB-20		20 45 50/3"	80				
40		*--- CONTINUED NEXT PAGE ---*										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-02

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 22-Aug-2008
BORING FINISHED: 25-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4261.32
EASTING (ft): 3643.72
ELEVATION (ft): 436.24

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL — W — LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
40		brownish gray at 40'		40.0	SB-21		24 42 50/4"	87				
42		gray at 41' dense at 42'			SB-22		32 25 22 N47	100				
44		seam of hard, yellowish gray and brown, CLAY at 43.5'		43.5								
		very dense at 44'		44.5	SB-23		18 36 50/4"	100				
46					SB-24		32 45 50/3"	73				
48					SB-25		24 24 50/5"	80				
50					SB-26		32 45 50/3"	87				
52		BORING TERMINATED AT 52'		52.0								
54												
56												
58												
60												

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-03

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 21-Aug-2008
BORING FINISHED: 21-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4780.02
EASTING (ft): 3685.25
ELEVATION (ft): 432.04

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✪ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % (20 40 60 80 ★); WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		Muddy										
0		GROUND SURFACE		432.0								
		Soft to firm, reddish brown, CLAY, with sand, some gravel		0.0	SB-1		2 2 2 N4	33				
2					ST-2			70	⊕			
4		very stiff, brown, mottled at 4'			SB-3		5 7 12 N19	83				
6					SB-4		5 12 15 N27	93				
		Very stiff, gray, silty CLAY		7.5								
8					SB-5		5 8 12 N20	87				
10		trace brown at 10'			SB-6		4 7 9 N16	93				
12		stiff, light brown at 12'			SB-7		3 5 7 N12	73				
14					SB-8		3 5 6 N11	87				
16					ST-9			55	⊕			
		Stiff, brown, CLAY, damp		17.0								
18		firm to stiff at 18'			SB-10		2 3 5 N8	100				
20		*--- CONTINUED NEXT PAGE ---*										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-03

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 21-Aug-2008
BORING FINISHED: 21-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 4780.02
EASTING (ft): 3685.25
ELEVATION (ft): 432.04

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % (20 40 60 80 ★) / WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
20		firm at 20'		20.0	SB-11		2 2 3 N5	100				
22		firm to stiff at 22'			SB-12		2 3 5 N8	100				
24		dark brown, some silt at 24'			SB-13		2 3 5 N8	87				
26		Dense, light brown, SAND, moist		26.0	SB-14		12 15 30 N45	73				*26' 08/21/2008*
28		very dense, gray at 28'			SB-15		12 31 30 N61	73				
30		dense, trace yellowish brown at 30'			SB-16		5 14 17 N31	67				
32		Hard, brown, some mottled dark brown, CLAY, damp		33.0	SB-17		3 13 21 N34	67				
34		Hard, gray and yellowish brown mottled, sandy CLAY, some iron staining		34.0	SB-18		6 21 23 N44	67				
36					SB-19		5 13 20 N33	87				
38					SB-20		7 16 25 N41	80				
40		*--- CONTINUED NEXT PAGE ---*										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-03

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 21-Aug-2008
BORING FINISHED: 21-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

DATUM: LOCAL
NORTHING (ft): 4780.02
EASTING (ft): 3685.25
ELEVATION (ft): 432.04

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % (20 40 60 80 ★) / WATER CONTENT PERCENT (PL — W — LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
40		trace iron oxide at 40'		40.0	SB-21		7 16 25 N41	80				
42					SB-22		10 19 29 N48	74				
44					ST-23			100				
46					SB-24		13 23 36 N59	73				
48		BORING TERMINATED AT 48'		48.0								
50												
52												
54												
56												
58												
60												

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: DH
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-04

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 20-Aug-2008
BORING FINISHED: 20-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

DATUM: LOCAL
NORTHING (ft): 5039.72
EASTING (ft): 3414.63
ELEVATION (ft): 429.19

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✪ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL — W — LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		Muddy										
0		GROUND SURFACE		429.2								
		Brown, sandy CLAY, damp		0.0	ST-1			75				
2		Brown, CLAY, with silt, damp		2.0	ST-2			65				
4		very stiff, reddish and yellowish brown, mottled, with occasional calcareous nodules at 4'			SB-3		4 6 10 N16	67				
6					ST-4			87				
8					SB-5		9 11 14 N25	27				
		Very stiff, brown, sandy CLAY, damp		9.0								
10		with occasional coarse, angular gravel at 9.5' reddish brown at 10'			SB-6		7 9 9 N18	53				
12		stiff at 12'			SB-7		10 5 4 N9	40				
14		Stiff, reddish brown, CLAY, with sand, damp		14.0	SB-8		4 6 5 N11	27				
		Compact, brown, fine, silty SAND, damp		15.5								
16		light brown at 16.25'			SB-9		7 12 14 N26	93				
		reddish brown at 17.25'										
18		Compact, reddish brown, clayey SAND, moist		18.0	SB-10		5 8 15 N23	87				
		Compact, light brown, fine, SAND, moist		19.0								
20		--- CONTINUED NEXT PAGE ---										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: CS
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-04

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 20-Aug-2008
BORING FINISHED: 20-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 5039.72
EASTING (ft): 3414.63
ELEVATION (ft): 429.19

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % (20 40 60 80 ★); WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
20		dense, occasional seams of gray at 20'		20.0	SB-11		6 20 20 N40	100				
22		occasional streaks of yellowish brown at 22'			SB-12		12 15 19 N34	93				▼ 22' 08/20/2008
24		very dense, gray with mottled reddish brown at 24'			SB-13		14 28 30 N58	100				
26		dense, mottled, reddish brown, yellowish brown, and gray at 26'			SB-14		13 21 22 N43	100				
28		very dense at 28'			SB-15		11 15 50 N65	87				
30		dense at 30'			SB-16		8 15 21 N36	87				
32					SB-17		14 18 27 N45	80				
34		very dense at 34'			SB-18		20 31 35 N66	100				
36					SB-19		20 31 31 N62	100				
38					SB-20		21 42 50/5"	100				
40		*--- CONTINUED NEXT PAGE ---*										

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: CS
CHECKED: *BLT*

RECORD OF BOREHOLE MW-FGD-04

DATUM: LOCAL

PROJECT: OAK GROVE SES
LOCATION: FRANKLIN, TEXAS

BORING STARTED: 20-Aug-2008
BORING FINISHED: 20-Aug-2008

DRILLING EQUIPMENT: MOBILE B-57 BUGGY
DRILLING OPERATOR: Lewis Environmental Drilling

NORTHING (ft): 5039.72
EASTING (ft): 3414.63
ELEVATION (ft): 429.19

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (ft)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.5 FT	RECOVERY%	UNDRAINED SHEAR STRENGTH Cu (CU - ● P.P. - ⊕ Field Vane Shear ■; UU - ✿ TORV. - ▲ UCS - ✳; 400 800 1200 1600)	ROCK QUALITY DESIGNATION (RQD) % ★ (20 40 60 80); WATER CONTENT PERCENT (PL W LL; 20 40 60 80)	ADDITIONAL LAB. TESTING	INSTALLATION NOTES AND GROUNDWATER OBSERVATIONS
		--- CONTINUED FROM PREVIOUS PAGE ---										
40				40.0	SB-21		18 35 33 N68	*100*				
42		Hard, gray, CLAY, with sand		42.0	SB-22		11 21 34 N55	*100*				
44		BORING TERMINATED AT 43.5'		43.5								
46												
48												
50												
52												
54												
56												
58												
60												

DEPTH SCALE
1 inch to 2.5 feet

Golder Associates

LOGGED: CS
CHECKED: *BLT*

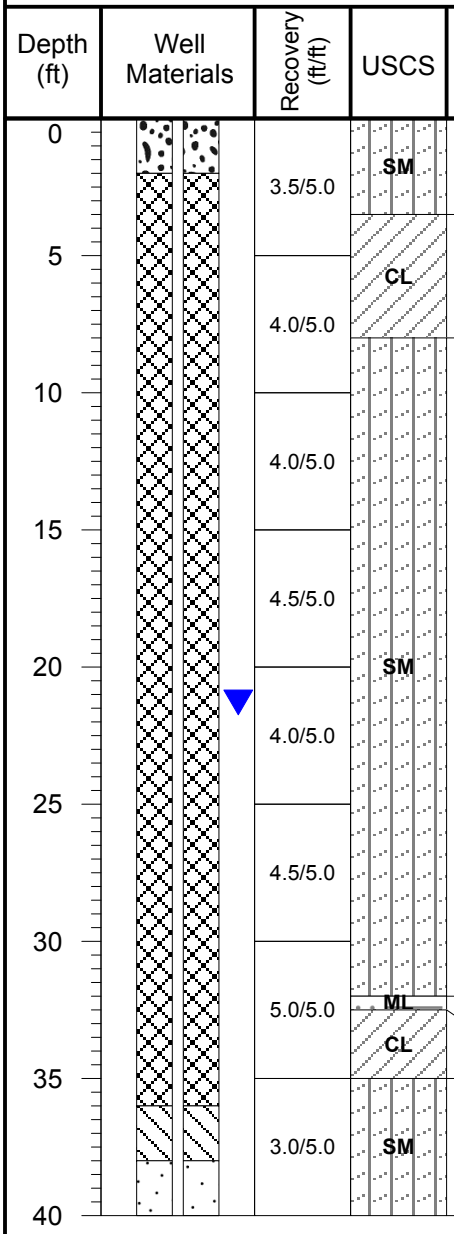
Luminant Power

Log of Boring: FGD-5

Oak Grove Steam Electric Station
Franklin, TX

PBW Project No. 1602

Completion Date:	3/3/10	Drilling Method:	HSA
Drilling Company:	Strata Core, Inc.	Borehole Diameter (in.):	6
Driller:	Roddy Qualls	Total Depth (ft):	50
Driller's License:	3121	Northing:	571950.33
Field Supervisor:	Chris Moore	Easting:	3200628.33
Sampling Method:	3"x5' Barrel	Ground Elev. (ft AMSL):	430.54



Lithologic Description

SILTY SAND, SM, brown, moist, soft.

SILTY CLAY, CL, mottled yellowish brown and yellowish red, moist, firm, with sand from 6'-8'.

SILTY SAND, SM, banded very pale brown and brownish yellow, moist, soft to firm, laminated, very fine grained, trace thinly laminated silt lenses.

SILT, ML, brown, moist to wet, very soft to soft.

CLAY, CL, dark gray, moist, firm to hard, with thinly laminated silt and sand lenses.

SILTY SAND, SM, dark gray to gray, moist, soft to firm, very fine grained, some thinly laminated silt lenses, trace thin carbonaceous lenses, wet at 40', clayey lenses at: 40.5' -41', 44'-44.5, and, 47'-48'.

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Initial Fluid Level (3/9/10)
▼ Depth to water: 23.67 ft BTOC

Annular Materials
(0.0 - 2.0) Concrete
(2.0 - 36.0) Cement/Bentonite Grout
(36.0 - 38.0) Bentonite Chips
(38.0 - 50.0) 12/20 Silica Sand

Well Materials
(+2.4 - 30.0) Casing, 2" Sch 40 FJT PVC
(30.0 - 40.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

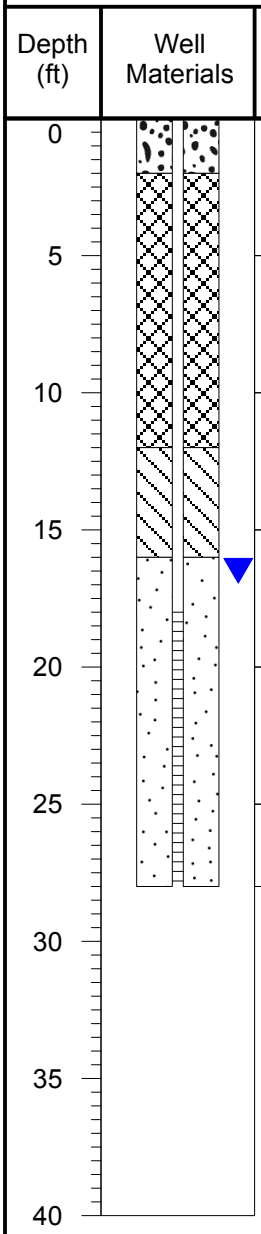
Luminant Power

Log of Boring: FGD-6

Oak Grove Steam Electric Station
Franklin, TX

PBW Project No. 1602

Completion Date:	3/4/10	Drilling Method:	HSA
Drilling Company:	Strata Core, Inc.	Borehole Diameter (in.):	6
Driller:	Roddy Qualls	Total Depth (ft):	28
Driller's License:	3121	Northing:	573195.06
Field Supervisor:	Chris Moore	Easting:	3200525.61
Sampling Method:	3"x5' Barrel	Ground Elev. (ft AMSL):	425.63



Lithologic Description
FILL, sandy clay, yellowish brown, moist, soft to firm, very fine grained sand.
FILL, clay, olive gray, moist, firm, with concrete fragments.
SAND, SP, yellowish brown, wet, soft, laminated, very fine grained, becomes gray at 26'.

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Initial Fluid Level (3/9/10)
▼ Depth to water: 19.48 ft BTOC

Annular Materials
(0.0 - 2.0) Concrete
(2.0 - 14.0) Cement/Bentonite Grout
(14.0 - 16.0) Bentonite Chips
(16.0 - 28.0) 12/20 Silica Sand

Well Materials
(+3.0 - 18.0) Casing, 2" Sch 40 FJT PVC
(18.0 - 28.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

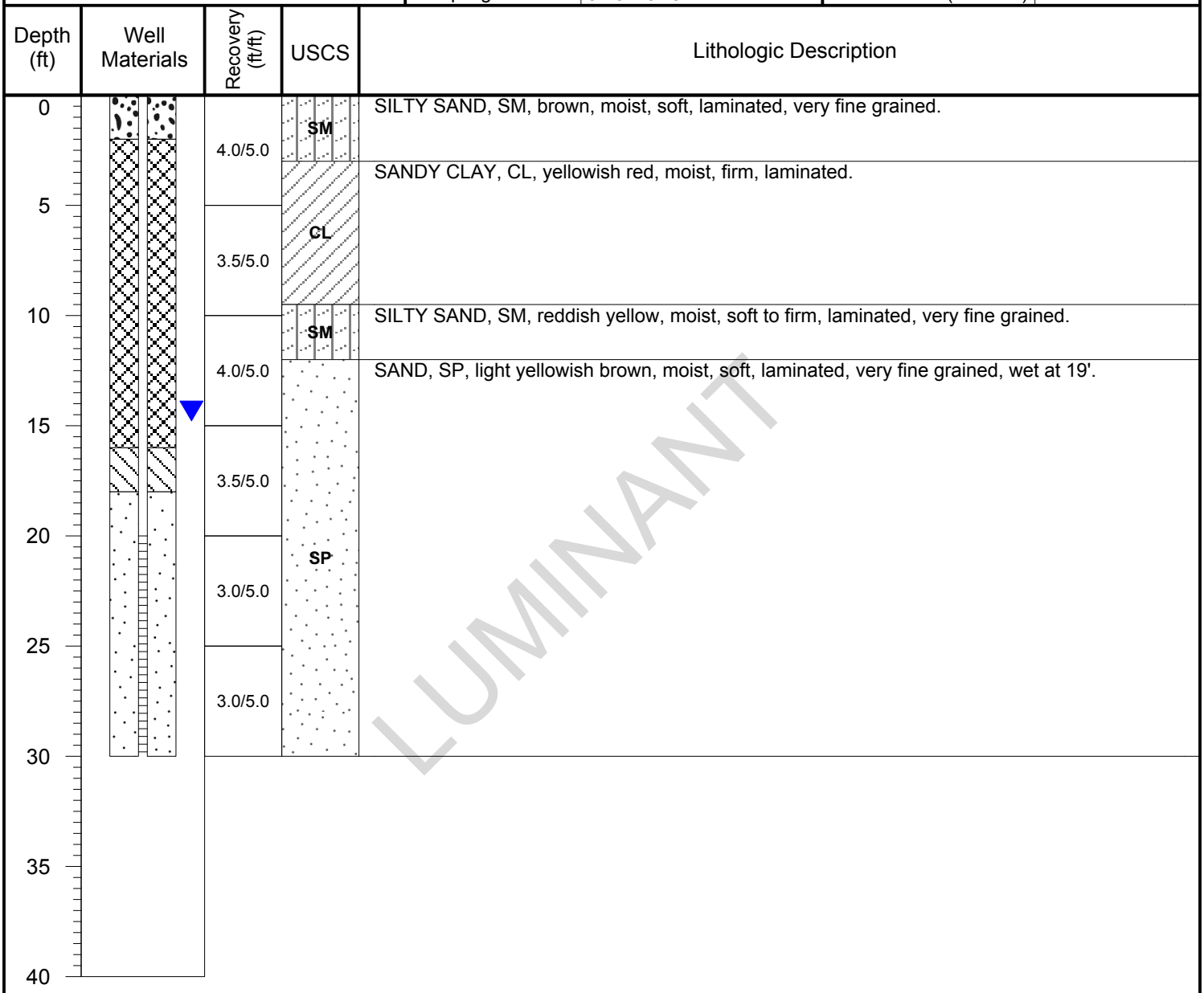
Luminant Power

Log of Boring: FGD-7

Oak Grove Steam Electric Station
Franklin, TX

PBW Project No. 1602

Completion Date:	3/3/10	Drilling Method:	HSA
Drilling Company:	Strata Core, Inc.	Borehole Diameter (in.):	6
Driller:	Roddy Qualls	Total Depth (ft):	30
Driller's License:	3121	Northing:	572591.64
Field Supervisor:	Chris Moore	Easting:	3199761.32
Sampling Method:	3"x5' Barrel	Ground Elev. (ft AMSL):	423.6



PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Initial Fluid Level (3/9/10)
▼ Depth to water: 16.55 ft BTOC

Annular Materials
(0.0 - 2.0) Concrete
(2.0 - 16.0) Cement/Bentonite Grout
(16.0 - 18.0) Bentonite Chips
(18.0 - 30.0) 12/20 Silica Sand

Well Materials
(+2.2 - 20.0) Casing, 2" Sch 40 FJT PVC
(20.0 - 30.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

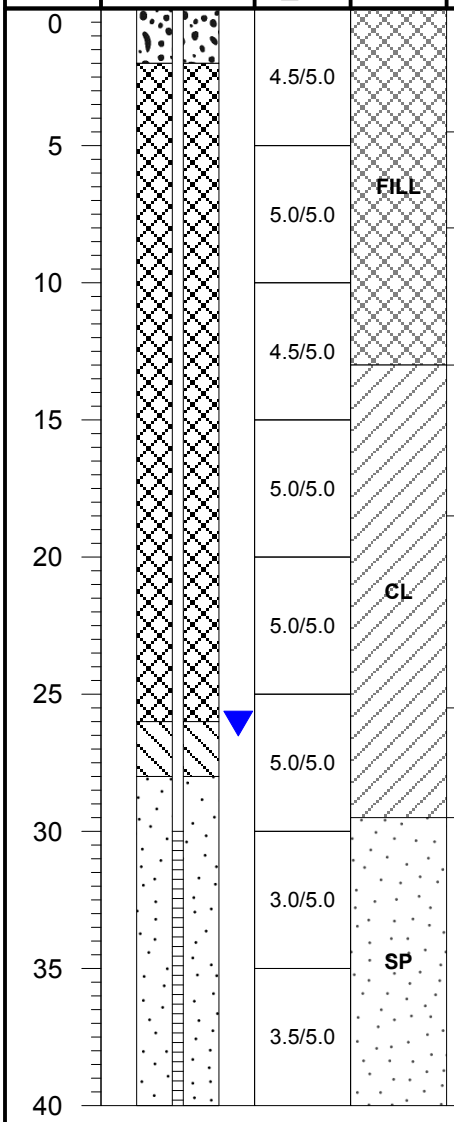
Luminant Power

Log of Boring: FGD-8

Oak Grove Steam Electric Station
Franklin, TX

PBW Project No. 1602

Completion Date:	3/4/10	Drilling Method:	HSA
Drilling Company:	Strata Core, Inc.	Borehole Diameter (in.):	6
Driller:	Roddy Qualls	Total Depth (ft):	40
Driller's License:	3121	Northing:	573033.29
Field Supervisor:	Chris Moore	Easting:	3198862.3
Sampling Method:	3"x5' Barrel	Ground Elev. (ft AMSL):	437.06



Lithologic Description
FILL, silty clay, CL, brown, moist, soft to firm.
FILL, silty sand, SM, very pale brown, dry to moist, soft, very fine grained.
FILL, silty clay, CL, dark gray, moist, firm, crumbles easily, some sand layers.
SANDY, CLAY, CL, strong brown, moist, firm, laminated, very fine grained sand
SILTY CLAY, CL, dark gray, moist, firm, with sand laminae.
SILTY CLAY, CL, mottled gray and brown, moist, firm to hard, some sand laminae, some oxidized staining.
SAND, SP, dark gray, wet, very soft to soft, very fine grained, some silty laminae.

PBW
Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Initial Fluid Level (3/9/10)
▼ Depth to water: 29.11 ft BTOC

Annular Materials
(0.0 - 2.0) Concrete
(2.0 - 26.0) Cement/Bentonite Grout
(26.0 - 28.0) Bentonite Chips
(28.0 - 40.0) 12/20 Silica Sand

Well Materials
(+3.0 - 30.0) Casing, 2" Sch 40 FJT PVC
(30.0 - 40.0) Screen, 2" Sch 40 FJT PVC, 0.01 slot

Golder Associates
500 Century Plaza Drive, Suite 190
Houston, Texas 77073
Telephone: (281) 821-6868
Fax: (281) 821-6870

BOREHOLE FGD-11

CLIENT Luminant Power
PROJECT NUMBER 1406296
DATE STARTED 11/25/14 **COMPLETED** 11/26/14
DRILLING CONTRACTOR Envirotech
DRILLING METHOD Auger
LOGGED BY DMW **CHECKED BY** CFR
NOTES

PROJECT NAME Luminant
PROJECT LOCATION Oak Grove SES
GROUND ELEVATION 448.67 ft **HOLE SIZE** 6 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING 40 40' bgs
AT END OF DRILLING
AFTER DRILLING

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / □ FINES CONTENT (%) □ 20 40 60 80
0		Firm, brown and green, CLAY, and topsoil, moist						
		Hard, brown and tan, SANDY CLAY, moist	ST	75		1.0		
			ST	50		4.5		
5			ST	54		4.5		
			SS	58	3-5-7-10 (12)			
			SS	79	6-8-8-9 (16)			
10			SS	67	5-9-10-12 (19)			
			SS	71	6-8-9-12 (17)			
		Very stiff, red and black, CLAY, with brown sand, moist						
15		Stiff, brown and tan, SANDY CLAY, moist	SS	67	6-8-6-7 (14)			
		maroon, gravel sized rocks at 15.0'	SS	92	5-6-8-9 (14)			
			SS	79	4-6-8-9 (14)			
20		Compact, brown and tan, CLAYEY SAND, moist						
		with gray and brown clay lenses at 21.0'	SS	71	6-8-7-8 (15)			
		loosely consolidated sand at 23.0'	SS	79	7-8-11-15 (19)			
25		orange mottlings at 25.0'	SS	83	9-13-17-19 (30)			
			SS	83	9-10-14-16 (24)			
			SS	92	8-9-18-21 (27)			
30		Very stiff, gray, SAND and CLAY, moist dense at 29.5'						

(Continued Next Page)

Golder Associates
500 Century Plaza Drive, Suite 190
Houston, Texas 77073
Telephone: (281) 821-6868
Fax: (281) 821-6870

BOREHOLE FGD-11

CLIENT Luminant Power **PROJECT NAME** Luminant

PROJECT NUMBER 1406296 **PROJECT LOCATION** Oak Grove SES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	DRY UNIT WT. (pcf)
30		Very stiff, gray, SAND and CLAY, moist *(continued)*	SS	83	9-13-17-19 (30)		
		without clay at 31.0'	SS	88	10-16-22-22 (38)		
		Dense, gray and tan, SILTY SAND, moist					
		poorly consoldiated at 33.0'	SS	83	7-11-17-17 (28)		
35			SS	71	6-13-14-15 (27)		
		Very stiff, gray, SILTY CLAY, moist	SS	75	4-6-13-17 (19)		
		Dense, gray and tan, SILTY SAND, moist moist to wet at 38.0'	SS	71	6-5-8-10 (13)		
40		Compact, gray and tan, SAND, moist to wet	SS	67	3-4-4-7 (8)		
		Compact, gray and tan, SILTY SAND, wet					
		Very stiff, gray, SILTY CLAY, moist	SS	88	7-9-10-13 (19)		
45		Dense, gray and tan, SILTY SAND, moist to wet	SS	92	3-8-24-28 (32)		
		moist at 46.0'	SS	83	4-8-26-40 (34)		
		slightly wet at 48.0'	SS	75	14-28-29-34 (57)		
50		very dense at 50.0'	SS	92	9-38-50 (88)		
		moist at 52.0'	SS	83	15-28-46-50 (74)		
		moist to wet at 54.0'	SS	71	14-36-50 (86)		
55			SS		21-39-48-113 (87)		

Bottom of borehole at 58.0 feet.

▲ SPT N VALUE ▲
20 40 60 80
PL MC LL
20 40 60 80
☐ FINES CONTENT (%) ☐
20 40 60 80

Golder Associates
500 Century Plaza Drive, Suite 190
Houston, Texas 77073
Telephone: (281) 821-6868
Fax: (281) 821-6870

BOREHOLE FGD-12

CLIENT Luminant Power
PROJECT NAME Luminant
PROJECT NUMBER 1406296
PROJECT LOCATION Oak Grove SES
DATE STARTED 11/26/14 **COMPLETED** 11/26/14
GROUND ELEVATION 439.48 ft **HOLE SIZE** 6 inches
DRILLING CONTRACTOR Envirotech
GROUND WATER LEVELS:
DRILLING METHOD Auger
AT TIME OF DRILLING 32 32' bgs
LOGGED BY DMW **CHECKED BY** CFR
AT END OF DRILLING
NOTES
AFTER DRILLING

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0		Firm, brown, CLAY, topsoil, moist	ST	46		1.0		
		Hard, brown, SANDY CLAY, moist	ST	63		4.5		
5			ST	42		4.5		
			SS	75	6-8-10-7 (18)			▲
		Firm, red, orange and gray, CLAY, moist, with red and orange mottling	SS	75	5-8-10-11 (18)			▲
10			SS	75	6-8-12-14 (20)			▲
		Very stiff, gray and red, SILTY CLAY, moist, silt partings	SS	71	4-8-14-15 (22)			▲
15		increasing silt at 15.0'	SS	63	8-10-19-16 (29)			▲
		decreasing silt at 16.0'	SS	75	5-9-12-16 (21)			▲
		Dense, red and gray, SANDY SILT, moist increasing silt at 17.5'	SS	79	8-14-12-8 (26)			▲
		Compact, orange and tan, SILTY SAND, moist	SS	63	7-5-5-6 (10)			▲
20		loosely consoldiated at 19.0'	SS	83	9-12-13-15 (25)			▲
		increased clay at 20.0'	SS		17-11-16-20 (27)			▲
		more consolidated at 21.0'	SS		12-18-14-15 (32)			▲
		Stiff, gray, SILTY CLAY, moist, silt partings	SS	83	9-19-19-17 (38)			▲
25		intervals of gray sand mixed with silty clay at 25.0'						
		Dense, gray, SAND, moist						
		Stiff, gray, SILTY CLAY, moist						
		Dense, gray, SILTY SAND, with interbedded clay, moist, with red staining						
30								

(Continued Next Page)

Golder Associates
500 Century Plaza Drive, Suite 190
Houston, Texas 77073
Telephone: (281) 821-6868
Fax: (281) 821-6870

BOREHOLE FGD-12

CLIENT Luminant Power **PROJECT NAME** Luminant

PROJECT NUMBER 1406296 **PROJECT LOCATION** Oak Grove SES

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN (tsf)	DRY UNIT WT. (pcf)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
30		Dense, gray, SILTY SAND, with interbedded clay, moist, with red staining *(continued)*	SS	88	4-5-15-24 (20)			▲
		▽ red to moist, turning red at 32.0'	SS	67	10-16-30-28 (46)			▲
35		brown to gray at 34.0'	SS	63	14-24-48-42 (72)			▲
			SS	92	8-18-32-42 (50)			▲
		increasing sand at 38.0'	SS	92	8-26-48-50 (74)			▲
40			SS	92	3-4-10-26 (14)			▲
		gray and tan at 42.0'	SS	92	13-24-42-43 (66)			▲
45			SS	92	16-30-45-50 (75)			▲
			SS	58	20-36-50 (86)			▲
50			SS	88	16-40-50 (90)			▲
			SS	71	18-26-50 (76)			▲
			SS	63	4-30-50 (80)			▲
55			SS	50	7-24-50 (74)			▲
			SS	58	22-48-50 (98)			▲
			SS	54	24-48-50 (98)			▲
60		dark gray at 60.0'	SS	46	25-48-50 (98)			▲
			SS	50	30-50			

Bottom of borehole at 64.0 feet.

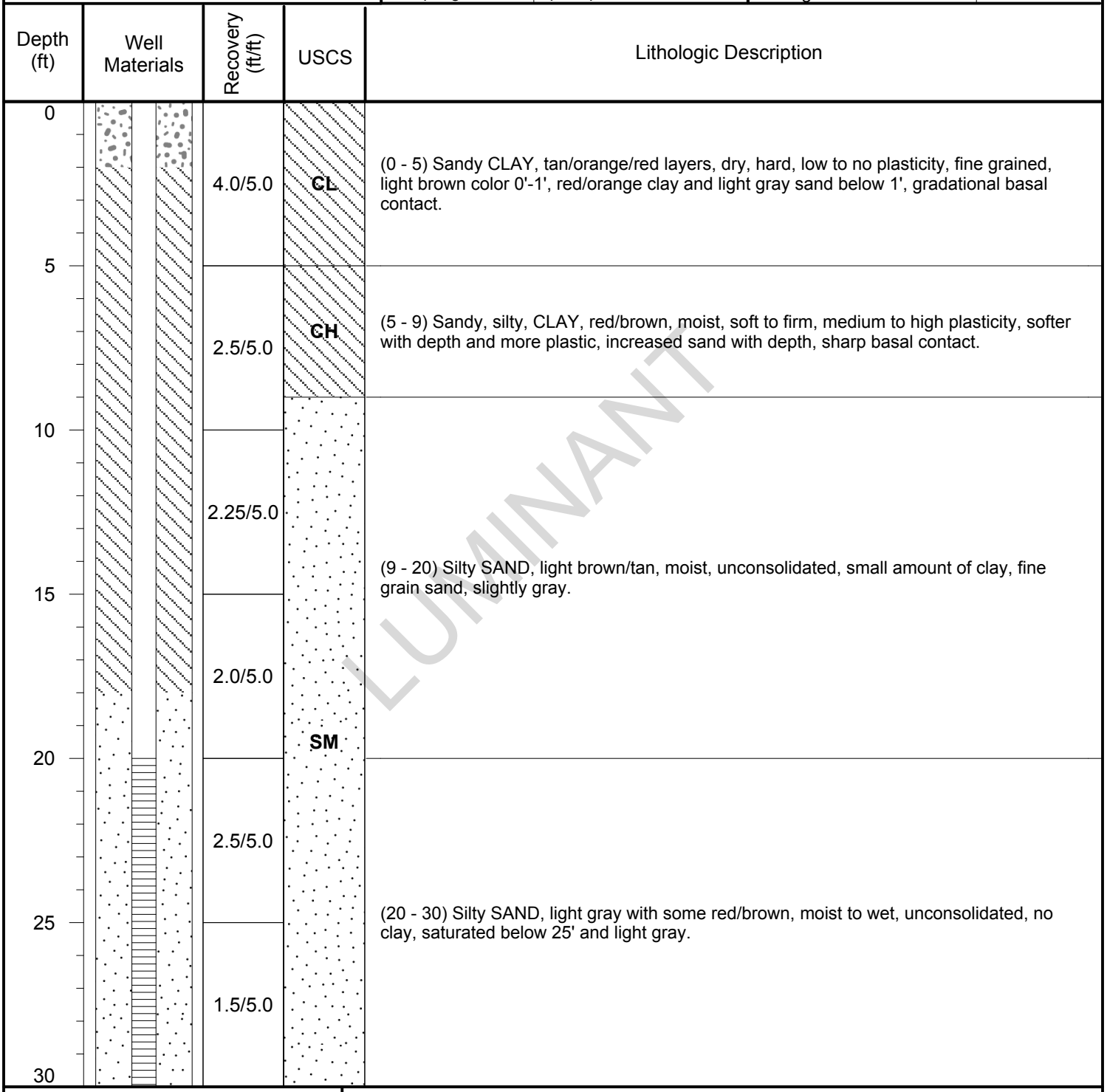
Luminant

Log of Boring: FGD-14

Oak Grove Steam Electric Station
Petteway, TX

PBW Project No. 5244

Completion Date:	7/25/2016	Drilling Method:	HSA
Drilling Company:	Sunbelt	Borehole Diameter (in.):	8.25
Driller:	Raymond Alcala	Total Depth (ft):	30
Driller's License:	59430	TOC Elevation (ft. AMSL):	428.91
Logged By:	Sara Taube	Northing:	572912.27
Sampling Method:	Split Spoon	Easting:	3201297.58



PBW

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
Tel (512) 671-3434 Fax (512) 671-3446

Notes:

Well Materials
(+2.70 - 20) Casing, 2" Sch 40 FJT PVC
(20 - 30) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0-2') Cement
(2'-18') Bentonite chips
(18'-30') 16/30 sand

Luminant

Log of Boring: FGD-15

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/22/2019	Drilling Method:	HSA
Drilling Company:	Vortex	Borehole Diameter (in.):	6
Driller:	Robert Joiner	Total Depth (ft):	35
Driller's License:	54776M	TOC Elevation (ft. AMSL):	437.17
Logged By:	Sergio Ruiz	Northing:	3452427
Sampling Method:	2"X2.5' Split Spoon	Easting:	739119.1

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		0.0/5.0	NR	(0 - 5) HydroVAC
5		1.2/2.5	SM	(5 - 12.8) Silty SAND, fine grained, light tan with some yellow orange, trace roots, clay lense from 7.5'-7.6', slightly moist, orange at 12.2' then back to light brown, some more cohesive, some small firm pieces
		1.2/2.5		
10		1.3/2.5		
		1.6/2.5	CL	(12.8 - 16.5) Sandy, silty, CLAY, brownish gray, thin fine sand lenses throughout, orange color 12.9'-13.1'
15		1.0/2.5		
		1.0/2.5	SM	(16.5 - 20.1) Silty SAND, fine grained with silt, more clay with increased depth, some Fe staining.
20		1.9/2.5	CL	(20.1 - 23) CLAY, brownish purple, moist to wet, firm, orange red staining at 20', fine sand lenses present
		1.5/2.5	SM	(23 - 24.5) Silty SAND, moist, soft, fine silty sand, some orange Fe staining, some clay throughout
25			CL	(24.5 - 25) CLAY, brown purple, moist, low to moderate plasticity, saturated at 25',
		1.5/2.5	SM	(25 - 35) Silty SAND, grayish purple, fine to very fine, wet, very soft, trace clay, some Fe staining
		1.0/2.5		
30		1.0/2.5		
		2.5/2.5		
35				

GOLDER
2201 Double Creek Dr., Suite 4004
Round Rock, Texas 78664
O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(+3 - 25) Casing, 2" Sch 40 FJT PVC
(25 - 35) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-2') Grout
(2'-23') Bentonite chips
(23'-35) 10/20 sand

Luminant

Log of Boring: FGD-16

Big Brown Steam Electric Station
Franklin, Texas

Golder Project No. 19122434E

Completion Date:	5/23/2019	Drilling Method:	HSA
Drilling Company:	Vortex	Borehole Diameter (in.):	6
Driller:	Robert Joiner	Total Depth (ft):	40
Driller's License:	54776M	TOC Elevation (ft. AMSL):	444.3
Logged By:	Jacob Jarvis	Northing:	3452861
Sampling Method:	2"X2.5' Split Spoon	Easting:	739235.7

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		0.0/5.0	NR	(0 - 5) HydroVAC
5		1.25/5.0	SC	(5 - 7.5) Sandy CLAY, dry, soft, low plasticity, clay decreases with depth, yellow orange
		1.2/2.5	SM	(7.5 - 10) Silty SAND, yellow orange, dry, very soft, subround, no plasticity, clay increases in bottom 3 inches
10		1.75/2.5		(10 - 12.5) Silty SAND, yellow orange, dry, soft, subround, no plasticity, few clay lenses, few clean sand lenses
		0.8/2.5	SW	(12.5 - 15) SAND, fine, well sorted, brown, very soft, dry, no plasticity, color change from brown to dark brown
15		1.7/2.5	CL	(15 - 17.5) Sandy CLAY, red, dry, hard, medium plasticity, hard clay with sand throughout
		1.25/2.5	SC	(17.5 - 18.5) Clayey SAND, dark red, hard, low plasticity, dry
20		1.5/2.5		
		1.7/2.5		
25		1.4/2.5		
		1.75/2.5	SW	(18.5 - 40) SAND, red to purple gray, well sorted, very soft, subround, no plasticity, gradual transition to clean sand, lighter red color, clay lenses 20.0'-22.5', saturated at 30'
30		1.75/2.5		
		1.75/2.5		
35		5.0/5.0		
40				

GOLDER
2201 Double Creek Dr., Suite 4004
Round Rock, Texas 78664
O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.

Well Materials
(3 - 30) Casing, 2" Sch 40 FJT PVC
(30 - 40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-2') Grout
(2'-28') Bentonite chips
(28'-40') 10/20 sand

Luminant

Log of Boring: FGD-2019-1

Big Brown Steam Electric Station
Franklin, TX

Golder Project No. 19122434E

Completion Date:	6/3/2019	Drilling Method:	HSA
Drilling Company:	Vortex	Borehole Diameter (in.):	6
Driller:	Robert Joiner	Total Depth (ft):	30
Driller's License:	54776	TOC Elevation (ft. AMSL):	
Logged By:	Jacob Jarvis	Northing:	3452823
Sampling Method:	2'X2.5' Split Spoon	Easting:	739015.9

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0	0.0/5.0	NR	(0 - 5) HydroVAC
5	1.6/2.5	CL	(5 - 7.5) Silty Sandy CLAY, light tan, dry, firm, low to mod plasticity
	1.55/2.5	SC	(7.5 - 10) Silty SAND, yellow orange, dry, soft, few clay lenses throughout
10	2.5/2.5	CL	(10 - 12.5) Silty CLAY, light gray, dry to moist, soft, low to moderate plasticity, plasticity and silt increases with depth
	2.5/2.5	CH	(12.5 - 22) CLAY, wet, brown to dark brown, soft to firm, high plasticity
15	2/2.5		
	2.5/2.5		
20	2.1/2.5		
	2.2/2.5	SW	(22 - 25) SAND, light tan, saturated, soft, no plasticity
25	5.0/5.0		
30			

GOLDER
2201 Double Creek Dr., Suite 4004
Round Rock, Texas 78664
O·512.671.3434 F·512.671.3446

Notes:
1. This log should not be used separately from the report to which it is attached.

APPENDIX B

LABORATORY ANALYTICAL REPORTS

June 05, 2019

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1905205

RE: Luminant-OGSES FGD Ponds

Dear Will Vienne:

DHL Analytical, Inc. received 9 sample(s) on 5/17/2019 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-19-24

Table of Contents

Miscellaneous Documents **3**

CaseNarrative 1905205 ..... **6**

WorkOrderSampleSummary 1905205 ..... **7**

PrepDatesReport 1905205 ..... **8**

AnalyticalDatesReport 1905205 ..... **12**

Analytical Report 1905205 ..... **16**

AnalyticalQCSummaryReport 1905205 ..... **34**

Subcontract Report 1905205 ..... **61**

DHL ANALYTICAL

2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: *www.dhlanalytical.com*
E-Mail: *login@dhlanalytical.com*

№ 82719

CHAIN-OF-CUSTODY

CLIENT: GOLDER
ADDRESS: 2201 DOUBLE CREEK DR, ROUND ROCK, TX 78664
PHONE: 512-671-3434 FAX/E-MAIL: 512-671-3446
DATA REPORTED TO: WILL VIENNE
ADDITIONAL REPORT COPIES TO:

DATE: 5-17-19 PAGE 1 OF 1
PO #:
DHL WORK ORDER #: 1905205
PROJECT LOCATION OR NAME: LUMINANT - OGSES FGD PONDS
CLENT PROJECT #: 19122262-F COLLECTOR: J. BRAYTON

Authorize 5% surcharge for TRRP Report? ❑ Yes ❑ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

PRESERVATION: HCl | HNO_3 | H_2SO_4 ❑ NaOH ❑ | ICE | UNPRESERVED

ANALYSES: BTEX ❑ MTBE ❑ [METHOD 8021] | TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑ | GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑ | VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑ | SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑ | 8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑ | 8270 O-P PEST ❑ 8082 PCB ❑ 8270 PCB ❑ | 8321 HERB ❑ T PHOS, AMMONIA ❑ | METALS 6020 ❑ METALS 200.8 ❑ DISS. METALS ❑ | RCRA ❑ TX11 ❑ ____ ❑ | PH ❑ HEX CHROM ❑ ALKALINITY ❑ COD ❑ | CHLORIDE ❑ ANIONS ____ ❑ | TCLP-SVOC ❑ VOC ❑ PEST ❑ HERB ❑ | TCLP-METALS ❑ RCRA 8 ❑ TX-11 ❑ Pb ❑ | RCI ❑ FLASHPOINT ❑ DGAS ❑ | TDS ❑ TSS ❑ % MOISTURE ❑ CYANIDE ❑ | APPENDIX III & IV | ALK, NO3, SO4, Na, Mg, K | FERROUS & FERRIC IRON

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 / NaOH	ICE	UNPRESERVED	APPENDIX III & IV	ALK, NO3, SO4, Na, Mg, K	FERROUS & FERRIC IRON	FIELD NOTES
FGD-6	01	5-16-19	0920	W		7						X	X	X	
FGD-4	02	↓	1015	W		7						X	X	X	
FGD-3	03		1110	W		7						X	X	X	
FGD-2	04		1200	W		7						X	X	X	
FGD-5	05		1350	W		7						X	X	X	
FGD-1	06		1450	W		7						X	X	X	
~~[illegible]~~ JB	–		~~1450~~ JB	W		7						X	X	X	
FGD-8	07		1545	W		7						X	X	X	
FGD-11	08		1640	W		7						X	X	X	
FGD-12	09	↓	1735	W		7						X	X	X	
~~[illegible]~~ JB	–														

LUMINANT

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	5-17-19 9:10	[signature]
[signature]	5-17-19 11:20	[signature]

❑ *DHL DISPOSAL @ $5.00 each* ❑ *Return*

TURN AROUND TIME
RUSH ❑ CALL FIRST
1 DAY ❑ CALL FIRST
2 DAY ❑
NORMAL ☒
OTHER ❑ ____

LABORATORY USE ONLY:
RECEIVING TEMP: 0.9/0.6°C THERM #: 78
CUSTODY SEALS: ❑ BROKEN ❑ INTACT ☒ NOT USED
CARRIER: ❑ LONE STAR ❑ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
☒ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

Appendix III Parameters:
Metals (Ca and B)
Anions (Cl, F, and SO4)
TDS

Appendix IV Parameters:

Metals (As, Ba, Be, Cd, Co, Cr, Hg, Li, Mo, Pb, Sb, Se, and Tl)
Ra-226
Ra-228

From: Vienne, Will [mailto:William_Vienne@golder.com]
Sent: Tuesday, April 09, 2019 12:48 PM
To: John DuPont <dupont@dhlanalytical.com>
Subject: CCR Analysis

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 5/17/2019

Work Order Number 1905205 | Received by EL

Checklist completed by: EL Signature | 5/17/2019 Date | Reviewed by DL Initials | 5/17/2019 Date

Carrier name Hand Delivered

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	0.9 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 11837
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *05-Jun-19*

CLIENT: Golder
Project: Luminant-OGSES FGD Ponds
Lab Order: 1905205

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
Method M3500-Fe D - Ferrous Iron Analysis (this parameter is not NELAP certified)
Method M3500-Fe D - Ferric Iron (calculation) (this calculation is not NELAP certified).
Method M4500-P E - Orthophosphate Analysis
Method M2540C - TDS Analysis
Sub-contract - Radium-228 and Radium-226 analyses by methods E904 and SM 7500 Ra B M. Analyzed at Pace Analytical.

LOG IN

The samples were received and log-in performed on 5/17/19. A total of 9 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 5/20/19 the matrix spike and matrix spike duplicate recoveries were out of control limits for three analytes. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis performed on 5/22/19 the RPD for the serial dilution was slightly above control limits for Boron. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis peformed on 5/22/19 LCVL6-190522 was above control limits for Sodium. This is flagged accordingly. The associated CCV6-190522 was within control limits for this analyte. No further corrective actions were taken.

ALKALINITY ANALYSIS

For Alkalinity analysis performed on 5/21/19 the recovery of the Initial Calibration Verification (ICV-190521) was slightly above control limits. This is flagged accordingly in the QC summary report. The remaining bracketing CCVs were within control limits. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT: Golder
Project: Luminant-OGSES FGD Ponds
Lab Order: 1905205

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905205-01	FGD-6		05/16/19 09:20 AM	5/17/2019
1905205-02	FGD-4		05/16/19 10:15 AM	5/17/2019
1905205-03	FGD-3		05/16/19 11:10 AM	5/17/2019
1905205-04	FGD-2		05/16/19 12:00 PM	5/17/2019
1905205-05	FGD-5		05/16/19 01:50 PM	5/17/2019
1905205-06	FGD-1		05/16/19 02:50 PM	5/17/2019
1905205-07	FGD-8		05/16/19 03:45 PM	5/17/2019
1905205-08	FGD-11		05/16/19 04:40 PM	5/17/2019
1905205-09	FGD-12		05/16/19 05:35 PM	5/17/2019

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905205-01A	FGD-6	05/16/19 09:20 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-01B	FGD-6	05/16/19 09:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-6	05/16/19 09:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-6	05/16/19 09:20 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-01C	FGD-6	05/16/19 09:20 AM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-6	05/16/19 09:20 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-6	05/16/19 09:20 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-6	05/16/19 09:20 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-6	05/16/19 09:20 AM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-02A	FGD-4	05/16/19 10:15 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-02B	FGD-4	05/16/19 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-4	05/16/19 10:15 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-4	05/16/19 10:15 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-02C	FGD-4	05/16/19 10:15 AM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-4	05/16/19 10:15 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-4	05/16/19 10:15 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-4	05/16/19 10:15 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-4	05/16/19 10:15 AM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-03A	FGD-3	05/16/19 11:10 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-03B	FGD-3	05/16/19 11:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-3	05/16/19 11:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-3	05/16/19 11:10 AM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-03C	FGD-3	05/16/19 11:10 AM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-3	05/16/19 11:10 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-3	05/16/19 11:10 AM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-3	05/16/19 11:10 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-3	05/16/19 11:10 AM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-04A	FGD-2	05/16/19 12:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905205-04B	FGD-2	05/16/19 12:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-2	05/16/19 12:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-2	05/16/19 12:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-04C	FGD-2	05/16/19 12:00 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-2	05/16/19 12:00 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-2	05/16/19 12:00 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-2	05/16/19 12:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-2	05/16/19 12:00 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-05A	FGD-5	05/16/19 01:50 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-05B	FGD-5	05/16/19 01:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-5	05/16/19 01:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-5	05/16/19 01:50 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-05C	FGD-5	05/16/19 01:50 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-5	05/16/19 01:50 PM	Aqueous	M2320 B	Alkalinity Preparation	05/30/19 03:00 PM	91142
	FGD-5	05/16/19 01:50 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-5	05/16/19 01:50 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-5	05/16/19 01:50 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-5	05/16/19 01:50 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-06A	FGD-1	05/16/19 02:50 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-06B	FGD-1	05/16/19 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-1	05/16/19 02:50 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-1	05/16/19 02:50 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-06C	FGD-1	05/16/19 02:50 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-1	05/16/19 02:50 PM	Aqueous	M2320 B	Alkalinity Preparation	05/30/19 03:00 PM	91142
	FGD-1	05/16/19 02:50 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-1	05/16/19 02:50 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-1	05/16/19 02:50 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-1	05/16/19 02:50 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905205-07A	FGD-8	05/16/19 03:45 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
	FGD-8	05/16/19 03:45 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
	FGD-8	05/16/19 03:45 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-07B	FGD-8	05/16/19 03:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-8	05/16/19 03:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-8	05/16/19 03:45 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-07C	FGD-8	05/16/19 03:45 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-8	05/16/19 03:45 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-8	05/16/19 03:45 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-8	05/16/19 03:45 PM	Aqueous	E300	Anion Preparation	05/20/19 09:14 AM	90986
	FGD-8	05/16/19 03:45 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-8	05/16/19 03:45 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-08A	FGD-11	05/16/19 04:40 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-08B	FGD-11	05/16/19 04:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-11	05/16/19 04:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-11	05/16/19 04:40 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-08C	FGD-11	05/16/19 04:40 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-11	05/16/19 04:40 PM	Aqueous	E300	Anion Preparation	05/20/19 09:14 AM	90986
	FGD-11	05/16/19 04:40 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-11	05/16/19 04:40 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-11	05/16/19 04:40 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-11	05/16/19 04:40 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019
1905205-09A	FGD-12	05/16/19 05:35 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/21/19 04:52 PM	91028
1905205-09B	FGD-12	05/16/19 05:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:30 AM	90989
	FGD-12	05/16/19 05:35 PM	Aqueous	SW7470A	Mercury Aq Prep	05/23/19 09:27 AM	91060
1905205-09C	FGD-12	05/16/19 05:35 PM	Aqueous	M2320 B	Alkalinity Preparation	05/21/19 09:05 AM	91010
	FGD-12	05/16/19 05:35 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965
	FGD-12	05/16/19 05:35 PM	Aqueous	E300	Anion Preparation	05/17/19 09:26 AM	90965

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905205-09C	FGD-12	05/16/19 05:35 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/17/19 12:01 PM	90972
	FGD-12	05/16/19 05:35 PM	Aqueous	M2540C	TDS Preparation	05/21/19 08:03 AM	91019

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905205-01A	FGD-6	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-6	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:41 PM	UV/VIS_2_190521B
1905205-01B	FGD-6	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 10:48 AM	CETAC2_HG_190524A
	FGD-6	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:52 PM	ICP-MS4_190522D
	FGD-6	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:55 AM	ICP-MS4_190523A
1905205-01C	FGD-6	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 10:03 AM	TITRATOR_190521A
	FGD-6	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 01:24 PM	IC4_190517A
	FGD-6	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 05:56 PM	IC4_190517A
	FGD-6	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:35 PM	UV/VIS_2_190517B
	FGD-6	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-02A	FGD-4	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-4	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:42 PM	UV/VIS_2_190521B
1905205-02B	FGD-4	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 10:50 AM	CETAC2_HG_190524A
	FGD-4	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:54 PM	ICP-MS4_190522D
	FGD-4	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 11:57 AM	ICP-MS4_190523A
1905205-02C	FGD-4	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 10:23 AM	TITRATOR_190521A
	FGD-4	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 02:12 PM	IC4_190517A
	FGD-4	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 06:12 PM	IC4_190517A
	FGD-4	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:35 PM	UV/VIS_2_190517B
	FGD-4	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-03A	FGD-3	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-3	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:42 PM	UV/VIS_2_190521B
1905205-03B	FGD-3	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:01 AM	CETAC2_HG_190524A
	FGD-3	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 11:59 AM	ICP-MS4_190523A
	FGD-3	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:56 PM	ICP-MS4_190522D
1905205-03C	FGD-3	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 10:42 AM	TITRATOR_190521A

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905205-03C	FGD-3	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 03:00 PM	IC4_190517A
	FGD-3	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 06:28 PM	IC4_190517A
	FGD-3	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:35 PM	UV/VIS_2_190517B
	FGD-3	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-04A	FGD-2	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-2	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:43 PM	UV/VIS_2_190521B
1905205-04B	FGD-2	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:03 AM	CETAC2_HG_190524A
	FGD-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 12:01 PM	ICP-MS4_190523A
	FGD-2	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 03:58 PM	ICP-MS4_190522D
1905205-04C	FGD-2	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 10:50 AM	TITRATOR_190521A
	FGD-2	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 06:44 PM	IC4_190517A
	FGD-2	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 03:16 PM	IC4_190517A
	FGD-2	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:37 PM	UV/VIS_2_190517B
	FGD-2	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-05A	FGD-5	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-5	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:43 PM	UV/VIS_2_190521B
1905205-05B	FGD-5	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:06 AM	CETAC2_HG_190524A
	FGD-5	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 04:00 PM	ICP-MS4_190522D
	FGD-5	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 12:03 PM	ICP-MS4_190523A
1905205-05C	FGD-5	Aqueous	M2320 B	Alkalinity	91142	1	05/30/19 03:20 PM	TITRATOR_190530A
	FGD-5	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 10:54 AM	TITRATOR_190521A
	FGD-5	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 03:32 PM	IC4_190517A
	FGD-5	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 07:00 PM	IC4_190517A
	FGD-5	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:37 PM	UV/VIS_2_190517B
	FGD-5	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-06A	FGD-1	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-1	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:44 PM	UV/VIS_2_190521B

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905205-06B	FGD-1	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:08 AM	CETAC2_HG_190524A
	FGD-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 04:02 PM	ICP-MS4_190522D
	FGD-1	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	10	05/23/19 12:05 PM	ICP-MS4_190523A
1905205-06C	FGD-1	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 11:03 AM	TITRATOR_190521A
	FGD-1	Aqueous	M2320 B	Alkalinity	91142	1	05/30/19 03:23 PM	TITRATOR_190530A
	FGD-1	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 03:48 PM	IC4_190517A
	FGD-1	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 07:16 PM	IC4_190517A
	FGD-1	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:37 PM	UV/VIS_2_190517B
	FGD-1	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-07A	FGD-8	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-8	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:44 PM	UV/VIS_2_190521B
	FGD-8	Aqueous	M3500-Fe D	Ferrous Iron	91028	100	05/21/19 05:52 PM	UV/VIS_2_190521B
	FGD-8	Aqueous	M3500-Fe D	Ferrous Iron	91028	1000	05/21/19 05:59 PM	UV/VIS_2_190521B
1905205-07B	FGD-8	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:10 AM	CETAC2_HG_190524A
	FGD-8	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 04:04 PM	ICP-MS4_190522D
	FGD-8	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	50	05/23/19 12:07 PM	ICP-MS4_190523A
1905205-07C	FGD-8	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 11:30 AM	TITRATOR_190521A
	FGD-8	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 04:04 PM	IC4_190517A
	FGD-8	Aqueous	E300	Anions by IC method - Water	90986	100	05/20/19 02:43 PM	IC4_190520A
	FGD-8	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 07:32 PM	IC4_190517A
	FGD-8	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:40 PM	UV/VIS_2_190517B
	FGD-8	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-08A	FGD-11	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-11	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:44 PM	UV/VIS_2_190521B
1905205-08B	FGD-11	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:12 AM	CETAC2_HG_190524A
	FGD-11	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 04:06 PM	ICP-MS4_190522D

Lab Order: 1905205
Client: Golder
Project: Luminant-OGSES FGD Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905205-08B	FGD-11	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	20	05/23/19 12:09 PM	ICP-MS4_190523A
1905205-08C	FGD-11	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 11:40 AM	TITRATOR_190521A
	FGD-11	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 07:48 PM	IC4_190517A
	FGD-11	Aqueous	E300	Anions by IC method - Water	90986	100	05/20/19 02:59 PM	IC4_190520A
	FGD-11	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 04:20 PM	IC4_190517A
	FGD-11	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:41 PM	UV/VIS_2_190517B
	FGD-11	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C
1905205-09A	FGD-12	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91028	1	05/30/19	UV/VIS_2_190530B
	FGD-12	Aqueous	M3500-Fe D	Ferrous Iron	91028	1	05/21/19 05:44 PM	UV/VIS_2_190521B
1905205-09B	FGD-12	Aqueous	SW7470A	Mercury Total: Aqueous	91060	1	05/24/19 11:15 AM	CETAC2_HG_190524A
	FGD-12	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90989	1	05/22/19 04:08 PM	ICP-MS4_190522D
1905205-09C	FGD-12	Aqueous	M2320 B	Alkalinity	91010	1	05/21/19 11:44 AM	TITRATOR_190521A
	FGD-12	Aqueous	E300	Anions by IC method - Water	90965	10	05/17/19 04:36 PM	IC4_190517A
	FGD-12	Aqueous	E300	Anions by IC method - Water	90965	1	05/17/19 08:04 PM	IC4_190517A
	FGD-12	Aqueous	M4500-P E	Orthophosphate	90972	1	05/17/19 12:41 PM	UV/VIS_2_190517B
	FGD-12	Aqueous	M2540C	Total Dissolved Solids	91019	1	05/21/19 10:00 AM	WC_190521C

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-6
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-01
Project No:	19122262-F	**Collection Date:**	05/16/19 09:20 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:52 PM
Arsenic	0.0294	0.00200	0.00500		mg/L	1	05/22/19 03:52 PM
Barium	0.107	0.00300	0.0100		mg/L	1	05/22/19 03:52 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:52 PM
Boron	0.116	0.0100	0.0300		mg/L	1	05/22/19 03:52 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:52 PM
Calcium	20.3	0.100	0.300		mg/L	1	05/22/19 03:52 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:52 PM
Cobalt	0.0132	0.00300	0.00500		mg/L	1	05/22/19 03:52 PM
Iron	4.86	0.0300	0.100		mg/L	1	05/22/19 03:52 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:52 PM
Lithium	0.00679	0.00500	0.0100	J	mg/L	1	05/22/19 03:52 PM
Magnesium	6.61	0.100	0.300		mg/L	1	05/22/19 03:52 PM
Molybdenum	0.00770	0.00200	0.00500		mg/L	1	05/22/19 03:52 PM
Potassium	0.706	0.100	0.300		mg/L	1	05/22/19 03:52 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:52 PM
Sodium	225	2.00	6.00		mg/L	20	05/23/19 11:55 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:52 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 10:48 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	170	3.00	10.0		mg/L	10	05/17/19 01:24 PM
Fluoride	0.669	0.100	0.400		mg/L	1	05/17/19 05:56 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/17/19 05:56 PM
Sulfate	51.3	1.00	3.00		mg/L	1	05/17/19 05:56 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	262	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:03 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:03 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:03 AM
Alkalinity, Total (As CaCO3)	262	20.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:03 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	4.86	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:41 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-6
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-01
Project No:	19122262-F	**Collection Date:**	05/16/19 09:20 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.714	0.0300	0.100		mg/L	1	05/17/19 12:35 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	710	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-4
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-02
Project No:	19122262-F	**Collection Date:**	05/16/19 10:15 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:54 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:54 PM
Barium	0.117	0.00300	0.0100		mg/L	1	05/22/19 03:54 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:54 PM
Boron	0.0733	0.0100	0.0300		mg/L	1	05/22/19 03:54 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:54 PM
Calcium	41.7	1.00	3.00		mg/L	10	05/23/19 11:57 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:54 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:54 PM
Iron	0.103	0.0300	0.100		mg/L	1	05/22/19 03:54 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:54 PM
Lithium	0.0325	0.00500	0.0100		mg/L	1	05/22/19 03:54 PM
Magnesium	18.6	0.100	0.300		mg/L	1	05/22/19 03:54 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:54 PM
Potassium	1.62	0.100	0.300		mg/L	1	05/22/19 03:54 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:54 PM
Sodium	160	1.00	3.00		mg/L	10	05/23/19 11:57 AM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:54 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 10:50 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	205	3.00	10.0		mg/L	10	05/17/19 02:12 PM
Fluoride	0.327	0.100	0.400	J	mg/L	1	05/17/19 06:12 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/17/19 06:12 PM
Sulfate	41.7	1.00	3.00		mg/L	1	05/17/19 06:12 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	201	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 10:23 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 10:23 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 10:23 AM
Alkalinity, Total (As CaCO3)	201	20.0	20.0		mg/L @ pH 4.52	1	05/21/19 10:23 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.103	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:42 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-4
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-02
Project No:	19122262-F	**Collection Date:**	05/16/19 10:15 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.251	0.0300	0.100		mg/L	1	05/17/19 12:35 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	651	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-3
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-03
Project No:	19122262-F	**Collection Date:**	05/16/19 11:10 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:56 PM
Arsenic	0.00230	0.00200	0.00500	J	mg/L	1	05/22/19 03:56 PM
Barium	0.0510	0.00300	0.0100		mg/L	1	05/22/19 03:56 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:56 PM
Boron	0.117	0.0100	0.0300		mg/L	1	05/22/19 03:56 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:56 PM
Calcium	60.1	2.00	6.00		mg/L	20	05/23/19 11:59 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:56 PM
Cobalt	0.00520	0.00300	0.00500		mg/L	1	05/22/19 03:56 PM
Iron	0.126	0.0300	0.100		mg/L	1	05/22/19 03:56 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:56 PM
Lithium	0.0570	0.00500	0.0100		mg/L	1	05/22/19 03:56 PM
Magnesium	33.6	2.00	6.00		mg/L	20	05/23/19 11:59 AM
Molybdenum	0.00311	0.00200	0.00500	J	mg/L	1	05/22/19 03:56 PM
Potassium	2.50	0.100	0.300		mg/L	1	05/22/19 03:56 PM
Selenium	0.0423	0.00200	0.00500		mg/L	1	05/22/19 03:56 PM
Sodium	277	2.00	6.00		mg/L	20	05/23/19 11:59 AM
Thallium	0.000600	0.000500	0.00150	J	mg/L	1	05/22/19 03:56 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:01 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	117	3.00	10.0		mg/L	10	05/17/19 03:00 PM
Fluoride	0.776	0.100	0.400		mg/L	1	05/17/19 06:28 PM
Nitrate-N	1.41	0.100	0.500		mg/L	1	05/17/19 06:28 PM
Sulfate	182	10.0	30.0		mg/L	10	05/17/19 03:00 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	533	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:42 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:42 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:42 AM
Alkalinity, Total (As CaCO3)	533	20.0	20.0		mg/L @ pH 4.53	1	05/21/19 10:42 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.126	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:42 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-3
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-03
Project No:	19122262-F	**Collection Date:**	05/16/19 11:10 AM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0960	0.0300	0.100	J	mg/L	1	05/17/19 12:35 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1100	50.0	50.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-2
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-04
Project No:	19122262-F	**Collection Date:**	05/16/19 12:00 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 03:58 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:58 PM
Barium	0.0993	0.00300	0.0100		mg/L	1	05/22/19 03:58 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:58 PM
Boron	0.105	0.0100	0.0300		mg/L	1	05/22/19 03:58 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:58 PM
Calcium	38.9	1.00	3.00		mg/L	10	05/23/19 12:01 PM
Chromium	0.00266	0.00200	0.00500	J	mg/L	1	05/22/19 03:58 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 03:58 PM
Iron	0.0799	0.0300	0.100	J	mg/L	1	05/22/19 03:58 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 03:58 PM
Lithium	0.0228	0.00500	0.0100		mg/L	1	05/22/19 03:58 PM
Magnesium	16.7	0.100	0.300		mg/L	1	05/22/19 03:58 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 03:58 PM
Potassium	2.57	0.100	0.300		mg/L	1	05/22/19 03:58 PM
Selenium	0.0214	0.00200	0.00500		mg/L	1	05/22/19 03:58 PM
Sodium	198	1.00	3.00		mg/L	10	05/23/19 12:01 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 03:58 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:03 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	260	3.00	10.0		mg/L	10	05/17/19 03:16 PM
Fluoride	0.383	0.100	0.400	J	mg/L	1	05/17/19 06:44 PM
Nitrate-N	1.54	0.100	0.500		mg/L	1	05/17/19 06:44 PM
Sulfate	70.7	1.00	3.00		mg/L	1	05/17/19 06:44 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	157	10.0	20.0		mg/L @ pH 4.51	1	05/21/19 10:50 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/21/19 10:50 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/21/19 10:50 AM
Alkalinity, Total (As CaCO3)	157	20.0	20.0		mg/L @ pH 4.51	1	05/21/19 10:50 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0799	0.0500	0.100	JN	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:43 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-2
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-04
Project No:	19122262-F	**Collection Date:**	05/16/19 12:00 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.237	0.0300	0.100		mg/L	1	05/17/19 12:37 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	729	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-5
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-05
Project No:	19122262-F	**Collection Date:**	05/16/19 01:50 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 04:00 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:00 PM
Barium	0.0926	0.00300	0.0100		mg/L	1	05/22/19 04:00 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:00 PM
Boron	0.108	0.0100	0.0300		mg/L	1	05/22/19 04:00 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:00 PM
Calcium	77.7	1.00	3.00		mg/L	10	05/23/19 12:03 PM
Chromium	0.0240	0.00200	0.00500		mg/L	1	05/22/19 04:00 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 04:00 PM
Iron	<0.0300	0.0300	0.100		mg/L	1	05/22/19 04:00 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:00 PM
Lithium	0.145	0.00500	0.0100		mg/L	1	05/22/19 04:00 PM
Magnesium	50.0	1.00	3.00		mg/L	10	05/23/19 12:03 PM
Molybdenum	0.00256	0.00200	0.00500	J	mg/L	1	05/22/19 04:00 PM
Potassium	3.46	0.100	0.300		mg/L	1	05/22/19 04:00 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:00 PM
Sodium	123	1.00	3.00		mg/L	10	05/23/19 12:03 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 04:00 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:06 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	287	3.00	10.0		mg/L	10	05/17/19 03:32 PM
Fluoride	0.579	0.100	0.400		mg/L	1	05/17/19 07:00 PM
Nitrate-N	0.859	0.100	0.500		mg/L	1	05/17/19 07:00 PM
Sulfate	67.2	1.00	3.00		mg/L	1	05/17/19 07:00 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	237	10.0	20.0		mg/L @ pH 4.52	1	05/30/19 03:20 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/30/19 03:20 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/30/19 03:20 PM
Alkalinity, Total (As CaCO3)	237	20.0	20.0		mg/L @ pH 4.52	1	05/30/19 03:20 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:43 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-5
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-05
Project No:	19122262-F	**Collection Date:**	05/16/19 01:50 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.176	0.0300	0.100		mg/L	1	05/17/19 12:37 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	801	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-1
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-06
Project No:	19122262-F	**Collection Date:**	05/16/19 02:50 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 04:02 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:02 PM
Barium	0.0485	0.00300	0.0100		mg/L	1	05/22/19 04:02 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:02 PM
Boron	0.0803	0.0100	0.0300		mg/L	1	05/22/19 04:02 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:02 PM
Calcium	19.5	0.100	0.300		mg/L	1	05/22/19 04:02 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:02 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 04:02 PM
Iron	0.186	0.0300	0.100		mg/L	1	05/22/19 04:02 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:02 PM
Lithium	0.0442	0.00500	0.0100		mg/L	1	05/22/19 04:02 PM
Magnesium	11.2	0.100	0.300		mg/L	1	05/22/19 04:02 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:02 PM
Potassium	2.11	0.100	0.300		mg/L	1	05/22/19 04:02 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:02 PM
Sodium	49.4	1.00	3.00		mg/L	10	05/23/19 12:05 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 04:02 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:08 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	62.4	3.00	10.0		mg/L	10	05/17/19 03:48 PM
Fluoride	0.362	0.100	0.400	J	mg/L	1	05/17/19 07:16 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/17/19 07:16 PM
Sulfate	78.7	1.00	3.00		mg/L	1	05/17/19 07:16 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	52.8	10.0	20.0		mg/L @ pH 4.5	1	05/30/19 03:23 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/30/19 03:23 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/30/19 03:23 PM
Alkalinity, Total (As CaCO3)	52.8	20.0	20.0		mg/L @ pH 4.5	1	05/30/19 03:23 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.186	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:44 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-1
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-06
Project No:	19122262-F	**Collection Date:**	05/16/19 02:50 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.473	0.0300	0.100		mg/L	1	05/17/19 12:37 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	320	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-8
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-07
Project No:	19122262-F	**Collection Date:**	05/16/19 03:45 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 04:04 PM
Arsenic	0.0126	0.00200	0.00500		mg/L	1	05/22/19 04:04 PM
Barium	0.864	0.00300	0.0100		mg/L	1	05/22/19 04:04 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:04 PM
Boron	0.0687	0.0100	0.0300		mg/L	1	05/22/19 04:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:04 PM
Calcium	314	5.00	15.0		mg/L	50	05/23/19 12:07 PM
Chromium	0.00346	0.00200	0.00500	J	mg/L	1	05/22/19 04:04 PM
Cobalt	0.0146	0.00300	0.00500		mg/L	1	05/22/19 04:04 PM
Iron	263	1.50	5.00		mg/L	50	05/23/19 12:07 PM
Lead	0.00194	0.000300	0.00100		mg/L	1	05/22/19 04:04 PM
Lithium	0.00864	0.00500	0.0100	J	mg/L	1	05/22/19 04:04 PM
Magnesium	204	5.00	15.0		mg/L	50	05/23/19 12:07 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:04 PM
Potassium	19.2	0.100	0.300		mg/L	1	05/22/19 04:04 PM
Selenium	0.00274	0.00200	0.00500	J	mg/L	1	05/22/19 04:04 PM
Sodium	792	5.00	15.0		mg/L	50	05/23/19 12:07 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 04:04 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:10 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	2040	30.0	100		mg/L	100	05/20/19 02:43 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/17/19 07:32 PM
Nitrate-N	0.107	0.100	0.500	J	mg/L	1	05/17/19 07:32 PM
Sulfate	173	10.0	30.0		mg/L	10	05/17/19 04:04 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	516	10.0	20.0		mg/L @ pH 4.54	1	05/21/19 11:30 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/21/19 11:30 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	05/21/19 11:30 AM
Alkalinity, Total (As CaCO3)	516	20.0	20.0		mg/L @ pH 4.54	1	05/21/19 11:30 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	61.0	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	202	50.0	100	N	mg/L	1000	05/21/19 05:59 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-8
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-07
Project No:	19122262-F	**Collection Date:**	05/16/19 03:45 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.219	0.0300	0.100		mg/L	1	05/17/19 12:40 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	3970	50.0	50.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-11
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-08
Project No:	19122262-F	**Collection Date:**	05/16/19 04:40 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 04:06 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:06 PM
Barium	0.347	0.00300	0.0100		mg/L	1	05/22/19 04:06 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:06 PM
Boron	0.108	0.0100	0.0300		mg/L	1	05/22/19 04:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:06 PM
Calcium	85.0	2.00	6.00		mg/L	20	05/23/19 12:09 PM
Chromium	0.0280	0.00200	0.00500		mg/L	1	05/22/19 04:06 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 04:06 PM
Iron	1.28	0.0300	0.100		mg/L	1	05/22/19 04:06 PM
Lead	0.000576	0.000300	0.00100	J	mg/L	1	05/22/19 04:06 PM
Lithium	0.0145	0.00500	0.0100		mg/L	1	05/22/19 04:06 PM
Magnesium	30.6	2.00	6.00		mg/L	20	05/23/19 12:09 PM
Molybdenum	0.00358	0.00200	0.00500	J	mg/L	1	05/22/19 04:06 PM
Potassium	4.13	0.100	0.300		mg/L	1	05/22/19 04:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:06 PM
Sodium	328	2.00	6.00		mg/L	20	05/23/19 12:09 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 04:06 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:12 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	566	30.0	100		mg/L	100	05/20/19 02:59 PM
Fluoride	0.380	0.100	0.400	J	mg/L	1	05/17/19 07:48 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/17/19 07:48 PM
Sulfate	50.9	1.00	3.00		mg/L	1	05/17/19 07:48 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	256	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 11:40 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 11:40 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/21/19 11:40 AM
Alkalinity, Total (As CaCO3)	256	20.0	20.0		mg/L @ pH 4.52	1	05/21/19 11:40 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	1.28	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:44 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-11
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-08
Project No:	19122262-F	**Collection Date:**	05/16/19 04:40 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.200	0.0300	0.100		mg/L	1	05/17/19 12:41 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1350	50.0	50.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-12
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-09
Project No:	19122262-F	**Collection Date:**	05/16/19 05:35 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/22/19 04:08 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:08 PM
Barium	0.0474	0.00300	0.0100		mg/L	1	05/22/19 04:08 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:08 PM
Boron	0.0723	0.0100	0.0300		mg/L	1	05/22/19 04:08 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:08 PM
Calcium	6.79	0.100	0.300		mg/L	1	05/22/19 04:08 PM
Chromium	0.00295	0.00200	0.00500	J	mg/L	1	05/22/19 04:08 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/22/19 04:08 PM
Iron	0.425	0.0300	0.100		mg/L	1	05/22/19 04:08 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/22/19 04:08 PM
Lithium	0.0221	0.00500	0.0100		mg/L	1	05/22/19 04:08 PM
Magnesium	2.97	0.100	0.300		mg/L	1	05/22/19 04:08 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:08 PM
Potassium	1.55	0.100	0.300		mg/L	1	05/22/19 04:08 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/22/19 04:08 PM
Sodium	20.1	0.100	0.300		mg/L	1	05/22/19 04:08 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/22/19 04:08 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/24/19 11:15 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	15.6	0.300	1.00		mg/L	1	05/17/19 08:04 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/17/19 08:04 PM
Nitrate-N	1.42	0.100	0.500		mg/L	1	05/17/19 08:04 PM
Sulfate	15.0	1.00	3.00		mg/L	1	05/17/19 08:04 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	36.6	10.0	20.0		mg/L @ pH 4.49	1	05/21/19 11:44 AM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	05/21/19 11:44 AM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	05/21/19 11:44 AM
Alkalinity, Total (As CaCO3)	36.6	20.0	20.0		mg/L @ pH 4.49	1	05/21/19 11:44 AM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.425	0.0500	0.100	N	mg/L	1	05/30/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/21/19 05:44 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *05-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-12
Project:	Luminant-OGSES FGD Ponds	**Lab ID:**	1905205-09
Project No:	19122262-F	**Collection Date:**	05/16/19 05:35 PM
Lab Order:	1905205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.168	0.0300	0.100		mg/L	1	05/17/19 12:41 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	140	10.0	10.0		mg/L	1	05/21/19 10:00 AM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

The QC data in batch 91060 applies to the following samples: 1905205-01B, 1905205-02B, 1905205-03B, 1905205-04B, 1905205-05B, 1905205-06B, 1905205-07B, 1905205-08B, 1905205-09B

Sample ID **MB-91060**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **MBLK**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:41:16 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	<0.0000800	0.000200									

Sample ID **LCS-91060**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **LCS**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:43:31 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.00188	0.000200	0.00200	0	94.0	85	115				

Sample ID **LCSD-91060**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **LCSD**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:45:47 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.00188	0.000200	0.00200	0	94.0	85	115	0	15		

Sample ID **1905205-02B MS**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **MS**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:52:35 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.00183	0.000200	0.00200	0	91.5	80	120				

Sample ID **1905205-02B MSD**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **MSD**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:54:51 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.00186	0.000200	0.00200	0	93.0	80	120	1.63	15		

Sample ID **1905205-02B SD**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **SD**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:57:06 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	<0.000400	0.00100	0	0				0	10		

Sample ID **1905205-02B PDS**	Batch ID: **91060**			TestNo: **SW7470A**				Units: **mg/L**			
SampType: **PDS**	Run ID: **CETAC2_HG_190524A**			Analysis Date: **5/24/2019 10:59:22 AM**				Prep Date: **5/23/2019**			
Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Mercury	0.00233	0.000200	0.00250	0	93.2	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190524A

Sample ID	**ICV-190524**	Batch ID:	**R104261**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 9:24:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00400	0.000200	0.00400	0	100	90	110			

Sample ID	**CCV2-190524**	Batch ID:	**R104261**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 10:36:42 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00212	0.000200	0.00200	0	106	90	110			

Sample ID	**CCV3-190524**	Batch ID:	**R104261**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190524A**	Analysis Date:	**5/24/2019 11:19:48 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00200	0.000200	0.00200	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190522D**

The QC data in batch 90989 applies to the following samples: 1905205-01B, 1905205-02B, 1905205-03B, 1905205-04B, 1905205-05B, 1905205-06B, 1905205-07B, 1905205-08B, 1905205-09B

Sample ID **MB-90989** Batch ID: **90989** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 2:44:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.000800	0.00250								
Arsenic	<0.00200	0.00500								
Barium	<0.00300	0.0100								
Beryllium	<0.000300	0.00100								
Boron	<0.0100	0.0300								
Cadmium	<0.000300	0.00100								
Calcium	<0.100	0.300								
Chromium	<0.00200	0.00500								
Cobalt	<0.00300	0.00500								
Iron	<0.0300	0.100								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Magnesium	<0.100	0.300								
Molybdenum	<0.00200	0.00500								
Potassium	<0.100	0.300								
Selenium	<0.00200	0.00500								
Sodium	<0.100	0.300								
Thallium	<0.000500	0.00150								

Sample ID **LCS-90989** Batch ID: **90989** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 2:46:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	80	120			
Arsenic	0.201	0.00500	0.200	0	100	80	120			
Barium	0.198	0.0100	0.200	0	99.2	80	120			
Beryllium	0.198	0.00100	0.200	0	99.2	80	120			
Boron	0.202	0.0300	0.200	0	101	80	120			
Cadmium	0.199	0.00100	0.200	0	99.6	80	120			
Calcium	4.60	0.300	5.00	0	92.1	80	120			
Chromium	0.200	0.00500	0.200	0	99.8	80	120			
Cobalt	0.202	0.00500	0.200	0	101	80	120			
Iron	5.23	0.100	5.00	0	105	80	120			
Lead	0.184	0.00100	0.200	0	91.9	80	120			
Lithium	0.196	0.0100	0.200	0	98.0	80	120			
Magnesium	5.02	0.300	5.00	0	100	80	120			
Molybdenum	0.190	0.00500	0.200	0	95.1	80	120			
Potassium	5.06	0.300	5.00	0	101	80	120			
Selenium	0.209	0.00500	0.200	0	104	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **LCS-90989**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:46:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	5.02	0.300	5.00	0	100	80	120			
Thallium	0.202	0.00150	0.200	0	101	80	120			

Sample ID **LCSD-90989**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:48:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	80	120	0.333	15	
Arsenic	0.203	0.00500	0.200	0	101	80	120	0.942	15	
Barium	0.199	0.0100	0.200	0	99.3	80	120	0.128	15	
Beryllium	0.198	0.00100	0.200	0	99.1	80	120	0.129	15	
Boron	0.201	0.0300	0.200	0	101	80	120	0.298	15	
Cadmium	0.198	0.00100	0.200	0	99.2	80	120	0.362	15	
Calcium	4.62	0.300	5.00	0	92.4	80	120	0.325	15	
Chromium	0.199	0.00500	0.200	0	99.7	80	120	0.085	15	
Cobalt	0.203	0.00500	0.200	0	102	80	120	0.820	15	
Iron	5.15	0.100	5.00	0	103	80	120	1.50	15	
Lead	0.185	0.00100	0.200	0	92.3	80	120	0.421	15	
Lithium	0.200	0.0100	0.200	0	100	80	120	2.22	15	
Magnesium	5.07	0.300	5.00	0	101	80	120	0.937	15	
Molybdenum	0.190	0.00500	0.200	0	95.0	80	120	0.081	15	
Potassium	5.12	0.300	5.00	0	102	80	120	1.16	15	
Selenium	0.204	0.00500	0.200	0	102	80	120	2.39	15	
Sodium	5.05	0.300	5.00	0	101	80	120	0.519	15	
Thallium	0.199	0.00150	0.200	0	99.3	80	120	1.55	15	

Sample ID **1905185-06B SD**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:54:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	<0.0100	0.0250	0	0				0	10	
Barium	0.0256	0.0500	0	0.0253				1.30	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Boron	0.501	0.150	0	0.449				10.8	10	R
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Iron	<0.150	0.500	0	0				0	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.109	0.0500	0	0.101				7.40	10	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **1905185-06B SD**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:54:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	<0.0100	0.0250	0	0.00218				0	10	
Potassium	13.4	1.50	0	13.2				1.21	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID **1905185-06B PDS**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:13:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	80	120			
Arsenic	0.204	0.00500	0.200	0	102	80	120			
Barium	0.218	0.0100	0.200	0.0253	96.3	80	120			
Beryllium	0.174	0.00100	0.200	0	87.2	80	120			
Boron	0.613	0.0300	0.200	0.449	81.7	80	120			
Cadmium	0.183	0.00100	0.200	0	91.4	80	120			
Chromium	0.188	0.00500	0.200	0	94.2	80	120			
Cobalt	0.193	0.00500	0.200	0	96.4	80	120			
Iron	4.70	0.100	5.00	0	94.1	80	120			
Lead	0.186	0.00100	0.200	0	93.0	80	120			
Lithium	0.265	0.0100	0.200	0.101	81.8	80	120			
Molybdenum	0.186	0.00500	0.200	0.00218	91.9	80	120			
Potassium	17.5	0.300	5.00	13.3	84.0	80	120			
Selenium	0.213	0.00500	0.200	0	106	80	120			
Thallium	0.200	0.00150	0.200	0	100	80	120			

Sample ID **1905185-06B MS**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:15:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	80	120			
Arsenic	0.208	0.00500	0.200	0	104	80	120			
Barium	0.226	0.0100	0.200	0.0253	100	80	120			
Beryllium	0.174	0.00100	0.200	0	87.0	80	120			
Boron	0.654	0.0300	0.200	0.449	103	80	120			
Cadmium	0.185	0.00100	0.200	0	92.7	80	120			
Calcium	197	0.300	5.00	194	64.2	80	120			S
Chromium	0.186	0.00500	0.200	0	93.0	80	120			
Cobalt	0.193	0.00500	0.200	0	96.7	80	120			
Iron	4.82	0.100	5.00	0	96.4	80	120			
Lead	0.187	0.00100	0.200	0	93.7	80	120			
Lithium	0.270	0.0100	0.200	0.101	84.2	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **1905185-06B MS**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:15:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	128	0.300	5.00	128	-3.79	80	120			S
Molybdenum	0.195	0.00500	0.200	0.00218	96.2	80	120			
Potassium	18.5	0.300	5.00	13.3	105	80	120			
Selenium	0.214	0.00500	0.200	0	107	80	120			
Sodium	252	0.300	5.00	257	-103	80	120			S
Thallium	0.203	0.00150	0.200	0	101	80	120			

Sample ID **1905185-06B MSD**	Batch ID: **90989**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:17:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120	0.836	15	
Arsenic	0.208	0.00500	0.200	0	104	80	120	0.067	15	
Barium	0.227	0.0100	0.200	0.0253	101	80	120	0.141	15	
Beryllium	0.174	0.00100	0.200	0	86.8	80	120	0.265	15	
Boron	0.618	0.0300	0.200	0.449	84.6	80	120	5.65	15	
Cadmium	0.184	0.00100	0.200	0	92.1	80	120	0.555	15	
Calcium	195	0.300	5.00	194	16.8	80	120	1.21	15	S
Chromium	0.187	0.00500	0.200	0	93.6	80	120	0.569	15	
Cobalt	0.192	0.00500	0.200	0	95.8	80	120	1.00	15	
Iron	4.73	0.100	5.00	0	94.7	80	120	1.78	15	
Lead	0.190	0.00100	0.200	0	94.8	80	120	1.15	15	
Lithium	0.265	0.0100	0.200	0.101	81.8	80	120	1.82	15	
Magnesium	127	0.300	5.00	128	-17.7	80	120	0.544	15	S
Molybdenum	0.197	0.00500	0.200	0.00218	97.5	80	120	1.33	15	
Potassium	18.3	0.300	5.00	13.3	100	80	120	1.25	15	
Selenium	0.213	0.00500	0.200	0	107	80	120	0.639	15	
Sodium	256	0.300	5.00	257	-34.0	80	120	1.36	15	S
Thallium	0.206	0.00150	0.200	0	103	80	120	1.46	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **ICV-190522** Batch ID: **R104232** TestNo: **SW6020A** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 11:38:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.101	0.00250	0.100	0	101	90	110			
Arsenic	0.102	0.00500	0.100	0	102	90	110			
Barium	0.0975	0.0100	0.100	0	97.5	90	110			
Beryllium	0.0986	0.00100	0.100	0	98.6	90	110			
Boron	0.104	0.0300	0.100	0	104	90	110			
Cadmium	0.0995	0.00100	0.100	0	99.5	90	110			
Calcium	2.35	0.300	2.50	0	94.2	90	110			
Chromium	0.104	0.00500	0.100	0	104	90	110			
Cobalt	0.105	0.00500	0.100	0	105	90	110			
Iron	2.57	0.100	2.50	0	103	90	110			
Lead	0.0926	0.00100	0.100	0	92.6	90	110			
Lithium	0.103	0.0100	0.100	0	103	90	110			
Magnesium	2.45	0.300	2.50	0	98.2	90	110			
Molybdenum	0.0911	0.00500	0.100	0	91.1	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			
Sodium	2.53	0.300	2.50	0	101	90	110			
Thallium	0.0926	0.00150	0.100	0	92.6	90	110			

Sample ID **LCVL-190522** Batch ID: **R104232** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 11:43:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00190	0.00250	0.00200	0	95.0	70	130			
Arsenic	0.00497	0.00500	0.00500	0	99.4	70	130			
Barium	0.00463	0.0100	0.00500	0	92.6	70	130			
Beryllium	0.00117	0.00100	0.00100	0	117	70	130			
Boron	0.0197	0.0300	0.0200	0	98.5	70	130			
Cadmium	0.000953	0.00100	0.00100	0	95.3	70	130			
Calcium	0.0981	0.300	0.100	0	98.1	70	130			
Chromium	0.00486	0.00500	0.00500	0	97.2	70	130			
Cobalt	0.00493	0.00500	0.00500	0	98.7	70	130			
Iron	0.111	0.100	0.100	0	111	70	130			
Lead	0.000870	0.00100	0.00100	0	87.0	70	130			
Lithium	0.00926	0.0100	0.0100	0	92.6	70	130			
Magnesium	0.0967	0.300	0.100	0	96.7	70	130			
Molybdenum	0.00458	0.00500	0.00500	0	91.5	70	130			
Potassium	0.0964	0.300	0.100	0	96.4	70	130			
Selenium	0.00494	0.00500	0.00500	0	98.8	70	130			
Sodium	0.0966	0.300	0.100	0	96.6	70	130			
Thallium	0.000843	0.00150	0.00100	0	84.3	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **CCV4-190522**	Batch ID: **R104232**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:34:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0	102	90	110			
Arsenic	0.209	0.00500	0.200	0	104	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.201	0.00100	0.200	0	100	90	110			
Boron	0.215	0.0300	0.200	0	108	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.66	0.300	5.00	0	93.3	90	110			
Chromium	0.203	0.00500	0.200	0	102	90	110			
Cobalt	0.208	0.00500	0.200	0	104	90	110			
Iron	5.05	0.100	5.00	0	101	90	110			
Lead	0.193	0.00100	0.200	0	96.7	90	110			
Lithium	0.195	0.0100	0.200	0	97.5	90	110			
Magnesium	5.05	0.300	5.00	0	101	90	110			
Molybdenum	0.193	0.00500	0.200	0	96.4	90	110			
Potassium	5.13	0.300	5.00	0	103	90	110			
Selenium	0.212	0.00500	0.200	0	106	90	110			
Sodium	5.03	0.300	5.00	0	101	90	110			
Thallium	0.205	0.00150	0.200	0	103	90	110			

Sample ID **LCVL4-190522**	Batch ID: **R104232**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 2:40:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00194	0.00250	0.00200	0	96.9	70	130			
Arsenic	0.00504	0.00500	0.00500	0	101	70	130			
Barium	0.00472	0.0100	0.00500	0	94.5	70	130			
Beryllium	0.00124	0.00100	0.00100	0	124	70	130			
Boron	0.0223	0.0300	0.0200	0	111	70	130			
Cadmium	0.000955	0.00100	0.00100	0	95.5	70	130			
Calcium	0.111	0.300	0.100	0	111	70	130			
Chromium	0.00487	0.00500	0.00500	0	97.4	70	130			
Cobalt	0.00501	0.00500	0.00500	0	100	70	130			
Iron	0.114	0.100	0.100	0	114	70	130			
Lead	0.000846	0.00100	0.00100	0	84.6	70	130			
Lithium	0.00964	0.0100	0.0100	0	96.4	70	130			
Magnesium	0.101	0.300	0.100	0	101	70	130			
Molybdenum	0.00453	0.00500	0.00500	0	90.7	70	130			
Potassium	0.0997	0.300	0.100	0	99.7	70	130			
Selenium	0.00427	0.00500	0.00500	0	85.3	70	130			
Sodium	0.111	0.300	0.100	0	111	70	130			
Thallium	0.000835	0.00150	0.00100	0	83.5	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **CCV5-190522**	Batch ID: **R104232**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	102	90	110			
Arsenic	0.205	0.00500	0.200	0	103	90	110			
Barium	0.200	0.0100	0.200	0	99.8	90	110			
Beryllium	0.200	0.00100	0.200	0	100	90	110			
Boron	0.220	0.0300	0.200	0	110	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.68	0.300	5.00	0	93.5	90	110			
Chromium	0.203	0.00500	0.200	0	101	90	110			
Cobalt	0.205	0.00500	0.200	0	102	90	110			
Iron	5.15	0.100	5.00	0	103	90	110			
Lead	0.188	0.00100	0.200	0	93.8	90	110			
Lithium	0.203	0.0100	0.200	0	102	90	110			
Magnesium	5.17	0.300	5.00	0	103	90	110			
Molybdenum	0.195	0.00500	0.200	0	97.3	90	110			
Potassium	5.20	0.300	5.00	0	104	90	110			
Selenium	0.213	0.00500	0.200	0	107	90	110			
Sodium	5.13	0.300	5.00	0	103	90	110			
Thallium	0.201	0.00150	0.200	0	101	90	110			

Sample ID **LCVL5-190522**	Batch ID: **R104232**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190522D**	Analysis Date: **5/22/2019 3:46:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00186	0.00250	0.00200	0	93.2	70	130			
Arsenic	0.00475	0.00500	0.00500	0	95.0	70	130			
Barium	0.00461	0.0100	0.00500	0	92.3	70	130			
Beryllium	0.000947	0.00100	0.00100	0	94.7	70	130			
Boron	0.0229	0.0300	0.0200	0	115	70	130			
Cadmium	0.000924	0.00100	0.00100	0	92.4	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Chromium	0.00452	0.00500	0.00500	0	90.4	70	130			
Cobalt	0.00479	0.00500	0.00500	0	95.8	70	130			
Iron	0.106	0.100	0.100	0	106	70	130			
Lead	0.000756	0.00100	0.00100	0	75.6	70	130			
Lithium	0.00948	0.0100	0.0100	0	94.8	70	130			
Magnesium	0.0981	0.300	0.100	0	98.1	70	130			
Molybdenum	0.00455	0.00500	0.00500	0	91.0	70	130			
Potassium	0.0951	0.300	0.100	0	95.1	70	130			
Selenium	0.00474	0.00500	0.00500	0	94.7	70	130			
Sodium	0.126	0.300	0.100	0	126	70	130			
Thallium	0.000763	0.00150	0.00100	0	76.3	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190522D

Sample ID **CCV6-190522** Batch ID: **R104232** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 4:12:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.208	0.00250	0.200	0	104	90	110			
Arsenic	0.211	0.00500	0.200	0	106	90	110			
Barium	0.208	0.0100	0.200	0	104	90	110			
Beryllium	0.195	0.00100	0.200	0	97.5	90	110			
Boron	0.207	0.0300	0.200	0	104	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	4.74	0.300	5.00	0	94.8	90	110			
Chromium	0.202	0.00500	0.200	0	101	90	110			
Cobalt	0.209	0.00500	0.200	0	104	90	110			
Iron	5.12	0.100	5.00	0	102	90	110			
Lead	0.192	0.00100	0.200	0	96.1	90	110			
Lithium	0.197	0.0100	0.200	0	98.7	90	110			
Magnesium	5.05	0.300	5.00	0	101	90	110			
Molybdenum	0.197	0.00500	0.200	0	98.4	90	110			
Potassium	5.17	0.300	5.00	0	103	90	110			
Selenium	0.213	0.00500	0.200	0	107	90	110			
Sodium	5.09	0.300	5.00	0	102	90	110			
Thallium	0.206	0.00150	0.200	0	103	90	110			

Sample ID **LCVL6-190522** Batch ID: **R104232** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_190522D** Analysis Date: **5/22/2019 4:22:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00200	0.00250	0.00200	0	100	70	130			
Arsenic	0.00486	0.00500	0.00500	0	97.1	70	130			
Barium	0.00495	0.0100	0.00500	0	99.0	70	130			
Beryllium	0.000939	0.00100	0.00100	0	93.9	70	130			
Boron	0.0216	0.0300	0.0200	0	108	70	130			
Cadmium	0.00101	0.00100	0.00100	0	101	70	130			
Calcium	0.113	0.300	0.100	0	113	70	130			
Chromium	0.00486	0.00500	0.00500	0	97.1	70	130			
Cobalt	0.00489	0.00500	0.00500	0	97.8	70	130			
Iron	0.113	0.100	0.100	0	113	70	130			
Lead	0.000805	0.00100	0.00100	0	80.5	70	130			
Lithium	0.00903	0.0100	0.0100	0	90.3	70	130			
Magnesium	0.104	0.300	0.100	0	104	70	130			
Molybdenum	0.00464	0.00500	0.00500	0	92.8	70	130			
Potassium	0.0982	0.300	0.100	0	98.2	70	130			
Selenium	0.00531	0.00500	0.00500	0	106	70	130			
Sodium	0.147	0.300	0.100	0	147	70	130			S
Thallium	0.000807	0.00150	0.00100	0	80.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190523A**

The QC data in batch 90989 applies to the following samples: 1905205-01B, 1905205-02B, 1905205-03B, 1905205-04B, 1905205-05B, 1905205-06B, 1905205-07B, 1905205-08B, 1905205-09B

Sample ID **1905185-06B SD** Batch ID: **90989** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_190523A** Analysis Date: **5/23/2019 11:20:00 AM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	207	30.0	0	200				3.62	10	
Magnesium	134	30.0	0	130				2.71	10	
Sodium	266	30.0	0	265				0.189	10	

Sample ID **1905185-06B PDS** Batch ID: **90989** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_190523A** Analysis Date: **5/23/2019 11:40:00 AM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	295	6.00	100	200	95.2	80	120			
Magnesium	227	6.00	100	130	96.8	80	120			
Sodium	365	6.00	100	265	99.6	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190523A

Sample ID **ICV-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 11:01:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.39	0.300	2.50	0	95.8	90	110			
Iron	2.56	0.100	2.50	0	102	90	110			
Magnesium	2.53	0.300	2.50	0	101	90	110			
Sodium	2.56	0.300	2.50	0	102	90	110			

Sample ID **LCVL-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 11:09:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0901	0.300	0.100	0	90.1	70	130			
Iron	0.105	0.100	0.100	0	105	70	130			
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.0949	0.300	0.100	0	94.9	70	130			

Sample ID **CCV1-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 11:42:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.76	0.300	5.00	0	95.2	90	110			
Iron	5.10	0.100	5.00	0	102	90	110			
Magnesium	5.21	0.300	5.00	0	104	90	110			
Sodium	5.14	0.300	5.00	0	103	90	110			

Sample ID **LCVL1-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 11:48:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0899	0.300	0.100	0	89.9	70	130			
Iron	0.105	0.100	0.100	0	105	70	130			
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.0973	0.300	0.100	0	97.3	70	130			

Sample ID **CCV2-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 12:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.79	0.300	5.00	0	95.7	90	110			
Iron	5.15	0.100	5.00	0	103	90	110			
Magnesium	5.29	0.300	5.00	0	106	90	110			
Sodium	5.22	0.300	5.00	0	104	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190523A

Sample ID **LCVL2-190523**	Batch ID: **R104240**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190523A**	Analysis Date: **5/23/2019 12:29:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.101	0.300	0.100	0	101	70	130			
Iron	0.105	0.100	0.100	0	105	70	130			
Magnesium	0.0985	0.300	0.100	0	98.5	70	130			
Sodium	0.0994	0.300	0.100	0	99.4	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_190517A

The QC data in batch 90965 applies to the following samples: 1905205-01C, 1905205-02C, 1905205-03C, 1905205-04C, 1905205-05C, 1905205-06C, 1905205-07C, 1905205-08C, 1905205-09C

Sample ID **MB-90965** Batch ID: **90965** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC4_190517A** Analysis Date: **5/17/2019 10:28:41 AM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Fluoride	<0.100	0.400								
Nitrate-N	<0.100	0.500								
Sulfate	<1.00	3.00								

Sample ID **LCS-90965** Batch ID: **90965** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC4_190517A** Analysis Date: **5/17/2019 10:44:41 AM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.65	1.00	10.00	0	96.5	90	110			
Fluoride	4.17	0.400	4.000	0	104	90	110			
Nitrate-N	5.13	0.500	5.000	0	103	90	110			
Sulfate	29.8	3.00	30.00	0	99.5	90	110			

Sample ID **LCSD-90965** Batch ID: **90965** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC4_190517A** Analysis Date: **5/17/2019 11:00:41 AM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.72	1.00	10.00	0	97.2	90	110	0.774	20	
Fluoride	4.22	0.400	4.000	0	106	90	110	1.24	20	
Nitrate-N	5.18	0.500	5.000	0	104	90	110	0.847	20	
Sulfate	30.0	3.00	30.00	0	100	90	110	0.565	20	

Sample ID **1905205-01CMS** Batch ID: **90965** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC4_190517A** Analysis Date: **5/17/2019 1:40:13 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	365	10.0	200.0	170.3	97.2	90	110			
Fluoride	216	4.00	200.0	0	108	90	110			
Nitrate-N	44.7	5.00	45.16	0	99.1	90	110			
Sulfate	251	30.0	200.0	49.70	101	90	110			

Sample ID **1905205-01CMSD** Batch ID: **90965** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC4_190517A** Analysis Date: **5/17/2019 1:56:13 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	363	10.0	200.0	170.3	96.3	90	110	0.462	20	
Fluoride	217	4.00	200.0	0	108	90	110	0.421	20	
Nitrate-N	46.1	5.00	45.16	0	102	90	110	2.98	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_190517A

Sample ID **1905205-01CMSD**	Batch ID: **90965**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 1:56:13 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	251	30.0	200.0	49.70	101	90	110	0.050	20	

Sample ID **1905205-02CMS**	Batch ID: **90965**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 2:28:13 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	393	10.0	200.0	204.5	94.3	90	110			
Fluoride	215	4.00	200.0	0	107	90	110			
Nitrate-N	45.4	5.00	45.16	0	100	90	110			
Sulfate	239	30.0	200.0	41.25	98.7	90	110			

Sample ID **1905205-02CMSD**	Batch ID: **90965**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 2:44:13 PM**	Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	396	10.0	200.0	204.5	95.8	90	110	0.770	20	
Fluoride	218	4.00	200.0	0	109	90	110	1.50	20	
Nitrate-N	46.0	5.00	45.16	0	102	90	110	1.44	20	
Sulfate	242	30.0	200.0	41.25	100	90	110	1.42	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_190517A

Sample ID **ICV-190517**	Batch ID: **R104153**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 9:56:41 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.0	1.00	25.00	0	99.8	90	110			
Fluoride	10.2	0.400	10.00	0	102	90	110			
Nitrate-N	13.0	0.500	12.50	0	104	90	110			
Sulfate	75.7	3.00	75.00	0	101	90	110			

Sample ID **CCV1-190517**	Batch ID: **R104153**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 5:24:12 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.74	1.00	10.00	0	97.4	90	110			
Fluoride	4.33	0.400	4.000	0	108	90	110			
Nitrate-N	5.19	0.500	5.000	0	104	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Sample ID **CCV2-190517**	Batch ID: **R104153**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_190517A**	Analysis Date: **5/17/2019 9:08:12 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.75	1.00	10.00	0	97.5	90	110			
Fluoride	4.40	0.400	4.000	0	110	90	110			
Nitrate-N	5.18	0.500	5.000	0	104	90	110			
Sulfate	30.1	3.00	30.00	0	100	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_190520A

The QC data in batch 90986 applies to the following samples: 1905205-07C, 1905205-08C

Sample ID	MB-90986	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	MBLK	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 10:20:17 AM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								

Sample ID	LCS-90986	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	LCS	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 10:36:17 AM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.25	1.00	10.00	0	92.5	90	110			

Sample ID	LCSD-90986	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	LCSD	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 10:52:17 AM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.37	1.00	10.00	0	93.7	90	110	1.29	20	

Sample ID	1905193-02DMS	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	MS	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 12:51:06 PM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2120	100	2000	187.2	96.4	90	110			

Sample ID	1905193-02DMSD	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	MSD	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 1:07:06 PM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2130	100	2000	187.2	97.0	90	110	0.536	20	

Sample ID	1905194-01DMS	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	MS	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 1:39:06 PM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2020	100	2000	0	101	90	110			

Sample ID	1905194-01DMSD	Batch ID:	90986	TestNo:	E300	Units:	mg/L
SampType:	MSD	Run ID:	IC4_190520A	Analysis Date:	5/20/2019 1:55:06 PM	Prep Date:	5/20/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2020	100	2000	0	101	90	110	0.304	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC4_190520A

Sample ID **ICV-190520**	Batch ID: **R104175**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC4_190520A**	Analysis Date: **5/20/2019 9:48:17 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	23.6	1.00	25.00	0	94.4	90	110			

Sample ID **CCV1-190520**	Batch ID: **R104175**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC4_190520A**	Analysis Date: **5/20/2019 4:03:05 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.60	1.00	10.00	0	96.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190521A

The QC data in batch 91010 applies to the following samples: 1905205-01C, 1905205-02C, 1905205-03C, 1905205-04C, 1905205-05C, 1905205-06C, 1905205-07C, 1905205-08C, 1905205-09C

Sample ID **MB-91010** Batch ID: **91010** TestNo: **M2320 B** Units: **mg/L @ pH 4.17**
SampType: **MBLK** Run ID: **TITRATOR_190521A** Analysis Date: **5/21/2019 9:19:00 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID **LCS-91010** Batch ID: **91010** TestNo: **M2320 B** Units: **mg/L @ pH 3.91**
SampType: **LCS** Run ID: **TITRATOR_190521A** Analysis Date: **5/21/2019 9:23:00 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	54.4	20.0	50.00	0	109	74	129			

Sample ID **LCSD-91010** Batch ID: **91010** TestNo: **M2320 B** Units: **mg/L @ pH 3.97**
SampType: **LCSD** Run ID: **TITRATOR_190521A** Analysis Date: **5/21/2019 9:27:00 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	53.6	20.0	50.00	0	107	74	129	1.48	20	

Sample ID **1905205-01C DUP** Batch ID: **91010** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_190521A** Analysis Date: **5/21/2019 10:14:00 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	267	20.0	0	261.5				2.04	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	267	20.0	0	261.5				2.04	20	

Sample ID **1905229-02B DUP** Batch ID: **91010** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_190521A** Analysis Date: **5/21/2019 4:14:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	250	20.0	0	251.0				0.319	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	250	20.0	0	251.0				0.319	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190521A

Sample ID **ICV-190521**	Batch ID: **R104203**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.08**
SampType: **ICV**	Run ID: **TITRATOR_190521A**	Analysis Date: **5/21/2019 9:15:00 AM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.08	20.0	0							
Alkalinity, Carbonate (As CaCO3)	96.5	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	105	20.0	100.0	0	105	98	102			S

Sample ID **CCV1-190521**	Batch ID: **R104203**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.14**
SampType: **CCV**	Run ID: **TITRATOR_190521A**	Analysis Date: **5/21/2019 12:25:00 PM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	13.9	20.0	0							
Alkalinity, Carbonate (As CaCO3)	86.6	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	90	110			

Sample ID **CCV2-190521**	Batch ID: **R104203**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.2**
SampType: **CCV**	Run ID: **TITRATOR_190521A**	Analysis Date: **5/21/2019 4:19:00 PM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	16.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	82.9	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.0	20.0	100.0	0	99.0	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190530A

The QC data in batch 91142 applies to the following samples: 1905205-05C, 1905205-06C

Sample ID	MB-91142	Batch ID:	91142	TestNo:	M2320 B	Units:	mg/L @ pH 4.2
SampType:	MBLK	Run ID:	TITRATOR_190530A	Analysis Date:	5/30/2019 3:08:00 PM	Prep Date:	5/30/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID	LCS-91142	Batch ID:	91142	TestNo:	M2320 B	Units:	mg/L @ pH 4.3
SampType:	LCS	Run ID:	TITRATOR_190530A	Analysis Date:	5/30/2019 3:12:00 PM	Prep Date:	5/30/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	50.5	20.0	50.00	0	101	74	129			

Sample ID	1905205-05C DUP	Batch ID:	91142	TestNo:	M2320 B	Units:	mg/L @ pH 4.52
SampType:	DUP	Run ID:	TITRATOR_190530A	Analysis Date:	5/30/2019 3:41:00 PM	Prep Date:	5/30/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	236	20.0	0	237.0				0.296	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	236	20.0	0	237.0				0.296	20	

Sample ID	LCSD-91142	Batch ID:	91142	TestNo:	M2320 B	Units:	mg/L @ pH 4.18
SampType:	LCSD	Run ID:	TITRATOR_190530A	Analysis Date:	5/30/2019 4:10:00 PM	Prep Date:	5/30/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	50.9	20.0	50.00	0	102	74	129	0.789	20	

Sample ID	1905321-02A DUP	Batch ID:	91142	TestNo:	M2320 B	Units:	mg/L @ pH 4.51
SampType:	DUP	Run ID:	TITRATOR_190530A	Analysis Date:	5/30/2019 5:07:00 PM	Prep Date:	5/30/2019

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	142	20.0	0	138.0				2.86	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	142	20.0	0	138.0				2.86	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190530A

Sample ID **ICV-190530**	Batch ID: **R104367**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.31**
SampType: **ICV**	Run ID: **TITRATOR_190530A**	Analysis Date: **5/30/2019 2:50:00 PM**	Prep Date: **5/30/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	11.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	88.0	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.8	20.0	100.0	0	99.8	98	102			

Sample ID **CCV1-190530**	Batch ID: **R104367**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.27**
SampType: **CCV**	Run ID: **TITRATOR_190530A**	Analysis Date: **5/30/2019 4:23:00 PM**	Prep Date: **5/30/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	14.6	20.0	0							
Alkalinity, Carbonate (As CaCO3)	83.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.8	20.0	100.0	0	97.8	90	110			

Sample ID **CCV2-190530**	Batch ID: **R104367**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.5**
SampType: **CCV**	Run ID: **TITRATOR_190530A**	Analysis Date: **5/30/2019 5:10:00 PM**	Prep Date: **5/30/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	95.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	95.8	20.0	100.0	0	95.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190517B

The QC data in batch 90972 applies to the following samples: 1905205-01C, 1905205-02C, 1905205-03C, 1905205-04C, 1905205-05C, 1905205-06C, 1905205-07C, 1905205-08C, 1905205-09C

Sample ID **MB-90972** Batch ID: **90972** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_190517B** Analysis Date: **5/17/2019 12:34:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	<0.0300	0.100								

Sample ID **LCS-90972** Batch ID: **90972** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_190517B** Analysis Date: **5/17/2019 12:34:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.520	0.100	0.5000	0	104	80	120			

Sample ID **LCSD-90972** Batch ID: **90972** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_190517B** Analysis Date: **5/17/2019 12:34:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.503	0.100	0.5000	0	101	80	120	3.32	15	

Sample ID **1905205-01CMS** Batch ID: **90972** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_190517B** Analysis Date: **5/17/2019 12:42:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	1.61	0.200	1.000	0.7140	90.0	80	120			

Sample ID **1905205-01CMSD** Batch ID: **90972** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_190517B** Analysis Date: **5/17/2019 12:42:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	1.59	0.200	1.000	0.7140	87.2	80	120	1.75	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190517B

Sample ID **ICV-190517**	Batch ID: **R104132**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190517B**	Analysis Date: **5/17/2019 12:33:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.218	0.100	0.2000	0	109	85	115			

Sample ID **CCV1-190517**	Batch ID: **R104132**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190517B**	Analysis Date: **5/17/2019 12:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.536	0.100	0.5000	0	107	85	115			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190521B

The QC data in batch 91028 applies to the following samples: 1905205-01A, 1905205-02A, 1905205-03A, 1905205-04A, 1905205-05A, 1905205-06A, 1905205-07A, 1905205-08A, 1905205-09A

Sample ID **MB-91028** Batch ID: **91028** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_190521B** Analysis Date: **5/21/2019 5:39:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	<0.0500	0.100								N

Sample ID **LCS-91028** Batch ID: **91028** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_190521B** Analysis Date: **5/21/2019 5:40:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.103	0.100	0.1000	0	103	85	115			N

Sample ID **LCSD-91028** Batch ID: **91028** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_190521B** Analysis Date: **5/21/2019 5:40:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0959	0.100	0.1000	0	95.9	85	115	7.39	15	N

Sample ID **1905205-09AMS** Batch ID: **91028** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_190521B** Analysis Date: **5/21/2019 5:45:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.108	0.100	0.1000	0	108	85	115			N

Sample ID **1905205-09AMSD** Batch ID: **91028** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_190521B** Analysis Date: **5/21/2019 5:45:00 PM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.110	0.100	0.1000	0	110	85	115	2.25	15	N

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190521B

Sample ID **ICV-190521**	Batch ID: **R104200**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190521B**	Analysis Date: **5/21/2019 5:38:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0971	0.100	0.1000	0	97.1	85	115			N

Sample ID **CCV1-190521**	Batch ID: **R104200**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190521B**	Analysis Date: **5/21/2019 5:46:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.221	0.100	0.2000	0	111	85	115			N

Sample ID **CCV2-190521**	Batch ID: **R104200**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190521B**	Analysis Date: **5/21/2019 6:00:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.212	0.100	0.2000	0	106	85	115			N

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905205
Project: Luminant-OGSES FGD Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190521C

The QC data in batch 91019 applies to the following samples: 1905205-01C, 1905205-02C, 1905205-03C, 1905205-04C, 1905205-05C, 1905205-06C, 1905205-07C, 1905205-08C, 1905205-09C

Sample ID **MB-91019**	Batch ID: **91019**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_190521C**	Analysis Date: **5/21/2019 10:00:00 AM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID **LCS-91019**	Batch ID: **91019**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_190521C**	Analysis Date: **5/21/2019 10:00:00 AM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	748	10.0	745.6	0	100	90	113			

Sample ID **1905188-01E-DUP**	Batch ID: **91019**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_190521C**	Analysis Date: **5/21/2019 10:00:00 AM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	9980	200	0	10160				1.79	5	

Sample ID **1905188-02E-DUP**	Batch ID: **91019**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_190521C**	Analysis Date: **5/21/2019 10:00:00 AM**	Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	10800	200	0	10840				0.370	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

May 29, 2019

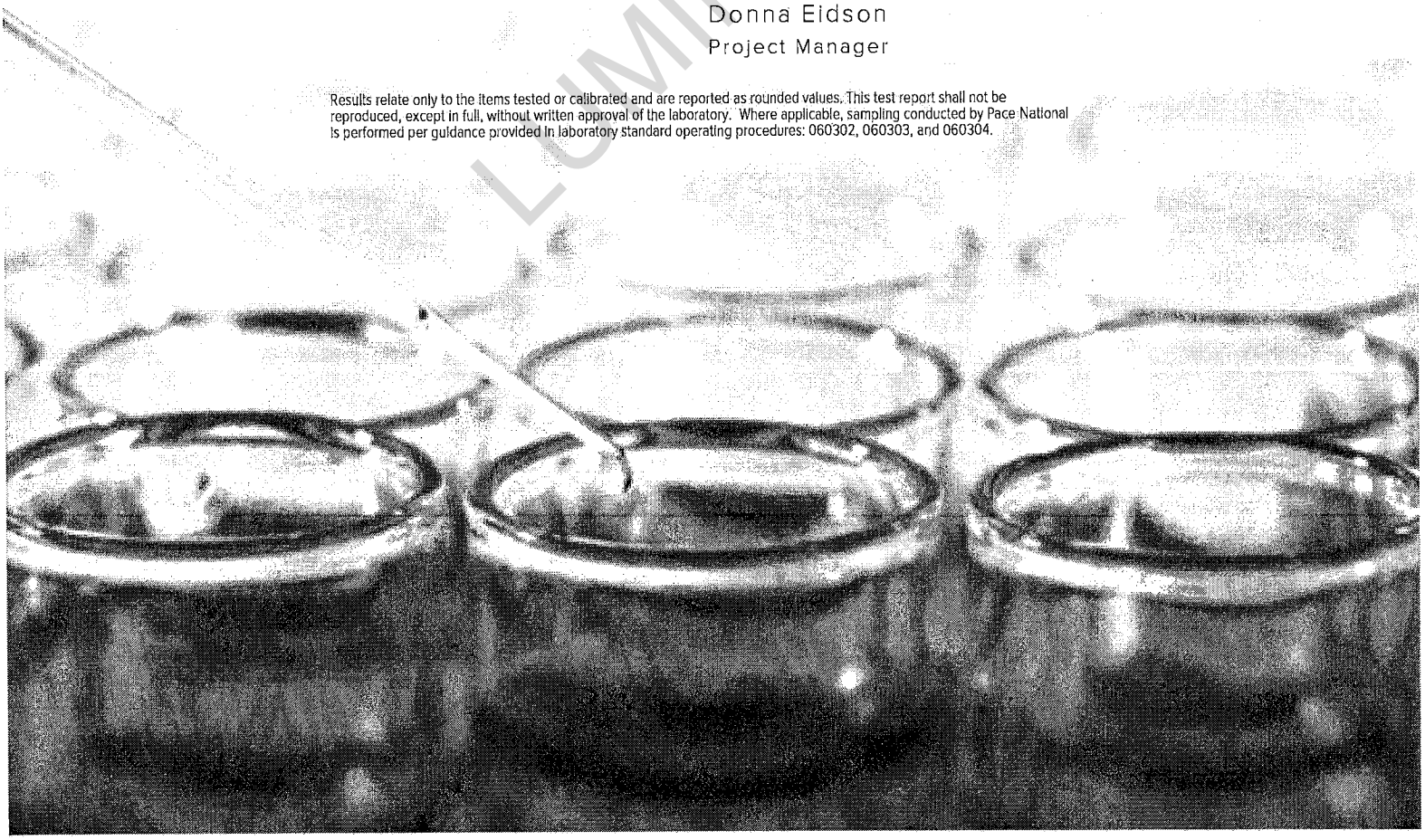
DHL Analytical, Inc.

Sample Delivery Group:	L1100949
Samples Received:	05/21/2019
Project Number:	1905205
Description:	

Report To: John DuPont
2300 Double Creek Drive
Round Rock, TX 78664

Entire Report Reviewed By: Donna Eidson

Donna Eidson
Project Manager



Cp: Cover Page 1
Tc: Table of Contents 2
Ss: Sample Summary 3
Cn: Case Narrative 5
Sr: Sample Results 6
FGD-6 L1100949-01 6
FGD-4 L1100949-02 7
FGD-3 L1100949-03 8
FGD-2 L1100949-04 9
FGD-5 L1100949-05 10
FGD-1 L1100949-06 11
FGD-8 L1100949-07 12
FGD-11 L1100949-08 13
FGD-12 L1100949-09 14
Qc: Quality Control Summary 15
Radiochemistry by Method 904 15
Radiochemistry by Method SM7500Ra B M 16
Gl: Glossary of Terms 17
Al: Accreditations & Locations 18
Sc: Sample Chain of Custody 19

FGD-6 L1100949-01 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 09:20	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 10:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 10:55	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:05	RRE	Mt. Juliet, TN

FGD-4 L1100949-02 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 10:15	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 10:55	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 10:55	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:05	RRE	Mt. Juliet, TN

FGD-3 L1100949-03 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 11:10	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:05	RRE	Mt. Juliet, TN

FGD-2 L1100949-04 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 12:00	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

FGD-5 L1100949-05 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 13:50	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

FGD-1 L1100949-06 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 14:50	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

FGD-8 L1100949-07 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 15:45	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

FGD-11 L1100949-08 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 16:40	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

FGD-12 L1100949-09 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				05/16/19 17:35	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1284744	1	05/22/19 08:25	05/28/19 14:05	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1284773	1	05/23/19 15:02	05/28/19 14:05	RRE	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1284773	1	05/23/19 15:02	05/24/19 17:18	RRE	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.67		0.422	0.593	05/28/2019 10:55	WG1284744
(T) Barium	*97.9*			*62.0-143*	*05/28/2019 10:55*	WG1284744
(T) Yttrium	*113*			*79.0-136*	*05/28/2019 10:55*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	3.10		0.890	0.863	05/28/2019 10:55	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	1.43		0.468	0.27	05/24/2019 17:05	WG1284773
(T) Barium-133	*90.8*			*30.0-143*	*05/24/2019 17:05*	WG1284773

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.745		0.407	0.556	05/28/2019 10:55	WG1284744
(T) Barium	*109*			*62.0-143*	*05/28/2019 10:55*	WG1284744
(T) Yttrium	*110*			*79.0-136*	*05/28/2019 10:55*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	1.37		0.716	0.755	05/28/2019 10:55	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.627		0.309	0.199	05/24/2019 17:05	WG1284773
(T) Barium-133	*92.0*			*30.0-143*	*05/24/2019 17:05*	WG1284773

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	0.403		0.412	0.638	05/28/2019 14:05	WG1284744
(T) Barium	*92.8*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*112*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	0.797		0.752	1.04	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.394		0.340	0.403	05/24/2019 17:05	WG1284773
(T) Barium-133	*59.2*			*30.0-143*	*05/24/2019 17:05*	WG1284773

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.588		0.391	0.541	05/28/2019 14:05	WG1284744
(T) Barium	*109*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*109*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.24		0.819	0.937	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.648		0.428	0.396	05/24/2019 17:18	WG1284773
(T) Barium-133	*92.1*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.0624		0.333	0.506	05/28/2019 14:05	WG1284744
(T) Barium	*105*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*108*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.404		0.552	0.696	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.342		0.219	0.19	05/24/2019 17:18	WG1284773
(T) Barium-133	*86.7*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	-0.0608		0.401	0.593	05/28/2019 14:05	WG1284744
(T) Barium	*95.4*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*110*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	0.184		0.635	0.923	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.184		0.234	0.33	05/24/2019 17:18	WG1284773
(T) Barium-133	*83.4*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	5.27		0.459	0.616	05/28/2019 14:05	WG1284744
(T) Barium	*91.3*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*107*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	8.40		1.14	0.795	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	3.14		0.685	0.179	05/24/2019 17:18	WG1284773
(T) Barium-133	*88.2*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	2.75		0.444	0.645	05/28/2019 14:05	WG1284744
(T) Barium	*112*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*108*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	5.14		0.963	0.952	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	2.39		0.519	0.307	05/24/2019 17:18	WG1284773
(T) Barium-133	*97.4*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	1.43		0.395	0.572	05/28/2019 14:05	WG1284744
(T) Barium	*111*			*62.0-143*	*05/28/2019 14:05*	WG1284744
(T) Yttrium	*115*			*79.0-136*	*05/28/2019 14:05*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	1.81		0.642	0.813	05/28/2019 14:05	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-226	0.385		0.247	0.241	05/24/2019 17:18	WG1284773
(T) Barium-133	*96.0*			*30.0-143*	*05/24/2019 17:18*	WG1284773

Method Blank (MB)

(MB) R3415641-1 05/28/19 10:55

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	-0.164		0.413
(T) Barium	*108*		
(T) Yttrium	*115*		

L1100192-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1100192-01 05/28/19 10:55 • (DUP) R3415641-5 05/28/19 10:55

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.157	-0.0367	1	200	0.366		20	3
(T) Barium	*91.7*	*102*						
(T) Yttrium	*110*	*107*						

Laboratory Control Sample (LCS)

(LCS) R3415641-2 05/28/19 10:55

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.47	89.4	80.0-120	
(T) Barium			*103*		
(T) Yttrium			*107*		

L1100922-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1100922-01 05/28/19 10:55 • (MS) R3415641-3 05/28/19 10:55 • (MSD) R3415641-4 05/28/19 10:55

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	7.14	-0.136	7.62	7.50	107	105	1	70.0-130			1.50		20
(T) Barium		*111*			*107*	*110*							
(T) Yttrium		*114*			*107*	*110*							

Method Blank (MB)

(MB) R3415635-1 05/24/19 17:04

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.459		0.209
(T) Barium-133	*84.6*		

L1100844-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1100844-01 05/24/19 17:04 • (DUP) R3415635-5 05/24/19 17:04

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.495	0.573	1	14.6	0.182		20	3
(T) Barium-133	*90.4*	*88.8*						

Laboratory Control Sample (LCS)

(LCS) R3415635-2 05/24/19 17:04

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	20.1	19.1	95.0	80.0-120	
(T) Barium-133			*79.1*		

L1100433-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1100433-01 05/24/19 17:04 • (MS) R3415635-3 05/24/19 17:04 • (MSD) R3415635-4 05/24/19 17:04

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.1	1.16	19.9	20.9	93.2	98.0	1	75.0-125			4.71		20
(T) Barium-133		*83.2*			*81.1*	*84.7*							

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
	The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

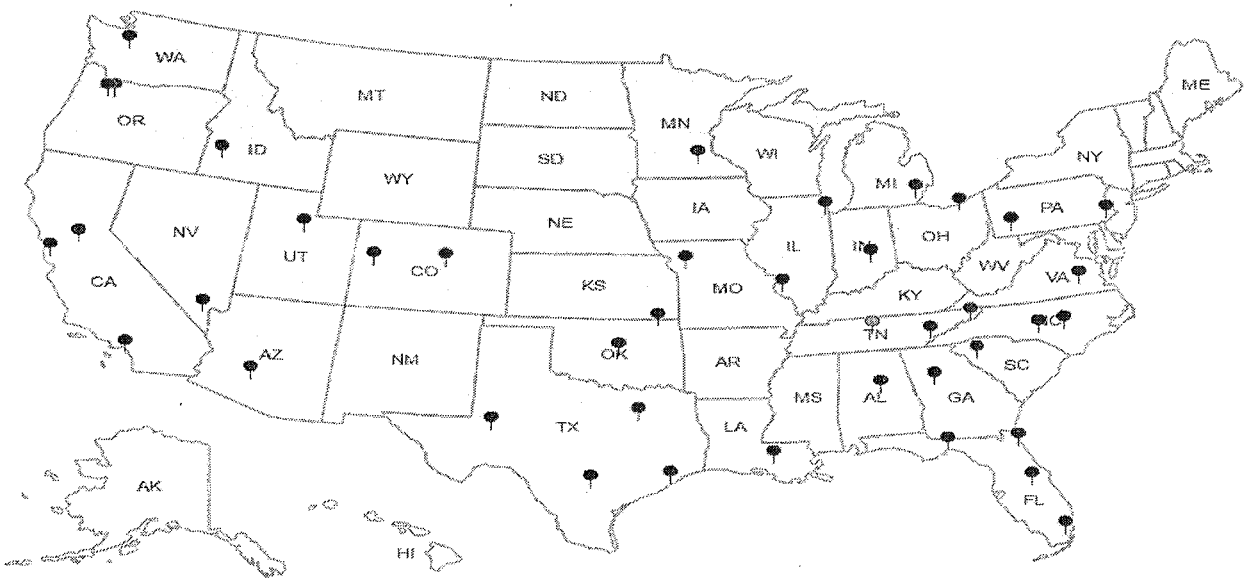
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRTX		SDG#:	1100949
Cooler Received/Opened On: 5/21/19		Temperature:	Amb
Received By: Brock Fariss			
Signature: BF Fariss			

Receipt Check List	NP	Yes	No
COC Seal Present / Intact?	✓		
COC Signed / Accurate?		✓	
Bottles arrive intact?		✓	
Correct bottles used?		✓	
Sufficient volume sent?		✓	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			✓

Pace Analytical®
National Center for Testing & Innovation

Login #:L1100949	Client:DHLRRTX	Date:05/21	Evaluated by:Kelsey S

Non-Conformance (check applicable items)

	Sample Integrity		Chain of Custody Clarification		
	Parameter(s) past holding time		Login Clarification Needed		**If Broken Container:**
	Temperature not in range		Chain of custody is incomplete		Insufficient packing material around container
	Improper container type		Please specify Metals requested.		Insufficient packing material inside cooler
x	pH not in range.		Please specify TCLP requested.		Improper handling by carrier (FedEx / UPS / Courie
	Insufficient sample volume.		Received additional samples not listed on coc.		Sample was frozen
	Sample is biphasic.		Sample ids on containers do not match ids on coc		Container lid not intact
	Vials received with headspace.		Trip Blank not received.		**If no Chain of Custody:**
	Broken container		Client did not "X" analysis.		Received by:
	Broken container:		Chain of Custody is missing		Date/Time:
	Sufficient sample remains				Temp./Cont. Rec./pH:
					Carrier:
					Tracking#

Login Comments: 2 of 2 FGD-8 was received with a pH of 6. pH adj in login 1424 05/21

Client informed by:		Call		Email		Voice Mail		Date:	Time:
TSR Initials:	Client Contact:								

Login Instructions:

Noted. DE 5/24/19

1100949

DHL Analytical, Inc.
2300 Double Creek Drive
Round Rock, TX 78664
TEL: *(512) 388-8222* FAX: *(512) 388-8229*

CHAIN-OF-CUSTODY RECORD

H005

Work Order: 1905205

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

TEL: (615) 773-5923
FAX:
Acct #: DHLRRTX

17-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests			
FGD-6	Aqueous	-01D	05/16/19 09:20 AM	1LHDPEHNO3		1				-01
FGD-6	Aqueous	-01E	05/16/19 09:20 AM	1LHDPEHNO3	1					01
FGD-4	Aqueous	-02D	05/16/19 10:15 AM	1LHDPEHNO3		1				02
FGD-4	Aqueous	-02E	05/16/19 10:15 AM	1LHDPEHNO3	1					02
FGD-3	Aqueous	-03D	05/16/19 11:10 AM	1LHDPEHNO3		1				03
FGD-3	Aqueous	-03E	05/16/19 11:10 AM	1LHDPEHNO3	1					03
FGD-2	Aqueous	-04D	05/16/19 12:00 PM	1LHDPEHNO3		1				04
FGD-2	Aqueous	-04E	05/16/19 12:00 PM	1LHDPEHNO3	1					04
FGD-5	Aqueous	-05D	05/16/19 01:50 PM	1LHDPEHNO3		1				05
FGD-5	Aqueous	-05E	05/16/19 01:50 PM	1LHDPEHNO3	1					05
FGD-1	Aqueous	-06D	05/16/19 02:50 PM	1LHDPEHNO3		1				06
FGD-1	Aqueous	-06E	05/16/19 02:50 PM	1LHDPEHNO3	1					06
FGD-8	Aqueous	-07D	05/16/19 03:45 PM	1LHDPEHNO3		1				07
FGD-8	Aqueous	-07E	05/16/19 03:45 PM	1LHDPEHNO3	1					07
FGD-11	Aqueous	-08D	05/16/19 04:40 PM	1LHDPEHNO3		1				08
FGD-11	Aqueous	-08E	05/16/19 04:40 PM	1LHDPEHNO3	1					08
FGD-12	Aqueous	-09D	05/16/19 05:35 PM	1LHDPEHNO3		1				09
FGD-12	Aqueous	-09E	05/16/19 05:35 PM	1LHDPEHNO3	1					09

< 2 < 2

General Comments:

Please analyze these samples with Normal Turnaround Time.
Report RA-226, Ra-228 & Combined per Specs.
Quality Control Package Needed: Standard - NELAC Rad Test compliant
Email to cac@dhlanalytical.com & dupont@dhlanalytical.com

UPS
Rec: 18

	Date/Time		Date/Time
Relinquished by:	5/17/19 1700	**Received by:**	5/21/19 1010
Relinquished by:		**Received by:**	

pH adj @ 1424

NCL

AM RAD SCREEN: <0.5 mR/hr

May 29, 2019

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1905222

RE: Luminant-OGSES-FGD Pond

Dear Will Vienne:

DHL Analytical, Inc. received 1 sample(s) on 5/18/2019 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-19-24

Table of Contents

Miscellaneous Documents **3**

CaseNarrative 1905222 ..... **6**

WorkOrderSampleSummary 1905222 ..... **7**

PrepDatesReport 1905222 ..... **8**

AnalyticalDatesReport 1905222 ..... **9**

Analytical Report 1905222 ..... **10**

AnalyticalQCSummaryReport 1905222 ..... **11**

DHL ANALYTICAL
2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: www.dhlanalytical.com
E-Mail: login@dhlanalytical.com

№ 86481

CHAIN-OF-CUSTODY

CLIENT: GOLDER
ADDRESS: 2201 DOUBLE CREEK DR, ROUND ROCK, TX 78664
PHONE: 512-671-3434 FAX/E-MAIL: 512-671-3446
DATA REPORTED TO: WILL VIENNE
ADDITIONAL REPORT COPIES TO:

DATE: 5-17-19 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 1905222
PROJECT LOCATION OR NAME: LUMINANT - OGSES - FGD POND
CLENT PROJECT #: 19122262-F COLLECTOR: J. BRAYTON

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL P=PAINT
W=WATER SL=SLUDGE
A=AIR O=OTHER
L=LIQUID SO=SOLID
SE=SEDIMENT

PRESERVATION: HCl, HNO_3, H_2SO_4 ☐ NaOH ☐, ICE, UNPRESERVED

ANALYSES: BTEX ☐ MTBE ☐ (METHOD 8021) | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO (METHOD 8015) ☐ DRO (METHOD 8105) ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | 8270 O-P PEST ☐ METALS 200.8 ☐ DISS. METALS ☐ | METALS 6020 ☐ METALS ☐ | RCRA ☐ TX11 ☐ | PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ | CHLORIDE ☐ ANIONS ☐ | TCLP SVOC ☐ VOC ☐ PEST ☐ HERB ☐ | TCLP METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ | RCI ☐ FLASHPOINT ☐ DGAS ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | SULFATE, COBALT, LITHIUM, SELENIUM

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	SULFATE, COBALT, LITHIUM, SELENIUM	FIELD NOTES
FGD-14	01	5-17-19	0750	W	P	2						X X	

LUMINANT

RELINQUISHED BY: (Signature) DATE/TIME 5-17-19 1730 RECEIVED BY: (Signature) FEDEX
RELINQUISHED BY: (Signature) DATE/TIME 5/18/19 4:30 PM RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

☐ DHL DISPOSAL @ $5.00 each ☐ Return

3

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☒
OTHER ☐ _____

LABORATORY USE ONLY:
RECEIVING TEMP: 3.0 THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LONE STAR ☒ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☐ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

ORIGIN ID:FWHA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 17MAY19
ACTWGT: 45.40 LB
CAD: 6981003/SSFO2002
DIMS: 25x14x14 IN

BILL THIRD PARTY

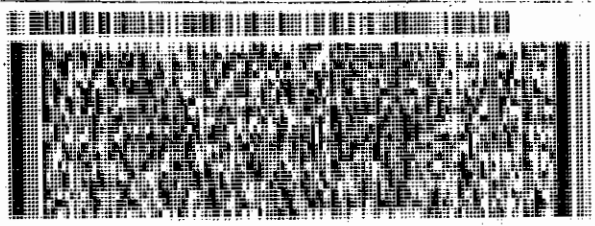
Part # 156[illegible]
DB2 EXP 03/20

TO

DHL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664

(512) 388-8222 REF:
INV:
PO: DEPT:



FedEx
Express

E

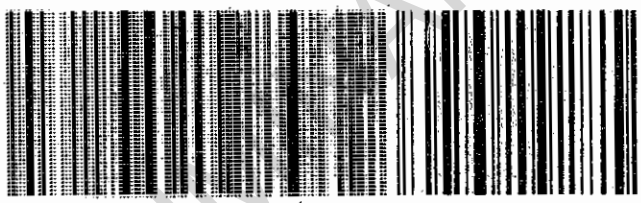
2 of 2

MPS# 0263 7873 2787 1824

Mstr# 7873 2787 1813 0201

SATURDAY 12:00P
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

XO BSMA



DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 5/18/2019

Work Order Number 1905222 | Received by AH

Checklist completed by: _____ (Signature) 5/20/2019 (Date) | Reviewed by CC (Initials) 5/20/2019 (Date)

Carrier name FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	3.0 °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 11837
	Adjusted? no		Checked by CC
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes	No	NA ☑ LOT #
	Adjusted?		Checked by

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

DHL Analytical, Inc. **Date:** *29-May-19*

CLIENT: Golder
Project: Luminant-OGSES-FGD Pond
Lab Order: 1905222

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method E300 - Anions Analysis

LOG IN

The sample was received and log-in performed on 5/18/19. A total of 1 sample was received. The sample arrived in good condition and was properly packaged. All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

DHL Analytical, Inc.

Date: *29-May-19*

CLIENT: Golder
Project: Luminant-OGSES-FGD Pond
Lab Order: 1905222

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905222-01	FGD-14		05/17/19 07:50 AM	5/18/2019

Lab Order: 1905222
Client: Golder
Project: Luminant-OGSES-FGD Pond

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905222-01A	FGD-14	05/17/19 07:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:41 AM	90992
1905222-01B	FGD-14	05/17/19 07:50 AM	Aqueous	E300	Anion Preparation	05/20/19 09:15 AM	90987

Lab Order: 1905222
Client: Golder
Project: Luminant-OGSES-FGD Pond

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905222-01A	FGD-14	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90992	1	05/21/19 01:06 PM	ICP-MS4_190521B
1905222-01B	FGD-14	Aqueous	E300	Anions by IC method - Water	90987	10	05/20/19 05:25 PM	IC2_190520A

DHL Analytical, Inc.

Date: *29-May-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-14
Project:	Luminant-OGSES-FGD Pond	**Lab ID:**	1905222-01
Project No:	19122262-F	**Collection Date:**	05/17/19 07:50 AM
Lab Order:	1905222	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/21/19 01:06 PM
Lithium	0.00564	0.00500	0.0100	J	mg/L	1	05/21/19 01:06 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 01:06 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Sulfate	41.6	10.0	30.0		mg/L	10	05/20/19 05:25 PM

Qualifiers:	*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
	S	Spike Recovery outside control limits	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190521B

The QC data in batch 90992 applies to the following samples: 1905222-01A

Sample ID **MB-90992** Batch ID: **90992** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_190521B** Analysis Date: **5/21/2019 12:50:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	<0.00300	0.00500								
Lithium	<0.00500	0.0100								
Selenium	<0.00200	0.00500								

Sample ID **LCS-90992** Batch ID: **90992** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_190521B** Analysis Date: **5/21/2019 12:52:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.205	0.00500	0.200	0	102	80	120			
Lithium	0.199	0.0100	0.200	0	99.6	80	120			
Selenium	0.202	0.00500	0.200	0	101	80	120			

Sample ID **LCSD-90992** Batch ID: **90992** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_190521B** Analysis Date: **5/21/2019 12:54:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.203	0.00500	0.200	0	101	80	120	1.11	15	
Lithium	0.205	0.0100	0.200	0	103	80	120	3.06	15	
Selenium	0.203	0.00500	0.200	0	102	80	120	0.424	15	

Sample ID **1905201-01A SD** Batch ID: **90992** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_190521B** Analysis Date: **5/21/2019 1:00:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	<0.0150	0.0250	0	0				0	10	
Lithium	<0.0250	0.0500	0	0.0251				0	10	
Selenium	<0.0100	0.0250	0	0				0	10	

Sample ID **1905201-01A PDS** Batch ID: **90992** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_190521B** Analysis Date: **5/21/2019 1:14:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.197	0.00500	0.200	0	98.4	80	120			
Lithium	0.209	0.0100	0.200	0.0251	92.0	80	120			
Selenium	0.199	0.00500	0.200	0	99.7	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190521B

Sample ID **1905201-01A MS**	Batch ID: **90992**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 1:16:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.194	0.00500	0.200	0	96.8	80	120			
Lithium	0.211	0.0100	0.200	0.0251	93.2	80	120			
Selenium	0.197	0.00500	0.200	0	98.6	80	120			

Sample ID **1905201-01A MSD**	Batch ID: **90992**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 1:18:00 PM**	Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.193	0.00500	0.200	0	96.5	80	120	0.256	15	
Lithium	0.216	0.0100	0.200	0.0251	95.3	80	120	2.00	15	
Selenium	0.201	0.00500	0.200	0	101	80	120	2.05	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190521B

Sample ID **ICV-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 11:02:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.104	0.00500	0.100	0	104	90	110			
Lithium	0.105	0.0100	0.100	0	105	90	110			
Selenium	0.102	0.00500	0.100	0	102	90	110			

Sample ID **LCVL-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 11:07:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00507	0.00500	0.00500	0	101	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Selenium	0.00506	0.00500	0.00500	0	101	70	130			

Sample ID **CCV2-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 12:37:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.206	0.00500	0.200	0	103	90	110			
Lithium	0.196	0.0100	0.200	0	97.9	90	110			
Selenium	0.202	0.00500	0.200	0	101	90	110			

Sample ID **LCVL2-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 12:42:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00505	0.00500	0.00500	0	101	70	130			
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Selenium	0.00483	0.00500	0.00500	0	96.6	70	130			

Sample ID **CCV3-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 1:20:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.201	0.00500	0.200	0	100	90	110			
Lithium	0.201	0.0100	0.200	0	100	90	110			
Selenium	0.201	0.00500	0.200	0	100	90	110			

Sample ID **LCVL3-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 1:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cobalt	0.00509	0.00500	0.00500	0	102	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190521B

Sample ID **LCVL3-190521**	Batch ID: **R104193**	TestNo: **SW6020A**	Units: **mg/L**		
SampType: **LCVL**	Run ID: **ICP-MS4_190521B**	Analysis Date: **5/21/2019 1:26:00 PM**	Prep Date:		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.0102	0.0100	0.0100	0	102	70	130			
Selenium	0.00554	0.00500	0.00500	0	111	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190520A

The QC data in batch 90987 applies to the following samples: 1905222-01B

Sample ID	**MB-90987**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 10:20:40 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	<1.00	3.00								

Sample ID	**LCS-90987**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 10:36:40 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30.7	3.00	30.00	0	102	90	110			

Sample ID	**LCSD-90987**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 10:52:40 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30.7	3.00	30.00	0	102	90	110	0.038	20	

Sample ID	**1905221-01BMS**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 3:01:53 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	238	30.0	200.0	29.76	104	90	110			

Sample ID	**1905221-01BMSD**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 3:17:53 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	236	30.0	200.0	29.76	103	90	110	0.887	20	

Sample ID	**1905221-02BMS**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 3:49:53 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	218	30.0	200.0	12.12	103	90	110			

Sample ID	**1905221-02BMSD**	Batch ID:	**90987**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190520A**	Analysis Date:	**5/20/2019 4:05:53 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	221	30.0	200.0	12.12	104	90	110	1.08	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1905222
Project: Luminant-OGSES-FGD Pond

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190520A

Sample ID **ICV-190520**	Batch ID: **R104174**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190520A**	Analysis Date: **5/20/2019 9:48:40 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	78.2	3.00	75.00	0	104	90	110			

Sample ID **CCV1-190520**	Batch ID: **R104174**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190520A**	Analysis Date: **5/20/2019 6:29:53 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	31.3	3.00	30.00	0	104	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

June 18, 2019

Will Vienne
Golder
2201 Double Creek Dr #4004
Round Rock, Texas 78664
TEL: (512) 671-3434
FAX (512) 671-3446

Order No.: 1906072

RE: LUMINANT-OGSES-FGD

Dear Will Vienne:

DHL Analytical, Inc. received 2 sample(s) on 6/7/2019 for the analyses presented in the following report.

There were no problems with the analyses and all data met requirements of NELAP except where noted in the Case Narrative. All non-NELAP methods will be identified accordingly in the case narrative and all estimated uncertainties of test results are within method or EPA specifications.

If you have any questions regarding these tests results, please feel free to call. Thank you for using DHL Analytical.

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-19-24

Table of Contents

Miscellaneous Documents **3**

CaseNarrative 1906072 ..... **7**

WorkOrderSampleSummary 1906072 ..... **8**

PrepDatesReport 1906072 ..... **9**

AnalyticalDatesReport 1906072 ..... **10**

Analytical Report 1906072 ..... **11**

AnalyticalQCSummaryReport 1906072 ..... **13**

DHL ANALYTICAL

2300 Double Creek Dr. ■ Round Rock, TX 78664
Phone (512) 388-8222 ■ FAX (512) 388-8229
Web: *www.dhlanalytical.com*
E-Mail: *login@dhlanalytical.com*

№ 83076

CHAIN-OF-CUSTODY

CLIENT: GOLDER
ADDRESS: 2201 DOUBLECREEK DR ROUND ROCK, TX 78664
PHONE: 512-671-3434 FAX/E-MAIL: 512-671-3446
DATA REPORTED TO: WILL VIENNE
ADDITIONAL REPORT COPIES TO:

DATE: 6-6-19 PAGE 1 OF 1
PO #: 19122262-F DHL WORK ORDER #: 1906072
PROJECT LOCATION OR NAME: LUMINANT- OGSES- FGD
CLENT PROJECT #: 19122262-F COLLECTOR: J.BRAYTON

Authorize 5% surcharge for TRRP Report? ☐ Yes ☐ No

S=SOIL P=PAINT W=WATER SL=SLUDGE A=AIR O=OTHER L=LIQUID SO=SOLID SE=SEDIMENT

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ 8321 HERB ☐ T PHOS, AMMONIA ☐ METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ RCRA ☐ TX11 ☐ ____ ☐ PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ CHLORIDE ☐ ANIONS ____ ☐ TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ RCI ☐ FLASHPOINT ☐ DGAS ☐ TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ LITHIUM, CATIONS/ANIONS, FERROUS/FERRIC IRON

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	LITHIUM	CATIONS/ANIONS	FERROUS/FERRIC IRON	FIELD NOTES
FGD-16	01	6-6-19	1300	W		7		X		X		X (JG)	X	X	
FGD-15	02	6-6-19	1445	W		7		X		X		X	X	X	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	6-6-19 1830	Fed EX
Fed Ex	6-7-19 1029	[signature]

☐ *DHL DISPOSAL @ $5.00 each* ☐ *Return*

TURN AROUND TIME
RUSH ☐ CALL FIRST
1 DAY ☐ CALL FIRST
2 DAY ☐
NORMAL ☒
OTHER ☐ ____

LABORATORY USE ONLY:
RECEIVING TEMP: 5.5°C THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LONE STAR ☒ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☐ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

Eric Lau

From: John DuPont
Sent: Tuesday, May 28, 2019 11:35 AM
To: Eric Lau
Subject: FW: CCR Analysis

Appendix III Parameters:
Metals (Ca and B)
Anions (Cl, F, and SO4)
TDS

Appendix IV Parameters:

Metals (As, Ba, Be, Cd, Co, Cr, Hg, Li, Mo, Pb, Sb, Se, and Tl)
Ra-226
Ra-228

From: Vienne, Will [mailto:William_Vienne@golder.com]
Sent: Tuesday, April 09, 2019 12:48 PM
To: John DuPont <dupont@dhlanalytical.com>
Subject: CCR Analysis

ORIGIN ID:ACTA (512) 671-3434
J. BRAYTON
GOLDER
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US

06JUN19
0 LB
8/SSFE2002
3 IN

TO DHL
DHL
DH00 DOUBLE CREEK DR.
230
ROUND ROCK TX 78664
RO
(512) 388-8222
INV:
PO:
REF:
DEPT:

512

1
10:30
D
7995
06.07

FedEx
Express

E

J191019010701uv

FRI - 07 JUN 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7877 3109 7995

44 BSMA

78664
TX-US AUS

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 6/7/2019

Work Order Number 1906072 | Received by EL

Checklist completed by: _____ 6/17/2019 (Signature / Date) | Reviewed by JD 6/17/2019 (Initials / Date)

Carrier name FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	5.5 °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 11837
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

Any No response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

CLIENT: Golder
Project: LUMINANT-OGSES-FGD
Lab Order: 1906072

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Method SW6020A - Metals Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
Method M3500-Fe D - Ferrous Iron Analysis (this parameter is not NELAP certified)
Method M3500-Fe D - Ferric Iron (calculation) (this calculation is not NELAP certified).
Method M4500-P E - Orthophosphate Analysis
Method M2540C - TDS Analysis

LOG IN

The samples were received and log-in performed on 6/7/19. A total of 2 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 6/12/19 the matrix spike and matrix spike duplicate recoveries were below control limits for Sodium. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

FERRIC IRON CALCULATION

The Ferric Iron is calculated as the Total Iron minus the Ferrous Iron.

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT: Golder
Project: LUMINANT-OGSES-FGD
Lab Order: 1906072

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1906072-01	FGD-16		06/06/19 01:00 PM	6/7/2019
1906072-02	FGD-15		06/06/19 02:45 PM	6/7/2019

Lab Order: 1906072
Client: Golder
Project: LUMINANT-OGSES-FGD

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1906072-01A	FGD-16	06/06/19 01:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/10/19 09:28 AM	91267
1906072-01B	FGD-16	06/06/19 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
	FGD-16	06/06/19 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
	FGD-16	06/06/19 01:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
1906072-01C	FGD-16	06/06/19 01:00 PM	Aqueous	M2320 B	Alkalinity Preparation	06/10/19 09:34 AM	91271
	FGD-16	06/06/19 01:00 PM	Aqueous	E300	Anion Preparation	06/07/19 12:27 PM	91226
	FGD-16	06/06/19 01:00 PM	Aqueous	E300	Anion Preparation	06/17/19 08:40 AM	91349
	FGD-16	06/06/19 01:00 PM	Aqueous	E300	Anion Preparation	06/17/19 08:40 AM	91349
	FGD-16	06/06/19 01:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	06/07/19 01:20 PM	91254
	FGD-16	06/06/19 01:00 PM	Aqueous	M2540C	TDS Preparation	06/13/19 04:04 PM	91332
1906072-02A	FGD-15	06/06/19 02:45 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	06/10/19 09:28 AM	91267
1906072-02B	FGD-15	06/06/19 02:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
	FGD-15	06/06/19 02:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
	FGD-15	06/06/19 02:45 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	06/10/19 08:17 AM	91261
1906072-02C	FGD-15	06/06/19 02:45 PM	Aqueous	M2320 B	Alkalinity Preparation	06/10/19 09:34 AM	91271
	FGD-15	06/06/19 02:45 PM	Aqueous	E300	Anion Preparation	06/07/19 12:27 PM	91226
	FGD-15	06/06/19 02:45 PM	Aqueous	E300	Anion Preparation	06/17/19 08:40 AM	91349
	FGD-15	06/06/19 02:45 PM	Aqueous	M4500-P E	Orthophosphate Prep	06/07/19 01:20 PM	91254
	FGD-15	06/06/19 02:45 PM	Aqueous	M2540C	TDS Preparation	06/13/19 04:04 PM	91332

Lab Order: 1906072
Client: Golder
Project: LUMINANT-OGSES-FGD

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1906072-01A	FGD-16	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R104593	1	06/14/19	UV/VIS_2_190614A
	FGD-16	Aqueous	M3500-Fe D	Ferrous Iron	91267	1	06/10/19 11:01 AM	UV/VIS_2_190610A
1906072-01B	FGD-16	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	10	06/12/19 11:53 AM	ICP-MS4_190612A
	FGD-16	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	1	06/12/19 01:41 PM	ICP-MS4_190612A
	FGD-16	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	1	06/11/19 04:05 PM	ICP-MS5_190611D
1906072-01C	FGD-16	Aqueous	M2320 B	Alkalinity	91271	1	06/10/19 12:47 PM	TITRATOR_190610A
	FGD-16	Aqueous	E300	Anions by IC method - Water	91226	1	06/07/19 04:58 PM	IC2_190607A
	FGD-16	Aqueous	E300	Anions by IC method - Water	91349	10	06/17/19 10:56 AM	IC2_190617A
	FGD-16	Aqueous	E300	Anions by IC method - Water	91349	1	06/17/19 12:16 PM	IC2_190617A
	FGD-16	Aqueous	M4500-P E	Orthophosphate	91254	1	06/07/19 01:51 PM	UV/VIS_2_190607B
	FGD-16	Aqueous	M2540C	Total Dissolved Solids	91332	1	06/14/19 12:00 PM	WC_190614B
1906072-02A	FGD-15	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	R104593	1	06/14/19	UV/VIS_2_190614A
	FGD-15	Aqueous	M3500-Fe D	Ferrous Iron	91267	1	06/10/19 11:03 AM	UV/VIS_2_190610A
1906072-02B	FGD-15	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	50	06/12/19 11:55 AM	ICP-MS4_190612A
	FGD-15	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	1	06/12/19 01:43 PM	ICP-MS4_190612A
	FGD-15	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	91261	1	06/11/19 04:08 PM	ICP-MS5_190611D
1906072-02C	FGD-15	Aqueous	M2320 B	Alkalinity	91271	1	06/10/19 12:56 PM	TITRATOR_190610A
	FGD-15	Aqueous	E300	Anions by IC method - Water	91226	1	06/07/19 05:14 PM	IC2_190607A
	FGD-15	Aqueous	E300	Anions by IC method - Water	91349	100	06/17/19 11:44 AM	IC2_190617A
	FGD-15	Aqueous	M4500-P E	Orthophosphate	91254	1	06/07/19 01:52 PM	UV/VIS_2_190607B
	FGD-15	Aqueous	M2540C	Total Dissolved Solids	91332	1	06/14/19 12:00 PM	WC_190614B

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-16
Project:	LUMINANT-OGSES-FGD	**Lab ID:**	1906072-01
Project No:	19122262-F	**Collection Date:**	06/06/19 01:00 PM
Lab Order:	1906072	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	16.5	1.00	3.00		mg/L	10	06/12/19 11:53 AM
Iron	<0.0300	0.0300	0.100		mg/L	1	06/11/19 04:05 PM
Magnesium	3.33	0.100	0.300		mg/L	1	06/11/19 04:05 PM
Potassium	3.06	0.100	0.300		mg/L	1	06/12/19 01:41 PM
Sodium	82.1	1.00	3.00		mg/L	10	06/12/19 11:53 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	74.8	3.00	10.0		mg/L	10	06/17/19 10:56 AM
Fluoride	0.164	0.100	0.400	J	mg/L	1	06/07/19 04:58 PM
Nitrate-N	0.361	0.100	0.500	J	mg/L	1	06/07/19 04:58 PM
Sulfate	13.9	1.00	3.00		mg/L	1	06/17/19 12:16 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	159	10.0	20.0		mg/L @ pH 4.55	1	06/10/19 12:47 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	06/10/19 12:47 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.55	1	06/10/19 12:47 PM
Alkalinity, Total (As CaCO3)	159	20.0	20.0		mg/L @ pH 4.55	1	06/10/19 12:47 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/10/19 11:01 AM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0490	0.0300	0.100	J	mg/L	1	06/07/19 01:51 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	325	10.0	10.0		mg/L	1	06/14/19 12:00 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

DHL Analytical, Inc.

Date: *18-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	FGD-15
Project:	LUMINANT-OGSES-FGD	**Lab ID:**	1906072-02
Project No:	19122262-F	**Collection Date:**	06/06/19 02:45 PM
Lab Order:	1906072	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **SP**
Calcium	252	5.00	15.0		mg/L	50	06/12/19 11:55 AM
Iron	<0.0300	0.0300	0.100		mg/L	1	06/11/19 04:08 PM
Lithium	0.0768	0.00500	0.0100		mg/L	1	06/11/19 04:08 PM
Magnesium	97.2	5.00	15.0		mg/L	50	06/12/19 11:55 AM
Potassium	5.06	0.100	0.300		mg/L	1	06/12/19 01:43 PM
Sodium	457	5.00	15.0		mg/L	50	06/12/19 11:55 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	634	30.0	100		mg/L	100	06/17/19 11:44 AM
Fluoride	0.622	0.100	0.400		mg/L	1	06/07/19 05:14 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	06/07/19 05:14 PM
Sulfate	926	100	300		mg/L	100	06/17/19 11:44 AM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	178	10.0	20.0		mg/L @ pH 4.54	1	06/10/19 12:56 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/10/19 12:56 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.54	1	06/10/19 12:56 PM
Alkalinity, Total (As CaCO3)	178	20.0	20.0		mg/L @ pH 4.54	1	06/10/19 12:56 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	06/14/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	06/10/19 11:03 AM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0840	0.0300	0.100	J	mg/L	1	06/07/19 01:52 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2880	50.0	50.0		mg/L	1	06/14/19 12:00 PM

Qualifiers:

*	Value exceeds TCLP Maximum Concentration Level	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	RL	Reporting Limit
S	Spike Recovery outside control limits	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190612A

The QC data in batch 91261 applies to the following samples: 1906072-01B, 1906072-02B

Sample ID **MB-91261** Batch ID: **91261** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_190612A** Analysis Date: **6/12/2019 10:50:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	<0.100	0.300								
Potassium	<0.100	0.300								
Sodium	<0.100	0.300								

Sample ID **LCS-91261** Batch ID: **91261** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_190612A** Analysis Date: **6/12/2019 10:52:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.66	0.300	5.00	0	93.2	80	120			
Potassium	4.97	0.300	5.00	0	99.4	80	120			
Sodium	5.11	0.300	5.00	0	102	80	120			

Sample ID **LCSD-91261** Batch ID: **91261** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_190612A** Analysis Date: **6/12/2019 10:54:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.67	0.300	5.00	0	93.4	80	120	0.234	15	
Potassium	4.93	0.300	5.00	0	98.5	80	120	0.913	15	
Sodium	5.15	0.300	5.00	0	103	80	120	0.824	15	

Sample ID **1906056-01A SD** Batch ID: **91261** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_190612A** Analysis Date: **6/12/2019 11:00:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	39.0	75.0	0	38.0				2.46	10	
Potassium	<25.0	75.0	0	0				0	10	
Sodium	116	75.0	0	115				0.316	10	

Sample ID **1906056-01A PDS** Batch ID: **91261** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_190612A** Analysis Date: **6/12/2019 11:20:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	276	15.0	250	38.0	95.0	80	120			
Potassium	247	15.0	250	0	98.7	80	120			
Sodium	379	15.0	250	115	105	80	120			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190612A

Sample ID **1906056-01A MS**	Batch ID: **91261**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 11:22:00 AM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	42.9	15.0	5.00	38.0	98.3	80	120			
Potassium	5.61	15.0	5.00	0	112	80	120			
Sodium	118	15.0	5.00	115	44.1	80	120			S

Sample ID **1906056-01A MSD**	Batch ID: **91261**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 11:24:00 AM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	42.4	15.0	5.00	38.0	87.2	80	120	1.30	15	
Potassium	5.65	15.0	5.00	0	113	80	120	0.726	15	
Sodium	116	15.0	5.00	115	20.3	80	120	1.02	15	S

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190612A

Sample ID **ICV-190612**	Batch ID: **R104563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 10:34:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	2.45	0.300	2.50	0	98.1	90	110			
Magnesium	2.44	0.300	2.50	0	97.4	90	110			
Potassium	2.48	0.300	2.50	0	99.1	90	110			
Sodium	2.55	0.300	2.50	0	102	90	110			

Sample ID **LCVL-190612**	Batch ID: **R104563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 10:44:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0989	0.300	0.100	0	98.9	70	130			
Magnesium	0.0972	0.300	0.100	0	97.2	70	130			
Potassium	0.101	0.300	0.100	0	101	70	130			
Sodium	0.103	0.300	0.100	0	103	70	130			

Sample ID **CCV1-190612**	Batch ID: **R104563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 11:26:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.71	0.300	5.00	0	94.3	90	110			
Magnesium	4.96	0.300	5.00	0	99.1	90	110			
Potassium	5.03	0.300	5.00	0	101	90	110			
Sodium	4.99	0.300	5.00	0	99.8	90	110			

Sample ID **LCVL1-190612**	Batch ID: **R104563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 11:42:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.102	0.300	0.100	0	102	70	130			
Magnesium	0.0966	0.300	0.100	0	96.6	70	130			
Potassium	0.0990	0.300	0.100	0	99.0	70	130			
Sodium	0.103	0.300	0.100	0	103	70	130			

Sample ID **CCV2-190612**	Batch ID: **R104563**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_190612A**	Analysis Date: **6/12/2019 12:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	4.65	0.300	5.00	0	93.1	90	110			
Magnesium	5.02	0.300	5.00	0	100	90	110			
Sodium	5.11	0.300	5.00	0	102	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_190612A

Sample ID	**LCVL2-190612**	Batch ID:	**R104563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190612A**	Analysis Date:	**6/12/2019 12:08:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.0958	0.300	0.100	0	95.8	70	130			
Magnesium	0.0967	0.300	0.100	0	96.7	70	130			
Sodium	0.103	0.300	0.100	0	103	70	130			

Sample ID	**CCV4-190612**	Batch ID:	**R104563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_190612A**	Analysis Date:	**6/12/2019 1:23:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	5.05	0.300	5.00	0	101	90	110			

Sample ID	**LCVL4-190612**	Batch ID:	**R104563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190612A**	Analysis Date:	**6/12/2019 1:27:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	0.0950	0.300	0.100	0	95.0	70	130			

Sample ID	**CCV5-190612**	Batch ID:	**R104563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_190612A**	Analysis Date:	**6/12/2019 1:45:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	5.00	0.300	5.00	0	100	90	110			

Sample ID	**LCVL5-190612**	Batch ID:	**R104563**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190612A**	Analysis Date:	**6/12/2019 1:50:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	0.0947	0.300	0.100	0	94.7	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190611D**

The QC data in batch 91261 applies to the following samples: 1906072-01B, 1906072-02B

Sample ID	**MB-91261**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:05:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	<0.0300	0.100								
Lithium	<0.00500	0.0100								
Magnesium	<0.100	0.300								

Sample ID	**LCS-91261**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:07:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.05	0.100	5.00	0	101	80	120			
Lithium	0.208	0.0100	0.200	0	104	80	120			
Magnesium	5.05	0.300	5.00	0	101	80	120			

Sample ID	**LCSD-91261**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:10:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.01	0.100	5.00	0	100	80	120	0.604	15	
Lithium	0.206	0.0100	0.200	0	103	80	120	0.952	15	
Magnesium	5.04	0.300	5.00	0	101	80	120	0.085	15	

Sample ID	**1906056-01A SD**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:16:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.190	0.500	0	0.0550				110	10	
Lithium	<0.0250	0.0500	0	0.00980				0	10	
Magnesium	8.05	1.50	0	7.98				0.840	10	

Sample ID	**1906056-01A PDS**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:39:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.99	0.100	5.00	0.0550	98.7	80	120			
Lithium	0.215	0.0100	0.200	0.00980	103	80	120			
Magnesium	12.3	0.300	5.00	7.98	87.2	80	120			

Sample ID	**1906056-01A MS**	Batch ID:	**91261**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS5_190611D**	Analysis Date:	**6/11/2019 3:41:00 PM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190611D

Sample ID **1906056-01A MS**	Batch ID: **91261**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 3:41:00 PM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.06	0.100	5.00	0.0550	100	80	120			
Lithium	0.210	0.0100	0.200	0.00980	100	80	120			
Magnesium	12.9	0.300	5.00	7.98	97.7	80	120			

Sample ID **1906056-01A MSD**	Batch ID: **91261**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 3:43:00 PM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.08	0.100	5.00	0.0550	101	80	120	0.370	15	
Lithium	0.209	0.0100	0.200	0.00980	99.7	80	120	0.400	15	
Magnesium	13.0	0.300	5.00	7.98	99.4	80	120	0.654	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190611D

Sample ID **ICV-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 10:46:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.45	0.100	2.50	0	98.2	90	110			
Lithium	0.102	0.0100	0.100	0	102	90	110			
Magnesium	2.39	0.300	2.50	0	95.6	90	110			

Sample ID **LCVL-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 10:52:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0944	0.100	0.100	0	94.4	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Magnesium	0.0959	0.300	0.100	0	95.9	70	130			

Sample ID **CCV3-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 2:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.97	0.100	5.00	0	99.4	90	110			
Lithium	0.204	0.0100	0.200	0	102	90	110			
Magnesium	4.96	0.300	5.00	0	99.2	90	110			

Sample ID **LCVL3-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 2:57:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0963	0.100	0.100	0	96.3	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Magnesium	0.0942	0.300	0.100	0	94.2	70	130			

Sample ID **CCV4-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 3:48:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.93	0.100	5.00	0	98.6	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			
Magnesium	4.99	0.300	5.00	0	99.7	90	110			

Sample ID **LCVL4-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 3:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0969	0.100	0.100	0	96.9	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_190611D

Sample ID **LCVL4-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 3:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Lithium	0.0106	0.0100	0.0100	0	106	70	130			
Magnesium	0.100	0.300	0.100	0	100	70	130			

Sample ID **CCV5-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 4:21:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	4.87	0.100	5.00	0	97.5	90	110			
Lithium	0.204	0.0100	0.200	0	102	90	110			
Magnesium	5.01	0.300	5.00	0	100	90	110			

Sample ID **LCVL5-190611**	Batch ID: **R104548**	TestNo: **SW6020A**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_190611D**	Analysis Date: **6/11/2019 4:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0924	0.100	0.100	0	92.4	70	130			
Lithium	0.0101	0.0100	0.0100	0	101	70	130			
Magnesium	0.100	0.300	0.100	0	100	70	130			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190607A

The QC data in batch 91226 applies to the following samples: 1906072-01C, 1906072-02C

Sample ID	**MB-91226**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 10:25:46 AM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	<0.100	0.400								
Nitrate-N	<0.100	0.500								

Sample ID	**LCS-91226**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 10:41:46 AM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.06	0.400	4.000	0	101	90	110			
Nitrate-N	5.17	0.500	5.000	0	103	90	110			

Sample ID	**LCSD-91226**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 10:57:46 AM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.07	0.400	4.000	0	102	90	110	0.405	20	
Nitrate-N	5.11	0.500	5.000	0	102	90	110	1.10	20	

Sample ID	**1906064-01EMS**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 12:01:26 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21.2	0.400	20.00	0.1842	105	90	110			
Nitrate-N	4.75	0.500	4.516	0.1911	101	90	110			

Sample ID	**1906064-01EMSD**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 12:17:26 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	21.2	0.400	20.00	0.1842	105	90	110	0.188	20	
Nitrate-N	4.75	0.500	4.516	0.1911	101	90	110	0.115	20	

Sample ID	**1906066-01DMS**	Batch ID:	**91226**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190607A**	Analysis Date:	**6/7/2019 1:46:15 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2110	40.0	2000	0	106	90	110			
Nitrate-N	456	50.0	451.6	0	101	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190607A

Sample ID **1906066-01DMSD**	Batch ID: **91226**	TestNo: **E300**	Units: **mg/L**		
SampType: **MSD**	Run ID: **IC2_190607A**	Analysis Date: **6/7/2019 2:02:15 PM**	Prep Date: **6/7/2019**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	2110	40.0	2000	0	105	90	110	0.071	20	
Nitrate-N	455	50.0	451.6	0	101	90	110	0.150	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190607A

Sample ID **ICV-190607**	Batch ID: **R104496**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190607A**	Analysis Date: **6/7/2019 9:53:47 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	10.4	0.400	10.00	0	104	90	110			
Nitrate-N	13.2	0.500	12.50	0	106	90	110			

Sample ID **CCV1-190607**	Batch ID: **R104496**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190607A**	Analysis Date: **6/7/2019 3:38:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.14	0.400	4.000	0	104	90	110			
Nitrate-N	5.23	0.500	5.000	0	105	90	110			

Sample ID **CCV2-190607**	Batch ID: **R104496**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190607A**	Analysis Date: **6/7/2019 6:18:14 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	4.16	0.400	4.000	0	104	90	110			
Nitrate-N	5.17	0.500	5.000	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190617A

The QC data in batch 91349 applies to the following samples: 1906072-01C, 1906072-02C

Sample ID	**MB-91349**	Batch ID:	**91349**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190617A**	Analysis Date:	**6/17/2019 9:53:33 AM**	Prep Date:	**6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	<0.300	1.00								
Sulfate	<1.00	3.00								

Sample ID	**LCS-91349**	Batch ID:	**91349**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190617A**	Analysis Date:	**6/17/2019 10:09:33 AM**	Prep Date:	**6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.0	1.00	10.00	0	100	90	110			
Sulfate	30.4	3.00	30.00	0	101	90	110			

Sample ID	**LCSD-91349**	Batch ID:	**91349**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190617A**	Analysis Date:	**6/17/2019 10:25:33 AM**	Prep Date:	**6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	1.27	20	
Sulfate	30.8	3.00	30.00	0	103	90	110	1.19	20	

Sample ID	**1906072-01CMS**	Batch ID:	**91349**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190617A**	Analysis Date:	**6/17/2019 11:12:11 AM**	Prep Date:	**6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	284	10.0	200.0	74.78	105	90	110			
Sulfate	219	30.0	200.0	15.57	102	90	110			

Sample ID	**1906072-01CMSD**	Batch ID:	**91349**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190617A**	Analysis Date:	**6/17/2019 11:28:11 AM**	Prep Date:	**6/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	287	10.0	200.0	74.78	106	90	110	0.914	20	
Sulfate	222	30.0	200.0	15.57	103	90	110	1.08	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190617A

Sample ID **ICV-190615**	Batch ID: **R104618**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_190617A**	Analysis Date: **6/17/2019 9:21:33 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.5	1.00	25.00	0	102	90	110			
Sulfate	77.0	3.00	75.00	0	103	90	110			

Sample ID **CCV1-190617**	Batch ID: **R104618**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_190617A**	Analysis Date: **6/17/2019 1:20:11 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190610A

The QC data in batch 91271 applies to the following samples: 1906072-01C, 1906072-02C

Sample ID **MB-91271** Batch ID: **91271** TestNo: **M2320 B** Units: **mg/L @ pH 4.27**
SampType: **MBLK** Run ID: **TITRATOR_190610A** Analysis Date: **6/10/2019 10:17:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0								
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0								
Alkalinity, Total (As CaCO3)	<20.0	20.0								

Sample ID **LCS-91271** Batch ID: **91271** TestNo: **M2320 B** Units: **mg/L @ pH 4.39**
SampType: **LCS** Run ID: **TITRATOR_190610A** Analysis Date: **6/10/2019 10:22:00 AM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	49.8	20.0	50.00	0	99.5	74	129			

Sample ID **1906073-02C DUP** Batch ID: **91271** TestNo: **M2320 B** Units: **mg/L @ pH 4.54**
SampType: **DUP** Run ID: **TITRATOR_190610A** Analysis Date: **6/10/2019 1:11:00 PM** Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	66.8	20.0	0	68.00				1.78	20	
Alkalinity, Carbonate (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0	0				0	20	
Alkalinity, Total (As CaCO3)	66.8	20.0	0	68.00				1.78	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_190610A

Sample ID **ICV-190610**	Batch ID: **R104513**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.29**
SampType: **ICV**	Run ID: **TITRATOR_190610A**	Analysis Date: **6/10/2019 10:15:00 AM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	4.00	20.0	0							
Alkalinity, Carbonate (As CaCO3)	96.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	98	102			

Sample ID **CCV1-190610**	Batch ID: **R104513**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.22**
SampType: **CCV**	Run ID: **TITRATOR_190610A**	Analysis Date: **6/10/2019 1:08:00 PM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	27.7	20.0	0							
Alkalinity, Carbonate (As CaCO3)	74.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	102	20.0	100.0	0	102	90	110			

Sample ID **CCV2-190610**	Batch ID: **R104513**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.21**
SampType: **CCV**	Run ID: **TITRATOR_190610A**	Analysis Date: **6/10/2019 1:16:00 PM**	Prep Date: **6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	26.1	20.0	0							
Alkalinity, Carbonate (As CaCO3)	73.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.8	20.0	100.0	0	99.8	90	110			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190607B**

The QC data in batch 91254 applies to the following samples: 1906072-01C, 1906072-02C

Sample ID	**MB-91254**	Batch ID:	**91254**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190607B**	Analysis Date:	**6/7/2019 1:50:00 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	<0.0300	0.100								

Sample ID	**LCS-91254**	Batch ID:	**91254**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190607B**	Analysis Date:	**6/7/2019 1:50:00 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.509	0.100	0.5000	0	102	80	120			

Sample ID	**LCSD-91254**	Batch ID:	**91254**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190607B**	Analysis Date:	**6/7/2019 1:50:00 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.507	0.100	0.5000	0	101	80	120	0.394	15	

Sample ID	**1906073-02CMS**	Batch ID:	**91254**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190607B**	Analysis Date:	**6/7/2019 1:53:00 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.517	0.100	0.5000	0	103	80	120			

Sample ID	**1906073-02CMSD**	Batch ID:	**91254**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190607B**	Analysis Date:	**6/7/2019 1:53:00 PM**	Prep Date:	**6/7/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.518	0.100	0.5000	0	104	80	120	0.193	15	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190607B

Sample ID **ICV-190607**	Batch ID: **R104504**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190607B**	Analysis Date: **6/7/2019 1:49:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.203	0.100	0.2000	0	102	85	115			

Sample ID **CCV1-190607**	Batch ID: **R104504**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190607B**	Analysis Date: **6/7/2019 1:53:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.566	0.100	0.5000	0	113	85	115			

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190610A

The QC data in batch 91267 applies to the following samples: 1906072-01A, 1906072-02A

Sample ID	**MB-91267**	Batch ID:	**91267**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190610A**	Analysis Date:	**6/10/2019 10:55:00 AM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	<0.0500	0.100								N

Sample ID	**LCS-91267**	Batch ID:	**91267**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190610A**	Analysis Date:	**6/10/2019 10:57:00 AM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.110	0.100	0.1000	0	110	85	115			N

Sample ID	**LCSD-91267**	Batch ID:	**91267**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190610A**	Analysis Date:	**6/10/2019 10:57:00 AM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.110	0.100	0.1000	0	110	85	115	0.609	15	N

Sample ID	**1906073-02AMS**	Batch ID:	**91267**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190610A**	Analysis Date:	**6/10/2019 11:05:00 AM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.107	0.100	0.1000	0	107	85	115			N

Sample ID	**1906073-02AMSD**	Batch ID:	**91267**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190610A**	Analysis Date:	**6/10/2019 11:05:00 AM**	Prep Date:	**6/10/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.102	0.100	0.1000	0	102	85	115	4.86	15	N

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_190610A

Sample ID **ICV-190610**	Batch ID: **R104507**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_190610A**	Analysis Date: **6/10/2019 10:51:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0908	0.100	0.1000	0	90.8	85	115			N

Sample ID **CCV1-190610**	Batch ID: **R104507**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190610A**	Analysis Date: **6/10/2019 11:01:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.223	0.100	0.2000	0	112	85	115			N

Sample ID **CCV2-190610**	Batch ID: **R104507**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_190610A**	Analysis Date: **6/10/2019 11:06:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.204	0.100	0.2000	0	102	85	115			N

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

CLIENT: Golder
Work Order: 1906072
Project: LUMINANT-OGSES-FGD

ANALYTICAL QC SUMMARY REPORT

RunID: WC_190614B

The QC data in batch 91332 applies to the following samples: 1906072-01C, 1906072-02C

Sample ID	**MB-91332**	Batch ID:	**91332**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190614B**	Analysis Date:	**6/14/2019 12:00:00 PM**	Prep Date:	**6/13/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	<10.0	10.0								

Sample ID	**LCS-91332**	Batch ID:	**91332**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190614B**	Analysis Date:	**6/14/2019 12:00:00 PM**	Prep Date:	**6/13/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	762	10.0	745.6	0	102	90	113			

Sample ID	**1906109-02B-DUP**	Batch ID:	**91332**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190614B**	Analysis Date:	**6/14/2019 12:00:00 PM**	Prep Date:	**6/13/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1800	50.0	0	1825				1.38	5	

Qualifiers:

B	Analyte detected in the associated Method Blank	DF	Dilution Factor
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
ND	Not Detected at the Method Detection Limit	R	RPD outside accepted control limits
RL	Reporting Limit	S	Spike Recovery outside control limits
J	Analyte detected between SDL and RL	N	Parameter not NELAP certified

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Golder Associates*
Project Number/ LIMS No.	*17431-01 / MI7024-MAY19*
Batch:	*Oak Grove FDG Ponds*
Sample Receipt:	*May 30, 2019*
Sample Analysis:	*June 12, 2019*
Reporting Date:	*June 14, 2019*
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 / Ben Eaton
Senior Mineralogist / Junior Mineralogist

Sarah Prout, Ph.D.,
Manager: Metallurgy

SGS Minerals
a division of SGS Canada Inc.
3260 Production Way, Burnaby, British Columbia, Canada V5A 4W4
Tel: (604) 638-2349 Fax: (604) 444-5486 www.sgs.com www.sgs.com/met
Member of the SGS Group (SGS SA)

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:

Panalytcal 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.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

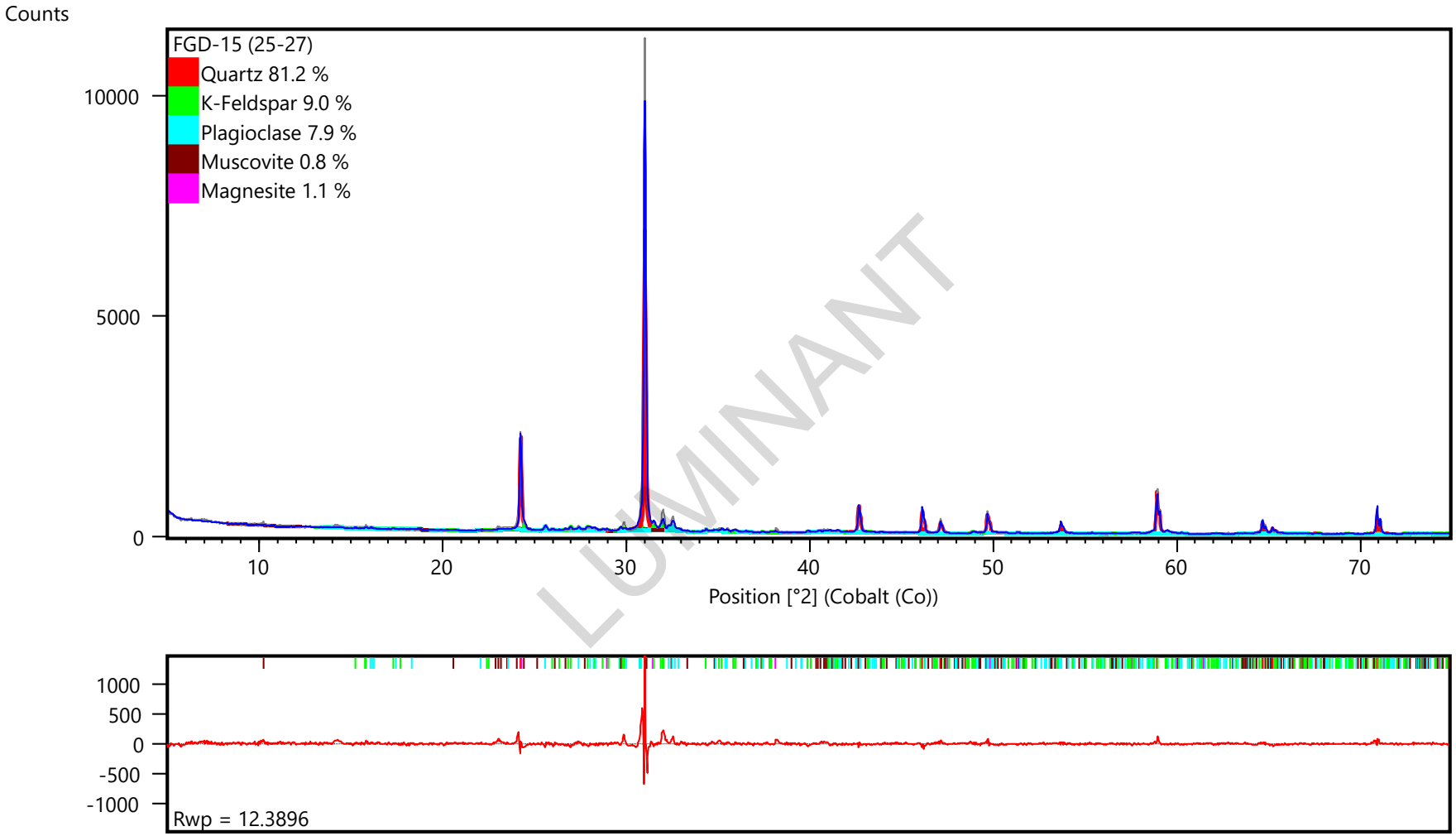
Quantitative X-ray Diffraction Results

Mineral/Compound	1 FGD-15 (25-27)	2 FGD-16 (30-32)	3 FGD-2019-1 (23-25)
	(wt %)	(wt %)	(wt %)
Quartz	81.2	80.5	84.9
K-feldspar	9.0	10.4	6.8
Plagioclase	7.9	9.0	7.3
Muscovite	0.8	0.1	1.0
Magnesite	1.1	--	--
TOTAL	100	100	100

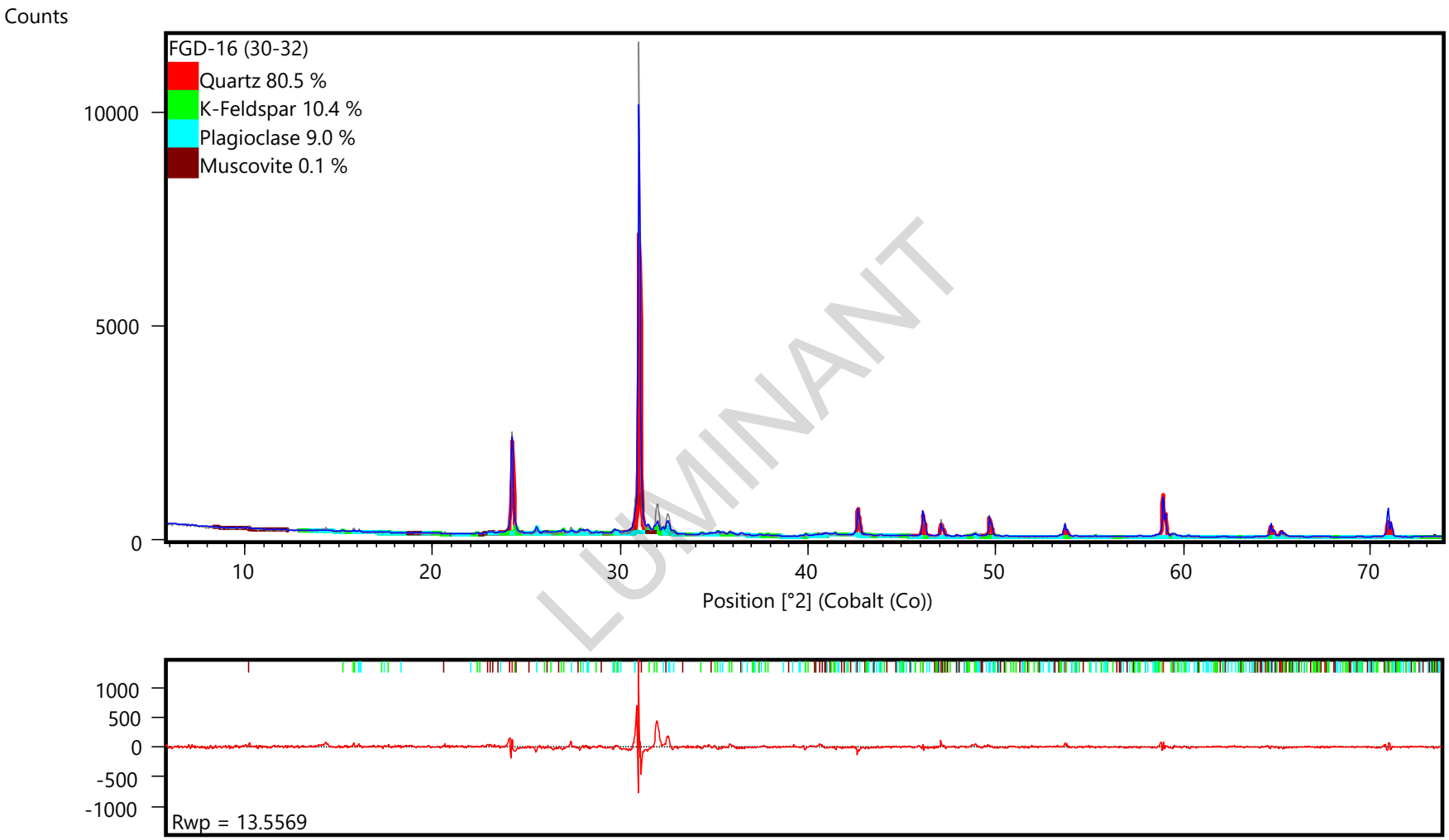
Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

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

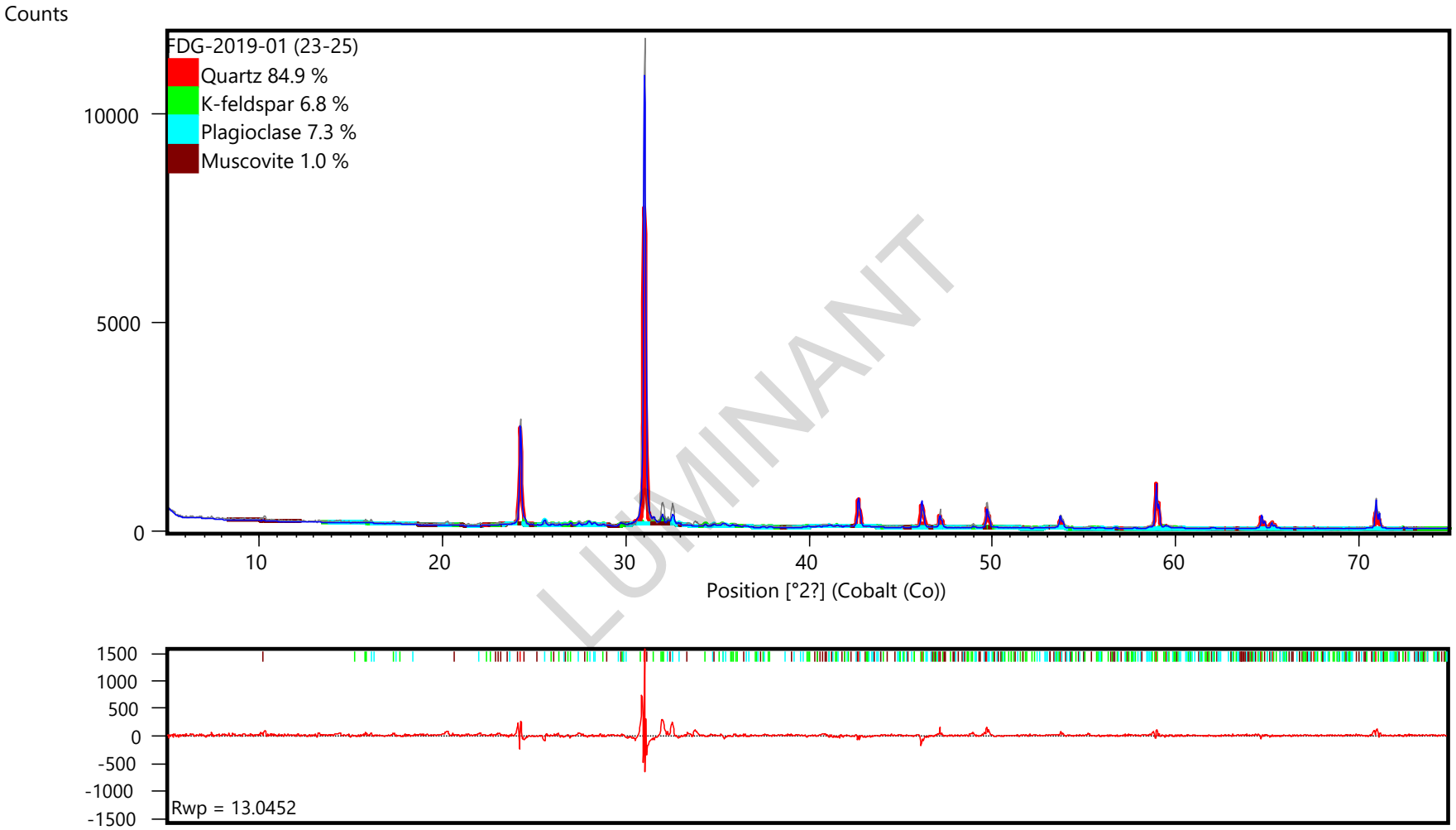
Mineral/Compound	Formula
Quartz	SiO_2
K-feldspar	$KAlSi_3O_8$
Plagioclase	$(Na,Ca)[Al(Si,Al)Si_2O_8]$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Magnesite	$MgCO_3$



X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.



X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.



X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 140-15376-1
Client Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

For:
Golder Associates Inc.
2201 Double Creek Dr
Suite 4004
Round Rock, Texas 78664

Attn: Will Vienne

Terry Walker Wasmund

Authorized for release by:
7/30/2019 3:12:58 PM

Terry Walker Wasmund, Project Manager II
(865)291-3000
terry.wasmund@testamericainc.com

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Detection Summary 6
Client Sample Results 11
Default Detection Limits 20
QC Sample Results 24
QC Association Summary 39
Lab Chronicle 45
Method Summary 59
Sample Summary 60
Chain of Custody 61

Definitions/Glossary

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

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.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL. The data are considered valid because the absolute difference is less than the RL.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)

Job ID: 140-15376-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-15376-1

Receipt
The samples were received on 5/24/2019 at 9:40 AM. The samples arrived in good condition, properly preserved, and on ice. The temperature of the cooler at receipt was 0.8º C.

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

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

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

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

Results were calculated using the following equation:

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

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

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

Job ID: 140-15376-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

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

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

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

The step 1 digestates were reanalyzed for vanadium at a 1/10 dilution due to positive interelement interferences resulting from the high magnesium results. The reporting limits were adjusted accordingly.

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

The serial dilution performed for the following samples associated with batch 140-31255 was outside control limits: (140-15376-A-1-A SD ^5), (140-15376-A-1-A SD ^50) and (140-15376-A-1-AA SD ^50)

Samples FGO-15 (25-27) (140-15376-1), FGO-14 (30-32) (140-15376-2), FGO-2019-1 (23-25) (140-15376-3), (140-15376-A-1-AB DU) and (140-15376-A-1-B DU) were diluted due to the presence of silicon or titanium which interferes with Arsenic, Cobalt, Selenium and Thallium. Elevated reporting limits (RLs) are provided.

Sample FGO-2019-1 (23-25) (140-15376-3) was diluted due to the presence of titanium which interferes with Cobalt. Elevated reporting limits (RLs) are provided.

There was a difference between the Total Metals results for cobalt and the Total SEP result for cobalt. At the client's request, the cobalt results for SEP 3 and SEP 4 were confirmed by reanalysis, and the total analysis for metals was reanalyzed with a separate aliquot. The original results for SEP 3 and SEP 4 were confirmed, but the reanalysis of the totals was much higher than the original test result. This suggests that the sample is heterogeneous, as different total cobalt results are obtained by the three tests. The affected sample is FGO-2019-1 (23-25) (140-15376-3).

The sample duplicate (DUP) precision for preparation batch 140-30453, 140-30480, 140-30481, 140-31696 and 140-31697 and analytical batch 140-31197 was outside control limits. Sample non-homogeneity is suspected.

The sample duplicate (DUP) precision for preparation batch 140-30852 and analytical batch 140-31255 was outside control limits. Sample non-homogeneity is suspected.

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: Oak Grove FGD Ponds - 7-Step SEP Metals

Job ID: 140-15376-1

Client Sample ID: FGO-15 (25-27)

Lab Sample ID: 140-15376-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.47	J	3.9	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	1.4	J	2.9	1.1	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	23		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Barium	1.4	J B	3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.020	J	0.33	0.020	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.63	J	3.3	0.059	mg/Kg	1	☼	6010B SEP	Step 3
Iron	58		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	14	B	0.98	0.035	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	600		13	2.1	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.64	J B	0.65	0.29	mg/Kg	1	☼	6010B SEP	Step 4
Barium	9.6		3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.12	J	0.33	0.021	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	0.41	J	3.3	0.069	mg/Kg	1	☼	6010B SEP	Step 4
Iron	1400		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.93	J	3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	6.9		0.98	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	0.65	* B	0.65	0.61	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	67	J *	200	31	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1200		13	2.1	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.62	J	0.65	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Barium	6.0		3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.053	J	0.33	0.016	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.27	J	3.3	0.060	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1100		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.93	J	3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	10		0.98	0.33	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	28000		130	21	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.90	J	1.3	0.34	mg/Kg	2	☼	6010B SEP	Step 7
Barium	510		33	1.6	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.48		0.33	0.0098	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.48	J	6.5	0.39	mg/Kg	2	☼	6010B SEP	Step 7
Iron	2900		6.5	5.4	mg/Kg	1	☼	6010B SEP	Step 7
Li	7.0		3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	54	B	0.98	0.068	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.11	J	2.6	0.11	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.59	J	4.6	0.47	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	30000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	2.2		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	530		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.67		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	1.8	J	2.5	0.023	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
Li	8.9		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	88		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Knoxville

Client Sample ID: FGO-15 (25-27) (Continued)
Lab Sample ID: 140-15376-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mo	0.11	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	0.65		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.59	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	4.2		1.8	0.27	mg/Kg	1	☼	6010B	Total/NA
Lead	3.2		1.8	0.34	mg/Kg	1	☼	6010B	Total/NA
Phosphorus	69		36	2.9	mg/Kg	1	☼	6010B	Total/NA
Aluminum	46000		130	21	mg/Kg	10	☼	6010B	Total/NA
Arsenic	1.6		0.65	0.17	mg/Kg	1	☼	6010B	Total/NA
Barium	670		33	1.6	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.71		0.33	0.0098	mg/Kg	1	☼	6010B	Total/NA
Cobalt	1.8	J	6.5	0.39	mg/Kg	2	☼	6010B	Total/NA
Iron	5700		6.5	5.4	mg/Kg	1	☼	6010B	Total/NA
Lithium	10		3.3	0.20	mg/Kg	1	☼	6010B	Total/NA
Manganese	93		0.98	0.068	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.21	J	2.6	0.11	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: FGO-14 (30-32)
Lab Sample ID: 140-15376-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.67	J	13	0.61	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	0.20	J	3.8	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Barium	0.55	J *	9.5	0.45	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	40		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.28	J	0.63	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Barium	6.4	B	3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.036	J	0.32	0.019	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.63	J	3.2	0.057	mg/Kg	1	☼	6010B SEP	Step 3
Iron	31		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	4.4	B	0.95	0.034	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	990		13	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.1	B	0.63	0.28	mg/Kg	1	☼	6010B SEP	Step 4
Barium	12		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.18	J	0.32	0.020	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	0.63	J	3.2	0.067	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2100		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.27	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	4.8		0.95	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	90	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1600		13	2.0	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.69		0.63	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Barium	4.2		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.056	J	0.32	0.015	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.32	J	3.2	0.058	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1300		6.3	3.7	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.57	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	6.4		0.95	0.32	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	39000		130	20	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.47	J	1.3	0.33	mg/Kg	2	☼	6010B SEP	Step 7
Barium	520		32	1.5	mg/Kg	10	☼	6010B SEP	Step 7

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Golder Associates Inc.
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Job ID: 140-15376-1

Client Sample ID: FGO-14 (30-32) (Continued)

Lab Sample ID: 140-15376-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Beryllium	0.59		0.32	0.0095	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.62	J	6.3	0.38	mg/Kg	2	☼	6010B SEP	Step 7
Iron	3100		6.3	5.2	mg/Kg	1	☼	6010B SEP	Step 7
Li	7.9		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	18	B	0.95	0.066	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.95	J	4.4	0.45	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	42000		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
Barium	540		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.86		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	2.2	J	2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	6600		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	8.7		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	34		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.95	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	3.3		1.8	0.26	mg/Kg	1	☼	6010B	Total/NA
Lead	3.4		1.8	0.33	mg/Kg	1	☼	6010B	Total/NA
Phosphorus	43		35	2.8	mg/Kg	1	☼	6010B	Total/NA
Aluminum	44000		130	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	2.5		1.3	0.33	mg/Kg	2	☼	6010B	Total/NA
Barium	760		32	1.5	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.85		0.32	0.0095	mg/Kg	1	☼	6010B	Total/NA
Cobalt	1.7	J	6.3	0.38	mg/Kg	2	☼	6010B	Total/NA
Iron	5900		6.3	5.2	mg/Kg	1	☼	6010B	Total/NA
Lithium	7.6		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Manganese	34		0.95	0.066	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.16	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.68	J	4.4	0.45	mg/Kg	2	☼	6010B	Total/NA

Client Sample ID: FGO-2019-1 (23-25)

Lab Sample ID: 140-15376-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.86	J	13	0.62	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	0.99	J	3.9	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Barium	1.9	J *	9.7	0.47	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.88	J B	1.9	0.66	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	62		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.30	J	0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 3
Barium	4.0	B	3.2	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.10	J	0.32	0.019	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	29		3.2	0.058	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	29		3.2	0.058	mg/Kg	1	☼	6010B SEP	Step 3
Iron	61		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 3
Li	0.80	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	110	B	0.97	0.035	mg/Kg	1	☼	6010B SEP	Step 3

This Detection Summary does not include radiochemical test results.

Client Sample ID: FGO-2019-1 (23-25) (Continued)

Lab Sample ID: 140-15376-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	1800		13	2.1	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.9	B	0.65	0.29	mg/Kg	1	☼	6010B SEP	Step 4
Barium	14		3.2	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.25	J	0.32	0.021	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	36		3.2	0.069	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	35		3.2	0.069	mg/Kg	1	☼	6010B SEP	Step 4
Iron	3400		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 4
Li	3.9		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	98		0.97	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Mo	0.18	J	2.6	0.11	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	65	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Barium	27	J *	49	2.3	mg/Kg	5	☼	6010B SEP	Step 5
Cobalt	2.6	J *	49	0.78	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	2600		13	2.1	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	1.6		0.65	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Barium	35		3.2	0.16	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.074	J	0.32	0.016	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	1.6	J	3.2	0.060	mg/Kg	1	☼	6010B SEP	Step 6
Iron	1100		6.5	3.8	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.2	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	10		0.97	0.32	mg/Kg	1	☼	6010B SEP	Step 6
Mo	0.21	J	2.6	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	33000		130	21	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		0.65	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Barium	410		32	1.6	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.39		0.32	0.0097	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.70	J	6.5	0.39	mg/Kg	2	☼	6010B SEP	Step 7
Iron	4400		6.5	5.3	mg/Kg	1	☼	6010B SEP	Step 7
Li	14		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	19	B	0.97	0.067	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.80	J	2.6	0.11	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	38000		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
Barium	490		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.81		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	69		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	9100		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	20		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	230		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	1.2	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	0.88		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	4.8		1.8	0.27	mg/Kg	1	☼	6010B	Total/NA
Lead	6.0		1.8	0.34	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: FGO-2019-1 (23-25) (Continued)
Lab Sample ID: 140-15376-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Phosphorus	65		36	2.9	mg/Kg	1	☼	6010B	Total/NA
Aluminum	43000		130	21	mg/Kg	10	☼	6010B	Total/NA
Arsenic	7.6		0.65	0.17	mg/Kg	1	☼	6010B	Total/NA
Barium	730		32	1.6	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.76		0.32	0.0097	mg/Kg	1	☼	6010B	Total/NA
Cobalt	6.9		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Cobalt	17		6.5	0.39	mg/Kg	2	☼	6010B	Total/NA
Iron	8400		6.5	5.3	mg/Kg	1	☼	6010B	Total/NA
Lithium	14		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA
Manganese	61		0.97	0.067	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	1.1	J	2.6	0.11	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.85	J	2.3	0.23	mg/Kg	1	☼	6010B	Total/NA
Hg	0.15		0.13	0.052	mg/Kg	1	☼	7470A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: FGO-15 (25-27)
Date Collected: 05/22/19 19:15
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-1
Matrix: Solid
Percent Solids: 76.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.4	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Antimony	ND		16	1.5	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Arsenic	ND		2.6	0.68	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Barium	ND		13	0.63	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Beryllium	ND		1.3	0.40	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Cobalt	ND		13	0.24	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Iron	ND		26	15	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Li	ND		13	0.78	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Manganese	**0.47**	**J**	3.9	0.16	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Mo	ND		10	0.43	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Selenium	ND		2.6	0.89	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4
Thallium	ND		9.1	1.1	mg/Kg	☼	05/31/19 08:00	06/17/19 14:14	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	39	6.3	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Antimony	ND		12	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Arsenic	ND		2.0	0.51	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Barium	ND	*	9.8	0.47	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Beryllium	ND	*	0.98	0.063	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Cobalt	ND		9.8	0.25	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Iron	ND	*	20	11	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Li	ND		9.8	0.59	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Manganese	**1.4**	**J**	2.9	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Mo	ND		7.8	0.32	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Selenium	ND		2.0	0.67	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3
Thallium	ND		6.9	0.82	mg/Kg	☼	06/03/19 08:00	06/17/19 15:37	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**23**		13	2.7	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Antimony	ND		3.9	0.37	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Arsenic	ND		0.65	0.17	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Barium	**1.4**	**J B**	3.3	0.16	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Beryllium	**0.020**	**J**	0.33	0.020	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Cobalt	**0.63**	**J**	3.3	0.059	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Iron	**58**		6.5	3.8	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Li	ND		3.3	0.20	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Manganese	**14**	**B**	0.98	0.035	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Mo	ND		2.6	0.11	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1
Thallium	ND		2.3	0.27	mg/Kg	☼	06/04/19 08:00	06/26/19 17:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**600**		13	2.1	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Antimony	ND		3.9	0.59	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Arsenic	**0.64**	**J B**	0.65	0.29	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Barium	**9.6**		3.3	0.16	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Beryllium	**0.12**	**J**	0.33	0.021	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1

Client Sample ID: FGO-15 (25-27) **Lab Sample ID: 140-15376-1**
Date Collected: 05/22/19 19:15 **Matrix: Solid**
Date Received: 05/24/19 09:40 **Percent Solids: 76.6**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.41	J	3.3	0.069	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Iron	1400		6.5	3.8	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Li	0.93	J	3.3	0.20	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Manganese	6.9		0.98	0.17	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Mo	ND		2.6	0.11	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Selenium	0.65	* B	0.65	0.61	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1
Thallium	ND		2.3	0.38	mg/Kg	☼	06/10/19 08:00	06/26/19 18:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	67	J *	200	31	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Antimony	ND		59	5.5	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Arsenic	ND		9.8	2.5	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Barium	ND	*	49	2.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Beryllium	ND	*	4.9	0.41	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Cobalt	ND	*	49	0.78	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Iron	ND	*	98	57	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Li	ND		49	2.9	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Manganese	ND	*	15	2.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Mo	ND		39	1.6	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Selenium	ND		9.8	3.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5
Thallium	ND	*	34	4.6	mg/Kg	☼	06/12/19 08:00	06/26/19 20:25	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		13	2.1	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Antimony	ND		3.9	0.37	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Arsenic	0.62	J	0.65	0.20	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Barium	6.0		3.3	0.16	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Beryllium	0.053	J	0.33	0.016	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Cobalt	0.27	J	3.3	0.060	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Iron	1100		6.5	3.8	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Li	0.93	J	3.3	0.20	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Manganese	10		0.98	0.33	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Mo	ND		2.6	0.13	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1
Thallium	ND		2.3	0.27	mg/Kg	☼	06/15/19 08:00	06/26/19 21:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28000		130	21	mg/Kg	☼	06/16/19 08:00	06/28/19 14:17	10
Antimony	ND		3.9	0.18	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1
Arsenic	0.90	J	1.3	0.34	mg/Kg	☼	06/16/19 08:00	06/28/19 17:43	2
Barium	510		33	1.6	mg/Kg	☼	06/16/19 08:00	06/28/19 14:17	10
Beryllium	0.48		0.33	0.0098	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1
Cobalt	0.48	J	6.5	0.39	mg/Kg	☼	06/16/19 08:00	06/28/19 17:43	2
Iron	2900		6.5	5.4	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1
Li	7.0		3.3	0.20	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1
Manganese	54	B	0.98	0.068	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1
Mo	0.11	J	2.6	0.11	mg/Kg	☼	06/16/19 08:00	06/28/19 12:53	1

Client Sample ID: FGO-15 (25-27)
Date Collected: 05/22/19 19:15
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-1
Matrix: Solid
Percent Solids: 76.6

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		1.3	0.44	mg/Kg	☼	06/16/19 08:00	06/28/19 17:43	2
Thallium	**0.59**	**J**	4.6	0.47	mg/Kg	☼	06/16/19 08:00	06/28/19 17:43	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30000**		10	1.6	mg/Kg			07/11/19 10:59	1
Antimony	ND		3.0	0.14	mg/Kg			07/11/19 10:59	1
Arsenic	**2.2**		0.50	0.13	mg/Kg			07/11/19 10:59	1
Barium	**530**		2.5	0.12	mg/Kg			07/11/19 10:59	1
Beryllium	**0.67**		0.25	0.0075	mg/Kg			07/11/19 10:59	1
Cobalt	**1.8**	**J**	2.5	0.023	mg/Kg			07/11/19 10:59	1
Iron	**5400**		5.0	4.1	mg/Kg			07/11/19 10:59	1
Li	**8.9**		2.5	0.15	mg/Kg			07/11/19 10:59	1
Manganese	**88**		0.75	0.052	mg/Kg			07/11/19 10:59	1
Mo	**0.11**	**J**	2.0	0.082	mg/Kg			07/11/19 10:59	1
Selenium	**0.65**		0.50	0.17	mg/Kg			07/11/19 10:59	1
Thallium	**0.59**	**J**	1.8	0.18	mg/Kg			07/11/19 10:59	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		24	12	mg/Kg	☼	06/16/19 08:00	06/17/19 11:27	1
Chromium	**4.2**		1.8	0.27	mg/Kg	☼	06/16/19 08:00	06/17/19 11:27	1
Lead	**3.2**		1.8	0.34	mg/Kg	☼	06/16/19 08:00	06/17/19 11:27	1
Phosphorus	**69**		36	2.9	mg/Kg	☼	06/16/19 08:00	06/17/19 11:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**46000**		130	21	mg/Kg	☼	05/30/19 08:00	06/28/19 16:37	10
Antimony	ND		3.9	0.18	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Arsenic	**1.6**		0.65	0.17	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Barium	**670**		33	1.6	mg/Kg	☼	05/30/19 08:00	06/28/19 16:37	10
Beryllium	**0.71**		0.33	0.0098	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Cobalt	**1.8**	**J**	6.5	0.39	mg/Kg	☼	05/30/19 08:00	06/28/19 18:40	2
Iron	**5700**		6.5	5.4	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Lithium	**10**		3.3	0.20	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Manganese	**93**		0.98	0.068	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Molybdenum	**0.21**	**J**	2.6	0.11	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Selenium	ND		0.65	0.22	mg/Kg	☼	05/30/19 08:00	06/28/19 15:23	1
Thallium	ND		4.6	0.47	mg/Kg	☼	05/30/19 08:00	06/28/19 18:40	2

Client Sample ID: FGO-14 (30-32)
Date Collected: 05/23/19 10:40
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-2
Matrix: Solid
Percent Solids: 79.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		51	8.1	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Antimony	ND		15	1.4	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Arsenic	ND		2.5	0.66	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Barium	**0.67**	**J**	13	0.61	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Beryllium	ND		1.3	0.39	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Cobalt	ND		13	0.23	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Iron	ND		25	15	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Li	ND		13	0.76	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Manganese	**0.20**	**J**	3.8	0.16	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Mo	ND		10	0.41	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Selenium	ND		2.5	0.86	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	4
Thallium	ND		8.8	1.1	mg/Kg	☼	05/31/19 08:00	06/17/19 14:24	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	☼	06/03/19 08:00	06/17/19 15:58	3
Antimony	ND		11	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Barium	**0.55**	**J ***	9.5	0.45	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Beryllium	ND	*	0.95	0.061	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Cobalt	ND		9.5	0.24	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Iron	ND	*	19	11	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Li	ND		9.5	0.57	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Manganese	ND		2.8	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Mo	ND		7.6	0.31	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Selenium	ND		1.9	0.64	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3
Thallium	ND		6.6	0.80	mg/Kg	☼	06/03/19 08:00	06/17/19 15:58	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40**		13	2.7	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Antimony	ND		3.8	0.35	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Arsenic	**0.28**	**J**	0.63	0.16	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Barium	**6.4**	**B**	3.2	0.15	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Beryllium	**0.036**	**J**	0.32	0.019	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Cobalt	**0.63**	**J**	3.2	0.057	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Iron	**31**		6.3	3.7	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Li	ND		3.2	0.19	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Manganese	**4.4**	**B**	0.95	0.034	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Mo	ND		2.5	0.10	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Selenium	ND		0.63	0.21	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1
Thallium	ND		2.2	0.27	mg/Kg	☼	06/04/19 08:00	06/26/19 17:40	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**990**		13	2.0	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Antimony	ND		3.8	0.57	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Arsenic	**1.1**	**B**	0.63	0.28	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Barium	**12**		3.2	0.15	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Beryllium	**0.18**	**J**	0.32	0.020	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1

Client Sample ID: FGO-14 (30-32)
Date Collected: 05/23/19 10:40
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-2
Matrix: Solid
Percent Solids: 79.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**0.63**	**J**	3.2	0.067	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Iron	**2100**		6.3	3.7	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Li	**0.27**	**J**	3.2	0.19	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Manganese	**4.8**		0.95	0.16	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Mo	ND		2.5	0.10	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Selenium	ND	*	0.63	0.59	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1
Thallium	ND		2.2	0.37	mg/Kg	☼	06/10/19 08:00	06/26/19 19:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**90**	**J ***	190	30	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Antimony	ND		57	5.3	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Arsenic	ND		9.5	2.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Barium	ND	*	47	2.3	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Beryllium	ND	*	4.7	0.40	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Cobalt	ND	*	47	0.76	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Iron	ND	*	95	56	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Li	ND		47	2.8	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Manganese	ND	*	14	2.3	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Mo	ND		38	1.6	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Selenium	ND		9.5	3.3	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5
Thallium	ND	*	33	4.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:35	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1600**		13	2.0	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Antimony	ND		3.8	0.35	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Arsenic	**0.69**		0.63	0.19	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Barium	**4.2**		3.2	0.15	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Beryllium	**0.056**	**J**	0.32	0.015	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Cobalt	**0.32**	**J**	3.2	0.058	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Iron	**1300**		6.3	3.7	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Li	**0.57**	**J**	3.2	0.19	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Manganese	**6.4**		0.95	0.32	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Mo	ND		2.5	0.13	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Selenium	ND		0.63	0.21	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1
Thallium	ND		2.2	0.27	mg/Kg	☼	06/15/19 08:00	06/26/19 22:14	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**39000**		130	20	mg/Kg	☼	06/16/19 08:00	06/28/19 14:27	10
Antimony	ND		3.8	0.18	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1
Arsenic	**0.47**	**J**	1.3	0.33	mg/Kg	☼	06/16/19 08:00	06/28/19 17:53	2
Barium	**520**		32	1.5	mg/Kg	☼	06/16/19 08:00	06/28/19 14:27	10
Beryllium	**0.59**		0.32	0.0095	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1
Cobalt	**0.62**	**J**	6.3	0.38	mg/Kg	☼	06/16/19 08:00	06/28/19 17:53	2
Iron	**3100**		6.3	5.2	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1
Li	**7.9**		3.2	0.19	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1
Manganese	**18**	**B**	0.95	0.066	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1
Mo	ND		2.5	0.10	mg/Kg	☼	06/16/19 08:00	06/28/19 13:19	1

Client Sample ID: FGO-14 (30-32)
Date Collected: 05/23/19 10:40
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-2
Matrix: Solid
Percent Solids: 79.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		1.3	0.43	mg/Kg	☼	06/16/19 08:00	06/28/19 17:53	2
Thallium	**0.95**	**J**	4.4	0.45	mg/Kg	☼	06/16/19 08:00	06/28/19 17:53	2

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			07/11/19 10:59	1
Antimony	ND		3.0	0.14	mg/Kg			07/11/19 10:59	1
Arsenic	**2.5**		0.50	0.13	mg/Kg			07/11/19 10:59	1
Barium	**540**		2.5	0.12	mg/Kg			07/11/19 10:59	1
Beryllium	**0.86**		0.25	0.0075	mg/Kg			07/11/19 10:59	1
Cobalt	**2.2**	**J**	2.5	0.023	mg/Kg			07/11/19 10:59	1
Iron	**6600**		5.0	4.1	mg/Kg			07/11/19 10:59	1
Li	**8.7**		2.5	0.15	mg/Kg			07/11/19 10:59	1
Manganese	**34**		0.75	0.052	mg/Kg			07/11/19 10:59	1
Mo	ND		2.0	0.082	mg/Kg			07/11/19 10:59	1
Selenium	ND		0.50	0.17	mg/Kg			07/11/19 10:59	1
Thallium	**0.95**	**J**	1.8	0.18	mg/Kg			07/11/19 10:59	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		24	12	mg/Kg	☼	06/16/19 08:00	06/17/19 11:41	1
Chromium	**3.3**		1.8	0.26	mg/Kg	☼	06/16/19 08:00	06/17/19 11:41	1
Lead	**3.4**		1.8	0.33	mg/Kg	☼	06/16/19 08:00	06/17/19 11:41	1
Phosphorus	**43**		35	2.8	mg/Kg	☼	06/16/19 08:00	06/17/19 11:41	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**44000**		130	20	mg/Kg	☼	05/30/19 08:00	06/28/19 16:47	10
Antimony	ND		3.8	0.18	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Arsenic	**2.5**		1.3	0.33	mg/Kg	☼	05/30/19 08:00	06/28/19 18:50	2
Barium	**760**		32	1.5	mg/Kg	☼	05/30/19 08:00	06/28/19 16:47	10
Beryllium	**0.85**		0.32	0.0095	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Cobalt	**1.7**	**J**	6.3	0.38	mg/Kg	☼	05/30/19 08:00	06/28/19 18:50	2
Iron	**5900**		6.3	5.2	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Lithium	**7.6**		3.2	0.19	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Manganese	**34**		0.95	0.066	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Molybdenum	**0.16**	**J**	2.5	0.10	mg/Kg	☼	05/30/19 08:00	06/28/19 15:34	1
Selenium	ND		1.3	0.43	mg/Kg	☼	05/30/19 08:00	06/28/19 18:50	2
Thallium	**0.68**	**J**	4.4	0.45	mg/Kg	☼	05/30/19 08:00	06/28/19 18:50	2

Method: 7470A - SEP Mercury (CVAA) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.13	0.051	mg/Kg	☼	05/30/19 08:00	06/03/19 14:52	1

Client Sample ID: FGO-2019-1 (23-25)
Date Collected: 05/23/19 15:20
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-3
Matrix: Solid
Percent Solids: 77.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.3	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Antimony	ND		16	1.5	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Arsenic	ND		2.6	0.67	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Barium	**0.86**	**J**	13	0.62	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Beryllium	ND		1.3	0.40	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Cobalt	ND		13	0.23	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Iron	ND		26	15	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Li	ND		13	0.78	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Manganese	**0.99**	**J**	3.9	0.16	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Mo	ND		10	0.43	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Selenium	ND		2.6	0.88	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4
Thallium	ND		9.1	1.1	mg/Kg	☼	05/31/19 08:00	06/17/19 14:29	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	39	6.2	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Antimony	ND		12	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Arsenic	ND		1.9	0.51	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Barium	**1.9**	**J ***	9.7	0.47	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Beryllium	ND	*	0.97	0.062	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Cobalt	ND		9.7	0.24	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Iron	ND	*	19	11	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Li	ND		9.7	0.58	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Manganese	ND		2.9	1.1	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Mo	ND		7.8	0.32	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Selenium	**0.88**	**J B**	1.9	0.66	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3
Thallium	ND		6.8	0.82	mg/Kg	☼	06/03/19 08:00	06/17/19 16:03	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**62**		13	2.7	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Antimony	ND		3.9	0.36	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Arsenic	**0.30**	**J**	0.65	0.17	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Barium	**4.0**	**B**	3.2	0.16	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Beryllium	**0.10**	**J**	0.32	0.019	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Cobalt	**29**		3.2	0.058	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Cobalt	**29**		3.2	0.058	mg/Kg	☼	07/16/19 08:00	07/17/19 11:32	1
Iron	**61**		6.5	3.8	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Li	**0.80**	**J**	3.2	0.19	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Manganese	**110**	**B**	0.97	0.035	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Mo	ND		2.6	0.11	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1
Thallium	ND		2.3	0.27	mg/Kg	☼	06/04/19 08:00	06/26/19 17:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1800**		13	2.1	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Antimony	ND		3.9	0.58	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Arsenic	**1.9**	**B**	0.65	0.29	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Barium	**14**		3.2	0.16	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1

Client Sample ID: FGO-2019-1 (23-25) **Lab Sample ID: 140-15376-3**
Date Collected: 05/23/19 15:20 **Matrix: Solid**
Date Received: 05/24/19 09:40 **Percent Solids: 77.2**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	**0.25**	**J**	0.32	0.021	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Cobalt	**36**		3.2	0.069	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Cobalt	**35**		3.2	0.069	mg/Kg	☼	07/16/19 08:00	07/17/19 11:53	1
Iron	**3400**		6.5	3.8	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Li	**3.9**		3.2	0.19	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Manganese	**98**		0.97	0.17	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Mo	**0.18**	**J**	2.6	0.11	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Selenium	ND	*	0.65	0.61	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1
Thallium	ND		2.3	0.38	mg/Kg	☼	06/10/19 08:00	06/26/19 19:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**65**	**J ***	190	30	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Antimony	ND		58	5.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Arsenic	ND		9.7	2.5	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Barium	**27**	**J ***	49	2.3	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Beryllium	ND	*	4.9	0.41	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Cobalt	**2.6**	**J ***	49	0.78	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Iron	ND	*	97	57	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Li	ND		49	2.9	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Manganese	ND	*	15	2.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Mo	ND		39	1.6	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Selenium	ND		9.7	3.4	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5
Thallium	ND	*	34	4.5	mg/Kg	☼	06/12/19 08:00	06/26/19 20:41	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2600**		13	2.1	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Antimony	ND		3.9	0.36	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Arsenic	**1.6**		0.65	0.19	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Barium	**35**		3.2	0.16	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Beryllium	**0.074**	**J**	0.32	0.016	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Cobalt	**1.6**	**J**	3.2	0.060	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Iron	**1100**		6.5	3.8	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Li	**1.2**	**J**	3.2	0.19	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Manganese	**10**		0.97	0.32	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Mo	**0.21**	**J**	2.6	0.13	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1
Thallium	ND		2.3	0.27	mg/Kg	☼	06/15/19 08:00	06/26/19 22:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**33000**		130	21	mg/Kg	☼	06/16/19 08:00	06/28/19 14:32	10
Antimony	ND		3.9	0.18	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Arsenic	**1.2**		0.65	0.17	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Barium	**410**		32	1.6	mg/Kg	☼	06/16/19 08:00	06/28/19 14:32	10
Beryllium	**0.39**		0.32	0.0097	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Cobalt	**0.70**	**J**	6.5	0.39	mg/Kg	☼	06/16/19 08:00	06/28/19 17:58	2
Iron	**4400**		6.5	5.3	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Li	**14**		3.2	0.19	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1

Client Sample ID: FGO-2019-1 (23-25) **Lab Sample ID: 140-15376-3**
Date Collected: 05/23/19 15:20 **Matrix: Solid**
Date Received: 05/24/19 09:40 **Percent Solids: 77.2**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	19	B	0.97	0.067	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Mo	0.80	J	2.6	0.11	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Selenium	ND		0.65	0.22	mg/Kg	☼	06/16/19 08:00	06/28/19 13:24	1
Thallium	ND		4.5	0.47	mg/Kg	☼	06/16/19 08:00	06/28/19 17:58	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	38000		10	1.6	mg/Kg			07/11/19 10:59	1
Antimony	ND		3.0	0.14	mg/Kg			07/11/19 10:59	1
Arsenic	5.0		0.50	0.13	mg/Kg			07/11/19 10:59	1
Barium	490		2.5	0.12	mg/Kg			07/11/19 10:59	1
Beryllium	0.81		0.25	0.0075	mg/Kg			07/11/19 10:59	1
Cobalt	69		2.5	0.023	mg/Kg			07/11/19 10:59	1
Iron	9100		5.0	4.1	mg/Kg			07/11/19 10:59	1
Li	20		2.5	0.15	mg/Kg			07/11/19 10:59	1
Manganese	230		0.75	0.052	mg/Kg			07/11/19 10:59	1
Mo	1.2	J	2.0	0.082	mg/Kg			07/11/19 10:59	1
Selenium	0.88		0.50	0.17	mg/Kg			07/11/19 10:59	1
Thallium	ND		1.8	0.18	mg/Kg			07/11/19 10:59	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		24	12	mg/Kg	☼	06/16/19 08:00	06/17/19 11:47	1
Chromium	4.8		1.8	0.27	mg/Kg	☼	06/16/19 08:00	06/17/19 11:47	1
Lead	6.0		1.8	0.34	mg/Kg	☼	06/16/19 08:00	06/17/19 11:47	1
Phosphorus	65		36	2.9	mg/Kg	☼	06/16/19 08:00	06/17/19 11:47	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	43000		130	21	mg/Kg	☼	05/30/19 08:00	06/28/19 16:52	10
Antimony	ND		3.9	0.18	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Arsenic	7.6		0.65	0.17	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Barium	730		32	1.6	mg/Kg	☼	05/30/19 08:00	06/28/19 16:52	10
Beryllium	0.76		0.32	0.0097	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Cobalt	6.9		3.2	0.19	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Cobalt	17		6.5	0.39	mg/Kg	☼	07/16/19 08:00	07/17/19 12:03	2
Iron	8400		6.5	5.3	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Lithium	14		3.2	0.19	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Manganese	61		0.97	0.067	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Molybdenum	1.1	J	2.6	0.11	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Selenium	ND		0.65	0.22	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1
Thallium	0.85	J	2.3	0.23	mg/Kg	☼	05/30/19 08:00	06/28/19 15:40	1

Method: 7470A - SEP Mercury (CVAA) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.15		0.13	0.052	mg/Kg	☼	05/30/19 08:00	06/03/19 14:54	1

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

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

Prep: 3010A

SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.077	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.031	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.28	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.015	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.027	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Metal Hydroxide

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

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

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.13	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.47	mg/Kg
Thallium	1.8	0.29	mg/Kg

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

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Barium	7.5	0.36	mg/Kg
Beryllium	0.75	0.063	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Iron	15	8.8	mg/Kg
Li	7.5	0.44	mg/Kg
Manganese	2.3	0.37	mg/Kg
Mo	6.0	0.25	mg/Kg
Selenium	1.5	0.52	mg/Kg
Thallium	5.3	0.70	mg/Kg

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

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.012	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.25	mg/Kg
Mo	2.0	0.099	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg

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

Prep: Residual

Analyte	RL	MDL	Units
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cobalt	2.5	0.15	mg/Kg
Iron	5.0	4.1	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

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

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Iron	5.0	4.1	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

Method: 6010B - Metals (ICP)

Prep: 3050B

Analyte	RL	MDL	Units
Boron	20	10	mg/Kg
Chromium	1.5	0.22	mg/Kg
Lead	1.5	0.28	mg/Kg
Phosphorus	30	2.4	mg/Kg

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

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cobalt	2.5	0.15	mg/Kg
Iron	5.0	4.1	mg/Kg
Lithium	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Molybdenum	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Method: 7470A - SEP Mercury (CVAA) - Total

Prep: Total

Analyte	RL	MDL	Units
Hg	0.10	0.040	mg/Kg

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-30853/8-A
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30853

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		20	10	mg/Kg		06/16/19 08:00	06/17/19 11:06	1
Chromium	ND		1.5	0.22	mg/Kg		06/16/19 08:00	06/17/19 11:06	1
Lead	ND		1.5	0.28	mg/Kg		06/16/19 08:00	06/17/19 11:06	1
Phosphorus	ND		30	2.4	mg/Kg		06/16/19 08:00	06/17/19 11:06	1

Lab Sample ID: LCS 140-30853/9-A
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30853

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	100	99.1		mg/Kg		99	80 - 120
Chromium	20.0	20.5		mg/Kg		102	90 - 110
Lead	10.0	10.2		mg/Kg		102	90 - 110
Phosphorus	500	507		mg/Kg		101	80 - 120

Lab Sample ID: 140-15376-1 MS
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30853

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	ND		128	121		mg/Kg	☼	95	75 - 125
Chromium	4.2		25.5	33.9		mg/Kg	☼	117	75 - 125
Lead	3.2		12.8	15.4		mg/Kg	☼	96	75 - 125
Phosphorus	69		638	680		mg/Kg	☼	96	75 - 125

Lab Sample ID: 140-15376-1 MSD
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30853

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		127	122		mg/Kg	☼	96	75 - 125	1	20
Chromium	4.2		25.4	33.5		mg/Kg	☼	116	75 - 125	1	20
Lead	3.2		12.7	15.4		mg/Kg	☼	96	75 - 125	1	20
Phosphorus	69		635	672		mg/Kg	☼	95	75 - 125	1	20

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

Lab Sample ID: MB 140-30373/11-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30373

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Antimony	ND		3.0	0.14	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Arsenic	ND		0.50	0.13	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Barium	ND		2.5	0.12	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Beryllium	ND		0.25	0.0075	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Cobalt	ND		2.5	0.15	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Iron	ND		5.0	4.1	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Lithium	ND		2.5	0.15	mg/Kg		05/30/19 08:00	06/28/19 12:27	1

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

Lab Sample ID: MB 140-30373/11-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30373

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	ND		0.75	0.052	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Molybdenum	ND		2.0	0.082	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Selenium	ND		0.50	0.17	mg/Kg		05/30/19 08:00	06/28/19 12:27	1
Thallium	ND		1.8	0.18	mg/Kg		05/30/19 08:00	06/28/19 12:27	1

Lab Sample ID: LCS 140-30373/12-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.4		mg/Kg		96	75 - 125
Antimony	25.0	25.3		mg/Kg		101	75 - 125
Arsenic	5.00	5.23		mg/Kg		105	75 - 125
Barium	5.00	5.07		mg/Kg		101	75 - 125
Beryllium	2.50	2.47		mg/Kg		99	75 - 125
Cobalt	5.00	5.25		mg/Kg		105	75 - 125
Iron	50.0	50.6		mg/Kg		101	75 - 125
Lithium	5.00	5.37		mg/Kg		107	75 - 125
Manganese	5.00	5.27		mg/Kg		105	75 - 125
Molybdenum	25.0	26.5		mg/Kg		106	75 - 125
Selenium	7.50	7.36		mg/Kg		98	75 - 125
Thallium	20.0	21.6		mg/Kg		108	75 - 125

Lab Sample ID: LCSD 140-30373/13-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	95.8		mg/Kg		96	75 - 125	1	30
Antimony	25.0	25.3		mg/Kg		101	75 - 125	0	30
Arsenic	5.00	5.23		mg/Kg		105	75 - 125	0	30
Barium	5.00	5.06		mg/Kg		101	75 - 125	0	30
Beryllium	2.50	2.47		mg/Kg		99	75 - 125	0	30
Cobalt	5.00	5.22		mg/Kg		104	75 - 125	0	30
Iron	50.0	50.6		mg/Kg		101	75 - 125	0	30
Lithium	5.00	5.35		mg/Kg		107	75 - 125	0	30
Manganese	5.00	5.25		mg/Kg		105	75 - 125	0	30
Molybdenum	25.0	26.4		mg/Kg		106	75 - 125	0	30
Selenium	7.50	7.37		mg/Kg		98	75 - 125	0	30
Thallium	20.0	21.4		mg/Kg		107	75 - 125	1	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	1.6		1.73		mg/Kg	☼	10	30
Beryllium	0.71		0.709		mg/Kg	☼	0.6	30

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

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	5700		5780		mg/Kg	☼	2	30
Lithium	10		10.4		mg/Kg	☼	0.9	30
Manganese	93		86.6		mg/Kg	☼	7	30
Molybdenum	0.21	J	0.176	J	mg/Kg	☼	17	30
Selenium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	46000		46400		mg/Kg	☼	1	30
Barium	670		697		mg/Kg	☼	3	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cobalt	1.8	J	1.74	J	mg/Kg	☼	5	30
Thallium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-31695/2-A
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 31695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		2.5	0.15	mg/Kg		07/16/19 08:00	07/17/19 11:17	1

Lab Sample ID: LCS 140-31695/3-A
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 31695

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	5.00	5.28		mg/Kg		106	75 - 125

Lab Sample ID: LCSD 140-31695/4-A
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 31695

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	5.00	5.29		mg/Kg		106	75 - 125	0	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-30374/11-B ^4
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 30422

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Antimony	ND		12	1.1	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Arsenic	ND		2.0	0.52	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Barium	ND		10	0.48	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Beryllium	ND		1.0	0.31	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Cobalt	ND		10	0.18	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Iron	ND		20	12	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Li	ND		10	0.60	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Manganese	ND		3.0	0.12	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Mo	ND		8.0	0.33	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Selenium	ND		2.0	0.68	mg/Kg		05/31/19 08:00	06/17/19 13:48	4
Thallium	ND		7.0	0.84	mg/Kg		05/31/19 08:00	06/17/19 13:48	4

Lab Sample ID: LCS 140-30374/12-B ^5
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 30422

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	94.0		mg/Kg		94	75 - 125
Antimony	25.0	24.7		mg/Kg		99	75 - 125
Arsenic	5.00	4.79		mg/Kg		96	75 - 125
Barium	5.00	5.16	J	mg/Kg		103	75 - 125
Beryllium	2.50	2.57		mg/Kg		103	75 - 125
Cobalt	5.00	5.06	J	mg/Kg		101	75 - 125
Iron	50.0	51.3		mg/Kg		103	75 - 125
Li	5.00	5.37	J	mg/Kg		107	75 - 125
Manganese	5.00	4.96		mg/Kg		99	75 - 125
Mo	25.0	25.8		mg/Kg		103	75 - 125
Selenium	7.50	7.86		mg/Kg		105	75 - 125
Thallium	20.0	19.6		mg/Kg		98	75 - 125

Lab Sample ID: LCSD 140-30374/13-B ^5
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 30422

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	96.4		mg/Kg		96	75 - 125	3	30
Antimony	25.0	23.9		mg/Kg		95	75 - 125	4	30
Arsenic	5.00	4.66		mg/Kg		93	75 - 125	3	30
Barium	5.00	5.00	J	mg/Kg		100	75 - 125	3	30
Beryllium	2.50	2.55		mg/Kg		102	75 - 125	1	30
Cobalt	5.00	4.97	J	mg/Kg		99	75 - 125	2	30
Iron	50.0	50.4		mg/Kg		101	75 - 125	2	30
Li	5.00	5.04	J	mg/Kg		101	75 - 125	6	30
Manganese	5.00	4.92		mg/Kg		98	75 - 125	1	30
Mo	25.0	25.3		mg/Kg		101	75 - 125	2	30
Selenium	7.50	7.98		mg/Kg		106	75 - 125	2	30
Thallium	20.0	19.4		mg/Kg		97	75 - 125	1	30

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

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 1
Prep Batch: 30422

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	ND			ND		mg/Kg	☼			NC	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Barium	ND			ND		mg/Kg	☼			NC	30
Beryllium	ND			ND		mg/Kg	☼			NC	30
Cobalt	ND			ND		mg/Kg	☼			NC	30
Iron	ND			ND		mg/Kg	☼			NC	30
Li	ND			ND		mg/Kg	☼			NC	30
Manganese	0.47	J		1.04	J F5	mg/Kg	☼			76	30
Mo	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Thallium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-30423/11-B ^3
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 30452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Antimony	ND		9.0	0.84	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Arsenic	ND		1.5	0.39	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Barium	ND		7.5	0.36	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Beryllium	ND		0.75	0.048	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Cobalt	ND		7.5	0.19	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Iron	ND		15	8.7	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Li	ND		7.5	0.45	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Manganese	ND		2.3	0.84	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Mo	ND		6.0	0.25	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Selenium	0.644	J	1.5	0.51	mg/Kg		06/03/19 08:00	06/17/19 15:11	3
Thallium	ND		5.3	0.63	mg/Kg		06/03/19 08:00	06/17/19 15:11	3

Lab Sample ID: LCS 140-30423/12-B ^5
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 30452

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			100	ND	*	mg/Kg		-4	75 - 125		
Antimony			25.0	21.2		mg/Kg		85	75 - 125		
Arsenic			5.00	3.93		mg/Kg		79	75 - 125		
Barium			5.00	2.38	J *	mg/Kg		48	75 - 125		
Beryllium			2.50	1.28	J *	mg/Kg		51	75 - 125		
Cobalt			5.00	4.75	J	mg/Kg		95	75 - 125		
Iron			50.0	ND	*	mg/Kg		2	75 - 125		
Li			5.00	4.71	J	mg/Kg		94	75 - 125		
Manganese			5.00	4.63		mg/Kg		93	75 - 125		
Mo			25.0	21.1		mg/Kg		84	75 - 125		
Selenium			7.50	6.91		mg/Kg		92	75 - 125		
Thallium			20.0	18.1		mg/Kg		90	75 - 125		

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

Lab Sample ID: LCSD 140-30423/13-B ^5
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 30452

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	ND	*	mg/Kg		-0.3	75 - 125	167	30
Antimony			25.0	21.3		mg/Kg		85	75 - 125	0	30
Arsenic			5.00	4.07		mg/Kg		81	75 - 125	4	30
Barium			5.00	2.40	J *	mg/Kg		48	75 - 125	1	30
Beryllium			2.50	1.27	J *	mg/Kg		51	75 - 125	0	30
Cobalt			5.00	4.76	J	mg/Kg		95	75 - 125	0	30
Iron			50.0	ND	*	mg/Kg		4	75 - 125	57	30
Li			5.00	5.06	J	mg/Kg		101	75 - 125	7	30
Manganese			5.00	4.64		mg/Kg		93	75 - 125	0	30
Mo			25.0	21.2		mg/Kg		85	75 - 125	0	30
Selenium			7.50	6.76		mg/Kg		90	75 - 125	2	30
Thallium			20.0	18.8		mg/Kg		94	75 - 125	4	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 30900

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 2
Prep Batch: 30452

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	ND	*		ND	*	mg/Kg	☼			NC	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Barium	ND	*		ND	*	mg/Kg	☼			NC	30
Beryllium	ND	*		ND	*	mg/Kg	☼			NC	30
Cobalt	ND			ND		mg/Kg	☼			NC	30
Iron	ND	*		ND	*	mg/Kg	☼			NC	30
Li	ND			ND		mg/Kg	☼			NC	30
Manganese	1.4	J		1.49	J	mg/Kg	☼			8	30
Mo	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Thallium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-30453/11-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 30480

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Antimony	ND		3.0	0.28	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Arsenic	ND		0.50	0.13	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Barium	0.487	J	2.5	0.12	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Beryllium	ND		0.25	0.015	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Cobalt	ND		2.5	0.045	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Iron	ND		5.0	2.9	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Li	ND		2.5	0.15	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Manganese	0.0625	J	0.75	0.027	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Mo	ND		2.0	0.082	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Selenium	ND		0.50	0.17	mg/Kg		06/04/19 08:00	06/26/19 17:04	1
Thallium	ND		1.8	0.21	mg/Kg		06/04/19 08:00	06/26/19 17:04	1

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

Lab Sample ID: LCS 140-30453/12-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 30480

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	95.1		mg/Kg		95	75 - 125
Antimony	25.0	24.2		mg/Kg		97	75 - 125
Arsenic	5.00	5.01		mg/Kg		100	75 - 125
Barium	5.00	4.36		mg/Kg		87	75 - 125
Beryllium	2.50	2.53		mg/Kg		101	75 - 125
Cobalt	5.00	4.87		mg/Kg		97	75 - 125
Iron	50.0	49.3		mg/Kg		99	75 - 125
Li	5.00	4.84		mg/Kg		97	75 - 125
Manganese	5.00	4.86		mg/Kg		97	75 - 125
Mo	25.0	24.5		mg/Kg		98	75 - 125
Selenium	7.50	7.45		mg/Kg		99	75 - 125
Thallium	20.0	20.0		mg/Kg		100	75 - 125

Lab Sample ID: LCSD 140-30453/13-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 30480

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.4		mg/Kg		98	75 - 125	3	30
Antimony	25.0	25.0		mg/Kg		100	75 - 125	3	30
Arsenic	5.00	5.11		mg/Kg		102	75 - 125	2	30
Barium	5.00	4.42		mg/Kg		88	75 - 125	2	30
Beryllium	2.50	2.64		mg/Kg		106	75 - 125	4	30
Cobalt	5.00	4.99		mg/Kg		100	75 - 125	2	30
Iron	50.0	50.9		mg/Kg		102	75 - 125	3	30
Li	5.00	4.97		mg/Kg		99	75 - 125	3	30
Manganese	5.00	5.00		mg/Kg		100	75 - 125	3	30
Mo	25.0	25.2		mg/Kg		101	75 - 125	3	30
Selenium	7.50	7.80		mg/Kg		104	75 - 125	5	30
Thallium	20.0	20.7		mg/Kg		104	75 - 125	3	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 3
Prep Batch: 30480

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	23		21.4		mg/Kg	☼	7	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Barium	1.4	J B	1.37	J	mg/Kg	☼	5	30
Beryllium	0.020	J	0.0202	J	mg/Kg	☼	3	30
Cobalt	0.63	J	0.599	J	mg/Kg	☼	4	30
Iron	58		54.6		mg/Kg	☼	6	30
Li	ND		ND		mg/Kg	☼	NC	30
Manganese	14	B	7.32	F3	mg/Kg	☼	63	30
Mo	ND		ND		mg/Kg	☼	NC	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Thallium	ND		ND		mg/Kg	☼	NC	30

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

Lab Sample ID: MB 140-30453/11-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 31696

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		2.5	0.045	mg/Kg		07/16/19 08:00	07/17/19 10:47	1

Lab Sample ID: LCS 140-30453/12-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 31696

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	5.00	4.88		mg/Kg		98	75 - 125

Lab Sample ID: LCSD 140-30453/13-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 31696

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	5.00	5.04		mg/Kg		101	75 - 125	3	30

Lab Sample ID: MB 140-30481/11-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 30528

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Antimony	ND		3.0	0.45	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Arsenic	0.220	J	0.50	0.22	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Barium	ND		2.5	0.12	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Beryllium	ND		0.25	0.016	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Cobalt	ND		2.5	0.053	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Iron	ND		5.0	2.9	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Li	ND		2.5	0.15	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Manganese	ND		0.75	0.13	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Mo	ND		2.0	0.082	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Selenium	0.473	J	0.50	0.47	mg/Kg		06/10/19 08:00	06/26/19 18:27	1
Thallium	ND		1.8	0.29	mg/Kg		06/10/19 08:00	06/26/19 18:27	1

Lab Sample ID: LCS 140-30481/12-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 30528

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.7		mg/Kg		97	75 - 125
Antimony	25.0	24.7		mg/Kg		99	75 - 125
Arsenic	5.00	5.37		mg/Kg		107	75 - 125
Barium	5.00	4.86		mg/Kg		97	75 - 125
Beryllium	2.50	2.61		mg/Kg		104	75 - 125
Cobalt	5.00	4.98		mg/Kg		100	75 - 125
Iron	50.0	50.1		mg/Kg		100	75 - 125
Li	5.00	5.01		mg/Kg		100	75 - 125
Manganese	5.00	4.99		mg/Kg		100	75 - 125
Mo	25.0	25.1		mg/Kg		100	75 - 125

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

Lab Sample ID: LCS 140-30481/12-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 30528

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Selenium	7.50	0.489	J *	mg/Kg		7	75 - 125
Thallium	20.0	18.2		mg/Kg		91	75 - 125

Lab Sample ID: LCSD 140-30481/13-B
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 30528

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	100		mg/Kg		100	75 - 125	4	30
Antimony	25.0	26.1		mg/Kg		104	75 - 125	5	30
Arsenic	5.00	5.60		mg/Kg		112	75 - 125	4	30
Barium	5.00	5.02		mg/Kg		100	75 - 125	3	30
Beryllium	2.50	2.71		mg/Kg		108	75 - 125	4	30
Cobalt	5.00	5.15		mg/Kg		103	75 - 125	3	30
Iron	50.0	51.4		mg/Kg		103	75 - 125	3	30
Li	5.00	5.15		mg/Kg		103	75 - 125	3	30
Manganese	5.00	5.14		mg/Kg		103	75 - 125	3	30
Mo	25.0	26.7		mg/Kg		107	75 - 125	6	30
Selenium	7.50	0.529	*	mg/Kg		7	75 - 125	8	30
Thallium	20.0	18.7		mg/Kg		94	75 - 125	3	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 4
Prep Batch: 30528

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	600		659		mg/Kg	☼	9	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	0.64	J B	0.637	J	mg/Kg	☼	0.5	30
Barium	9.6		10.1		mg/Kg	☼	5	30
Beryllium	0.12	J	0.120	J	mg/Kg	☼	4	30
Cobalt	0.41	J	0.445	J	mg/Kg	☼	8	30
Iron	1400		1370		mg/Kg	☼	2	30
Li	0.93	J	1.11	J	mg/Kg	☼	18	30
Manganese	6.9		5.98		mg/Kg	☼	14	30
Mo	ND		ND		mg/Kg	☼	NC	30
Selenium	0.65	* B	0.697	*	mg/Kg	☼	8	30
Thallium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-30481/11-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 31697

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		2.5	0.053	mg/Kg		07/16/19 08:00	07/17/19 11:02	1

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

Lab Sample ID: LCS 140-30481/12-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 31697

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Cobalt			5.00	5.05		mg/Kg		101	75 - 125		

Lab Sample ID: LCSD 140-30481/13-C
Matrix: Solid
Analysis Batch: 31812

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 31697

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt			5.00	5.21		mg/Kg		104	75 - 125	3	30

Lab Sample ID: MB 140-30529/11-B ^5
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 30726

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Antimony	ND		45	4.2	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Arsenic	ND		7.5	1.9	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Barium	ND		38	1.8	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Beryllium	ND		3.8	0.32	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Cobalt	ND		38	0.60	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Iron	ND		75	44	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Li	ND		38	2.2	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Manganese	ND		11	1.9	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Mo	ND		30	1.3	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Selenium	ND		7.5	2.6	mg/Kg		06/12/19 08:00	06/26/19 19:48	5
Thallium	ND		26	3.5	mg/Kg		06/12/19 08:00	06/26/19 19:48	5

Lab Sample ID: LCS 140-30529/12-B ^5
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 30726

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Aluminum			300	30.0	J *	mg/Kg		10	75 - 125		
Antimony			75.0	85.8		mg/Kg		114	75 - 125		
Arsenic			15.0	12.7		mg/Kg		85	75 - 125		
Barium			15.0	8.33	J *	mg/Kg		56	75 - 125		
Beryllium			7.50	4.27	*	mg/Kg		57	75 - 125		
Cobalt			15.0	5.06	J *	mg/Kg		34	75 - 125		
Iron			150	ND	*	mg/Kg		0.4	75 - 125		
Li			15.0	16.5	J	mg/Kg		110	75 - 125		
Manganese			15.0	3.17	J *	mg/Kg		21	75 - 125		
Mo			75.0	63.7		mg/Kg		85	75 - 125		
Selenium			22.5	26.1		mg/Kg		116	75 - 125		
Thallium			60.0	25.2	J *	mg/Kg		42	75 - 125		

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

Lab Sample ID: LCSD 140-30529/13-B ^5
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 30726

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			300	ND	*	mg/Kg		6	75 - 125	43	30
Antimony			75.0	85.4		mg/Kg		114	75 - 125	0	30
Arsenic			15.0	12.5		mg/Kg		84	75 - 125	2	30
Barium			15.0	8.04	J *	mg/Kg		54	75 - 125	3	30
Beryllium			7.50	4.25	*	mg/Kg		57	75 - 125	0	30
Cobalt			15.0	4.94	J *	mg/Kg		33	75 - 125	2	30
Iron			150	ND	*	mg/Kg		1	75 - 125	103	30
Li			15.0	17.4	J	mg/Kg		116	75 - 125	5	30
Manganese			15.0	4.43	J *	mg/Kg		30	75 - 125	33	30
Mo			75.0	64.0		mg/Kg		85	75 - 125	0	30
Selenium			22.5	27.5		mg/Kg		122	75 - 125	5	30
Thallium			60.0	26.1	*	mg/Kg		44	75 - 125	3	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 5
Prep Batch: 30726

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	67	J *		61.2	J *	mg/Kg	☼			10	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Barium	ND	*		ND	*	mg/Kg	☼			NC	30
Beryllium	ND	*		ND	*	mg/Kg	☼			NC	30
Cobalt	ND	*		ND	*	mg/Kg	☼			NC	30
Iron	ND	*		ND	*	mg/Kg	☼			NC	30
Li	ND			ND		mg/Kg	☼			NC	30
Manganese	ND	*		ND	*	mg/Kg	☼			NC	30
Mo	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Thallium	ND	*		ND	*	mg/Kg	☼			NC	30

Lab Sample ID: MB 140-30781/11-A
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 30781

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Antimony	ND		3.0	0.28	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Arsenic	ND		0.50	0.15	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Barium	ND		2.5	0.12	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Beryllium	ND		0.25	0.012	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Cobalt	ND		2.5	0.046	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Iron	ND		5.0	2.9	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Li	ND		2.5	0.15	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Manganese	ND		0.75	0.25	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Mo	ND		2.0	0.099	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Selenium	ND		0.50	0.17	mg/Kg		06/15/19 08:00	06/26/19 21:23	1
Thallium	ND		1.8	0.21	mg/Kg		06/15/19 08:00	06/26/19 21:23	1

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

Lab Sample ID: LCS 140-30781/12-A
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 30781

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	97.3		mg/Kg		97	75 - 125
Antimony	25.0	25.0		mg/Kg		100	75 - 125
Arsenic	5.00	5.14		mg/Kg		103	75 - 125
Barium	5.00	4.63		mg/Kg		93	75 - 125
Beryllium	2.50	2.59		mg/Kg		104	75 - 125
Cobalt	5.00	4.78		mg/Kg		96	75 - 125
Iron	50.0	49.6		mg/Kg		99	75 - 125
Li	5.00	4.67		mg/Kg		93	75 - 125
Manganese	5.00	4.87		mg/Kg		97	75 - 125
Mo	25.0	24.3		mg/Kg		97	75 - 125
Selenium	7.50	7.24		mg/Kg		97	75 - 125
Thallium	20.0	19.7		mg/Kg		99	75 - 125

Lab Sample ID: LCSD 140-30781/13-A
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 30781

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	103		mg/Kg		103	75 - 125	5	30
Antimony	25.0	26.5		mg/Kg		106	75 - 125	6	30
Arsenic	5.00	5.49		mg/Kg		110	75 - 125	7	30
Barium	5.00	4.90		mg/Kg		98	75 - 125	6	30
Beryllium	2.50	2.76		mg/Kg		110	75 - 125	6	30
Cobalt	5.00	5.04		mg/Kg		101	75 - 125	5	30
Iron	50.0	52.4		mg/Kg		105	75 - 125	5	30
Li	5.00	4.93		mg/Kg		99	75 - 125	5	30
Manganese	5.00	5.14		mg/Kg		103	75 - 125	5	30
Mo	25.0	25.7		mg/Kg		103	75 - 125	6	30
Selenium	7.50	7.77		mg/Kg		104	75 - 125	7	30
Thallium	20.0	20.7		mg/Kg		104	75 - 125	5	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31197

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 6
Prep Batch: 30781

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	1200		1360		mg/Kg	☼	9	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	0.62	J	0.568	J	mg/Kg	☼	9	30
Barium	6.0		6.53		mg/Kg	☼	8	30
Beryllium	0.053	J	0.0522	J	mg/Kg	☼	1	30
Cobalt	0.27	J	0.286	J	mg/Kg	☼	8	30
Iron	1100		1090		mg/Kg	☼	2	30
Li	0.93	J	0.902	J	mg/Kg	☼	3	30
Manganese	10		10.8		mg/Kg	☼	5	30
Mo	ND		ND		mg/Kg	☼	NC	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Thallium	ND		ND		mg/Kg	☼	NC	30

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

Lab Sample ID: MB 140-30852/11-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 30852

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Antimony	ND		3.0	0.14	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Arsenic	ND		0.50	0.13	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Barium	ND		2.5	0.12	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Beryllium	ND		0.25	0.0075	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Cobalt	ND		2.5	0.15	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Iron	ND		5.0	4.1	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Li	ND		2.5	0.15	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Manganese	0.0585	J	0.75	0.052	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Mo	ND		2.0	0.082	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Selenium	ND		0.50	0.17	mg/Kg		06/16/19 08:00	06/28/19 12:11	1
Thallium	ND		1.8	0.18	mg/Kg		06/16/19 08:00	06/28/19 12:11	1

Lab Sample ID: LCS 140-30852/12-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 30852

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.0		mg/Kg		96	75 - 125
Antimony	25.0	25.5		mg/Kg		102	75 - 125
Arsenic	5.00	5.23		mg/Kg		105	75 - 125
Barium	5.00	5.07		mg/Kg		101	75 - 125
Beryllium	2.50	2.50		mg/Kg		100	75 - 125
Cobalt	5.00	5.26		mg/Kg		105	75 - 125
Iron	50.0	51.1		mg/Kg		102	75 - 125
Li	5.00	5.34		mg/Kg		107	75 - 125
Manganese	5.00	5.28		mg/Kg		106	75 - 125
Mo	25.0	26.6		mg/Kg		106	75 - 125
Selenium	7.50	7.39		mg/Kg		98	75 - 125
Thallium	20.0	21.5		mg/Kg		108	75 - 125

Lab Sample ID: LCSD 140-30852/13-A
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 30852

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	95.8		mg/Kg		96	75 - 125	0	30
Antimony	25.0	25.6		mg/Kg		102	75 - 125	0	30
Arsenic	5.00	5.24		mg/Kg		105	75 - 125	0	30
Barium	5.00	5.13		mg/Kg		103	75 - 125	1	30
Beryllium	2.50	2.51		mg/Kg		100	75 - 125	0	30
Cobalt	5.00	5.29		mg/Kg		106	75 - 125	1	30
Iron	50.0	51.1		mg/Kg		102	75 - 125	0	30
Li	5.00	5.47		mg/Kg		109	75 - 125	2	30
Manganese	5.00	5.42		mg/Kg		108	75 - 125	3	30
Mo	25.0	26.8		mg/Kg		107	75 - 125	1	30
Selenium	7.50	7.49		mg/Kg		100	75 - 125	1	30
Thallium	20.0	21.6		mg/Kg		108	75 - 125	0	30

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

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 7
Prep Batch: 30852

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		ND		mg/Kg	☼	NC	30
Beryllium	0.48		0.502		mg/Kg	☼	5	30
Iron	2900		3090		mg/Kg	☼	5	30
Li	7.0		8.01		mg/Kg	☼	13	30
Manganese	54	B	51.4		mg/Kg	☼	6	30
Mo	0.11	J	ND		mg/Kg	☼	NC	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 7
Prep Batch: 30852

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	28000		35200		mg/Kg	☼	23	30
Barium	510		545		mg/Kg	☼	6	30

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Analysis Batch: 31255

Client Sample ID: FGO-15 (25-27)
Prep Type: Step 7
Prep Batch: 30852

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.90	J	0.478	J F5	mg/Kg	☼	61	30
Cobalt	0.48	J	0.509	J	mg/Kg	☼	7	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Thallium	0.59	J	0.828	J F5	mg/Kg	☼	34	30

Method: 7470A - SEP Mercury (CVAA) - Total

Lab Sample ID: MB 140-30373/11-B
Matrix: Solid
Analysis Batch: 30491

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30373

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.040	mg/Kg		05/30/19 08:00	06/03/19 14:34	1

Lab Sample ID: LCS 140-30373/12-B
Matrix: Solid
Analysis Batch: 30491

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	2.50	2.54		mg/Kg		101	75 - 125

Lab Sample ID: LCSD 140-30373/13-B
Matrix: Solid
Analysis Batch: 30491

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	2.50	2.53		mg/Kg		101	75 - 125	0	30

Client: Golder Associates Inc.
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Job ID: 140-15376-1

Method: 7470A - SEP Mercury (CVAA) - Total (Continued)

Lab Sample ID: 140-15376-A-1-J DU
Matrix: Solid
Analysis Batch: 30491

Client Sample ID: 140-15376-A-1-J DU
Prep Type: Total/NA
Prep Batch: 30373

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Hg	ND			ND		mg/Kg	☼			NC	30

Metals

Prep Batch: 30373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	Total	
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	Total	
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	Total	
MB 140-30373/11-A	Method Blank	Total/NA	Solid	Total	
MB 140-30373/11-B	Method Blank	Total/NA	Solid	Total	
LCS 140-30373/12-A	Lab Control Sample	Total/NA	Solid	Total	
LCS 140-30373/12-B	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-30373/13-A	Lab Control Sample Dup	Total/NA	Solid	Total	
LCSD 140-30373/13-B	Lab Control Sample Dup	Total/NA	Solid	Total	
140-15376-1 DU	FGO-15 (25-27)	Total/NA	Solid	Total	
140-15376-A-1-J DU	140-15376-A-1-J DU	Total/NA	Solid	Total	

SEP Batch: 30374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 1	Solid	Exchangeable	
140-15376-2	FGO-14 (30-32)	Step 1	Solid	Exchangeable	
140-15376-3	FGO-2019-1 (23-25)	Step 1	Solid	Exchangeable	
MB 140-30374/11-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-30374/12-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-30374/13-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-15376-1 DU	FGO-15 (25-27)	Step 1	Solid	Exchangeable	

Prep Batch: 30422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 1	Solid	3010A	30374
140-15376-2	FGO-14 (30-32)	Step 1	Solid	3010A	30374
140-15376-3	FGO-2019-1 (23-25)	Step 1	Solid	3010A	30374
MB 140-30374/11-B ^4	Method Blank	Step 1	Solid	3010A	30374
LCS 140-30374/12-B ^5	Lab Control Sample	Step 1	Solid	3010A	30374
LCSD 140-30374/13-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	30374
140-15376-1 DU	FGO-15 (25-27)	Step 1	Solid	3010A	30374

SEP Batch: 30423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 2	Solid	Carbonate	
140-15376-2	FGO-14 (30-32)	Step 2	Solid	Carbonate	
140-15376-3	FGO-2019-1 (23-25)	Step 2	Solid	Carbonate	
MB 140-30423/11-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-30423/12-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-30423/13-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-15376-1 DU	FGO-15 (25-27)	Step 2	Solid	Carbonate	

Prep Batch: 30447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	7470A	30373
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	7470A	30373
MB 140-30373/11-B	Method Blank	Total/NA	Solid	7470A	30373
LCS 140-30373/12-B	Lab Control Sample	Total/NA	Solid	7470A	30373
LCSD 140-30373/13-B	Lab Control Sample Dup	Total/NA	Solid	7470A	30373
140-15376-A-1-J DU	140-15376-A-1-J DU	Total/NA	Solid	7470A	30373

Metals

Prep Batch: 30452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 2	Solid	3010A	30423
140-15376-2	FGO-14 (30-32)	Step 2	Solid	3010A	30423
140-15376-3	FGO-2019-1 (23-25)	Step 2	Solid	3010A	30423
MB 140-30423/11-B ^3	Method Blank	Step 2	Solid	3010A	30423
LCS 140-30423/12-B ^5	Lab Control Sample	Step 2	Solid	3010A	30423
LCSD 140-30423/13-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	30423
140-15376-1 DU	FGO-15 (25-27)	Step 2	Solid	3010A	30423

SEP Batch: 30453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 3	Solid	Non-Crystalline	
140-15376-2	FGO-14 (30-32)	Step 3	Solid	Non-Crystalline	
140-15376-3	FGO-2019-1 (23-25)	Step 3	Solid	Non-Crystalline	
MB 140-30453/11-B	Method Blank	Step 3	Solid	Non-Crystalline	
MB 140-30453/11-C	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-30453/12-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCS 140-30453/12-C	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-30453/13-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
LCSD 140-30453/13-C	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-15376-1 DU	FGO-15 (25-27)	Step 3	Solid	Non-Crystalline	

Prep Batch: 30480

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 3	Solid	3010A	30453
140-15376-2	FGO-14 (30-32)	Step 3	Solid	3010A	30453
140-15376-3	FGO-2019-1 (23-25)	Step 3	Solid	3010A	30453
MB 140-30453/11-B	Method Blank	Step 3	Solid	3010A	30453
LCS 140-30453/12-B	Lab Control Sample	Step 3	Solid	3010A	30453
LCSD 140-30453/13-B	Lab Control Sample Dup	Step 3	Solid	3010A	30453
140-15376-1 DU	FGO-15 (25-27)	Step 3	Solid	3010A	30453

SEP Batch: 30481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 4	Solid	Metal Hydroxide	
140-15376-2	FGO-14 (30-32)	Step 4	Solid	Metal Hydroxide	
140-15376-3	FGO-2019-1 (23-25)	Step 4	Solid	Metal Hydroxide	
MB 140-30481/11-B	Method Blank	Step 4	Solid	Metal Hydroxide	
MB 140-30481/11-C	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-30481/12-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCS 140-30481/12-C	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-30481/13-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
LCSD 140-30481/13-C	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-15376-1 DU	FGO-15 (25-27)	Step 4	Solid	Metal Hydroxide	

Analysis Batch: 30491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	7470A	30447
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	7470A	30447
MB 140-30373/11-B	Method Blank	Total/NA	Solid	7470A	30447
LCS 140-30373/12-B	Lab Control Sample	Total/NA	Solid	7470A	30447
LCSD 140-30373/13-B	Lab Control Sample Dup	Total/NA	Solid	7470A	30447

Metals (Continued)

Analysis Batch: 30491 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-A-1-J DU	140-15376-A-1-J DU	Total/NA	Solid	7470A	30447

Prep Batch: 30528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 4	Solid	3010A	30481
140-15376-2	FGO-14 (30-32)	Step 4	Solid	3010A	30481
140-15376-3	FGO-2019-1 (23-25)	Step 4	Solid	3010A	30481
MB 140-30481/11-B	Method Blank	Step 4	Solid	3010A	30481
LCS 140-30481/12-B	Lab Control Sample	Step 4	Solid	3010A	30481
LCSD 140-30481/13-B	Lab Control Sample Dup	Step 4	Solid	3010A	30481
140-15376-1 DU	FGO-15 (25-27)	Step 4	Solid	3010A	30481

SEP Batch: 30529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 5	Solid	Organic-Bound	
140-15376-2	FGO-14 (30-32)	Step 5	Solid	Organic-Bound	
140-15376-3	FGO-2019-1 (23-25)	Step 5	Solid	Organic-Bound	
MB 140-30529/11-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-30529/12-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-30529/13-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-15376-1 DU	FGO-15 (25-27)	Step 5	Solid	Organic-Bound	

Prep Batch: 30726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 5	Solid	3010A	30529
140-15376-2	FGO-14 (30-32)	Step 5	Solid	3010A	30529
140-15376-3	FGO-2019-1 (23-25)	Step 5	Solid	3010A	30529
MB 140-30529/11-B ^5	Method Blank	Step 5	Solid	3010A	30529
LCS 140-30529/12-B ^5	Lab Control Sample	Step 5	Solid	3010A	30529
LCSD 140-30529/13-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	30529
140-15376-1 DU	FGO-15 (25-27)	Step 5	Solid	3010A	30529

SEP Batch: 30781

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 6	Solid	Acid/Sulfide	
140-15376-2	FGO-14 (30-32)	Step 6	Solid	Acid/Sulfide	
140-15376-3	FGO-2019-1 (23-25)	Step 6	Solid	Acid/Sulfide	
MB 140-30781/11-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-30781/12-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-30781/13-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-15376-1 DU	FGO-15 (25-27)	Step 6	Solid	Acid/Sulfide	

Prep Batch: 30852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 7	Solid	Residual	
140-15376-2	FGO-14 (30-32)	Step 7	Solid	Residual	
140-15376-3	FGO-2019-1 (23-25)	Step 7	Solid	Residual	
MB 140-30852/11-A	Method Blank	Step 7	Solid	Residual	
LCS 140-30852/12-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-30852/13-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-15376-1 DU	FGO-15 (25-27)	Step 7	Solid	Residual	

Metals

Prep Batch: 30853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	3050B	
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	3050B	
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	3050B	
MB 140-30853/8-A	Method Blank	Total/NA	Solid	3050B	
LCS 140-30853/9-A	Lab Control Sample	Total/NA	Solid	3050B	
140-15376-1 MS	FGO-15 (25-27)	Total/NA	Solid	3050B	
140-15376-1 MSD	FGO-15 (25-27)	Total/NA	Solid	3050B	

Analysis Batch: 30900

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 1	Solid	6010B SEP	30422
140-15376-1	FGO-15 (25-27)	Step 2	Solid	6010B SEP	30452
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	6010B	30853
140-15376-2	FGO-14 (30-32)	Step 1	Solid	6010B SEP	30422
140-15376-2	FGO-14 (30-32)	Step 2	Solid	6010B SEP	30452
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	6010B	30853
140-15376-3	FGO-2019-1 (23-25)	Step 1	Solid	6010B SEP	30422
140-15376-3	FGO-2019-1 (23-25)	Step 2	Solid	6010B SEP	30452
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	6010B	30853
MB 140-30374/11-B ^4	Method Blank	Step 1	Solid	6010B SEP	30422
MB 140-30423/11-B ^3	Method Blank	Step 2	Solid	6010B SEP	30452
MB 140-30853/8-A	Method Blank	Total/NA	Solid	6010B	30853
LCS 140-30374/12-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	30422
LCS 140-30423/12-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	30452
LCS 140-30853/9-A	Lab Control Sample	Total/NA	Solid	6010B	30853
LCSD 140-30374/13-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	30422
LCSD 140-30423/13-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	30452
140-15376-1 MS	FGO-15 (25-27)	Total/NA	Solid	6010B	30853
140-15376-1 MSD	FGO-15 (25-27)	Total/NA	Solid	6010B	30853
140-15376-1 DU	FGO-15 (25-27)	Step 1	Solid	6010B SEP	30422
140-15376-1 DU	FGO-15 (25-27)	Step 2	Solid	6010B SEP	30452

Analysis Batch: 31197

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 3	Solid	6010B SEP	30480
140-15376-1	FGO-15 (25-27)	Step 4	Solid	6010B SEP	30528
140-15376-1	FGO-15 (25-27)	Step 5	Solid	6010B SEP	30726
140-15376-1	FGO-15 (25-27)	Step 6	Solid	6010B SEP	30781
140-15376-2	FGO-14 (30-32)	Step 3	Solid	6010B SEP	30480
140-15376-2	FGO-14 (30-32)	Step 4	Solid	6010B SEP	30528
140-15376-2	FGO-14 (30-32)	Step 5	Solid	6010B SEP	30726
140-15376-2	FGO-14 (30-32)	Step 6	Solid	6010B SEP	30781
140-15376-3	FGO-2019-1 (23-25)	Step 3	Solid	6010B SEP	30480
140-15376-3	FGO-2019-1 (23-25)	Step 4	Solid	6010B SEP	30528
140-15376-3	FGO-2019-1 (23-25)	Step 5	Solid	6010B SEP	30726
140-15376-3	FGO-2019-1 (23-25)	Step 6	Solid	6010B SEP	30781
MB 140-30453/11-B	Method Blank	Step 3	Solid	6010B SEP	30480
MB 140-30481/11-B	Method Blank	Step 4	Solid	6010B SEP	30528
MB 140-30529/11-B ^5	Method Blank	Step 5	Solid	6010B SEP	30726
MB 140-30781/11-A	Method Blank	Step 6	Solid	6010B SEP	30781
LCS 140-30453/12-B	Lab Control Sample	Step 3	Solid	6010B SEP	30480

Metals (Continued)

Analysis Batch: 31197 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 140-30481/12-B	Lab Control Sample	Step 4	Solid	6010B SEP	30528
LCS 140-30529/12-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	30726
LCS 140-30781/12-A	Lab Control Sample	Step 6	Solid	6010B SEP	30781
LCSD 140-30453/13-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	30480
LCSD 140-30481/13-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	30528
LCSD 140-30529/13-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	30726
LCSD 140-30781/13-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	30781
140-15376-1 DU	FGO-15 (25-27)	Step 3	Solid	6010B SEP	30480
140-15376-1 DU	FGO-15 (25-27)	Step 4	Solid	6010B SEP	30528
140-15376-1 DU	FGO-15 (25-27)	Step 5	Solid	6010B SEP	30726
140-15376-1 DU	FGO-15 (25-27)	Step 6	Solid	6010B SEP	30781

Analysis Batch: 31255

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	6010B	30373
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	6010B	30373
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	6010B	30373
140-15376-2	FGO-14 (30-32)	Step 7	Solid	6010B SEP	30852
140-15376-2	FGO-14 (30-32)	Step 7	Solid	6010B SEP	30852
140-15376-2	FGO-14 (30-32)	Step 7	Solid	6010B SEP	30852
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	6010B	30373
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	6010B	30373
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	6010B	30373
140-15376-3	FGO-2019-1 (23-25)	Step 7	Solid	6010B SEP	30852
140-15376-3	FGO-2019-1 (23-25)	Step 7	Solid	6010B SEP	30852
140-15376-3	FGO-2019-1 (23-25)	Step 7	Solid	6010B SEP	30852
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	6010B	30373
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	6010B	30373
MB 140-30373/11-A	Method Blank	Total/NA	Solid	6010B	30373
MB 140-30852/11-A	Method Blank	Step 7	Solid	6010B SEP	30852
LCS 140-30373/12-A	Lab Control Sample	Total/NA	Solid	6010B	30373
LCS 140-30852/12-A	Lab Control Sample	Step 7	Solid	6010B SEP	30852
LCSD 140-30373/13-A	Lab Control Sample Dup	Total/NA	Solid	6010B	30373
LCSD 140-30852/13-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	30852
140-15376-1 DU	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1 DU	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1 DU	FGO-15 (25-27)	Step 7	Solid	6010B SEP	30852
140-15376-1 DU	FGO-15 (25-27)	Total/NA	Solid	6010B	30373
140-15376-1 DU	FGO-15 (25-27)	Total/NA	Solid	6010B	30373
140-15376-1 DU	FGO-15 (25-27)	Total/NA	Solid	6010B	30373

Analysis Batch: 31570

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Sum of Steps 1-7	Solid	6010B SEP	
140-15376-2	FGO-14 (30-32)	Sum of Steps 1-7	Solid	6010B SEP	
140-15376-3	FGO-2019-1 (23-25)	Sum of Steps 1-7	Solid	6010B SEP	

Metals

Prep Batch: 31695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	Total	
MB 140-31695/2-A	Method Blank	Total/NA	Solid	Total	
LCS 140-31695/3-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-31695/4-A	Lab Control Sample Dup	Total/NA	Solid	Total	

Prep Batch: 31696

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-3	FGO-2019-1 (23-25)	Step 3	Solid	3010A	30453
MB 140-30453/11-C	Method Blank	Step 3	Solid	3010A	30453
LCS 140-30453/12-C	Lab Control Sample	Step 3	Solid	3010A	30453
LCSD 140-30453/13-C	Lab Control Sample Dup	Step 3	Solid	3010A	30453

Prep Batch: 31697

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-3	FGO-2019-1 (23-25)	Step 4	Solid	3010A	30481
MB 140-30481/11-C	Method Blank	Step 4	Solid	3010A	30481
LCS 140-30481/12-C	Lab Control Sample	Step 4	Solid	3010A	30481
LCSD 140-30481/13-C	Lab Control Sample Dup	Step 4	Solid	3010A	30481

Analysis Batch: 31812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-3	FGO-2019-1 (23-25)	Step 3	Solid	6010B SEP	31696
140-15376-3	FGO-2019-1 (23-25)	Step 4	Solid	6010B SEP	31697
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	6010B	31695
MB 140-30453/11-C	Method Blank	Step 3	Solid	6010B SEP	31696
MB 140-30481/11-C	Method Blank	Step 4	Solid	6010B SEP	31697
MB 140-31695/2-A	Method Blank	Total/NA	Solid	6010B	31695
LCS 140-30453/12-C	Lab Control Sample	Step 3	Solid	6010B SEP	31696
LCS 140-30481/12-C	Lab Control Sample	Step 4	Solid	6010B SEP	31697
LCS 140-31695/3-A	Lab Control Sample	Total/NA	Solid	6010B	31695
LCSD 140-30453/13-C	Lab Control Sample Dup	Step 3	Solid	6010B SEP	31696
LCSD 140-30481/13-C	Lab Control Sample Dup	Step 4	Solid	6010B SEP	31697
LCSD 140-31695/4-A	Lab Control Sample Dup	Total/NA	Solid	6010B	31695

General Chemistry

Analysis Batch: 30352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15376-1	FGO-15 (25-27)	Total/NA	Solid	Moisture	
140-15376-2	FGO-14 (30-32)	Total/NA	Solid	Moisture	
140-15376-3	FGO-2019-1 (23-25)	Total/NA	Solid	Moisture	
140-15376-1 DU	FGO-15 (25-27)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: FGO-15 (25-27)
Lab Sample ID: 140-15376-1
Date Collected: 05/22/19 19:15
Matrix: Solid
Date Received: 05/24/19 09:40

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			31570	07/11/19 10:59	CLJ	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			30352	05/28/19 16:16	BKD	TAL KNX
	Instrument ID: W3									

Client Sample ID: FGO-15 (25-27)
Lab Sample ID: 140-15376-1
Date Collected: 05/22/19 19:15
Matrix: Solid
Date Received: 05/24/19 09:40
Percent Solids: 76.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.542 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:27	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 15:23	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31255	06/28/19 16:37	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31255	06/28/19 18:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			30900	06/17/19 14:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			30900	06/17/19 15:37	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 18:52	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 20:25	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 21:48	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: FGO-15 (25-27)
Lab Sample ID: 140-15376-1
Date Collected: 05/22/19 19:15
Matrix: Solid
Date Received: 05/24/19 09:40
Percent Solids: 76.6

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	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 12:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31255	06/28/19 14:17	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31255	06/28/19 17:43	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: FGO-14 (30-32)
Lab Sample ID: 140-15376-2
Date Collected: 05/23/19 10:40
Matrix: Solid
Date Received: 05/24/19 09:40

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			31570	07/11/19 10:59	CLJ	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			30352	05/28/19 16:16	BKD	TAL KNX
	Instrument ID: W3									

Client Sample ID: FGO-14 (30-32)
Lab Sample ID: 140-15376-2
Date Collected: 05/23/19 10:40
Matrix: Solid
Date Received: 05/24/19 09:40
Percent Solids: 79.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.535 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:41	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 15:34	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31255	06/28/19 16:47	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31255	06/28/19 18:50	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			30900	06/17/19 14:24	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			30900	06/17/19 15:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: FGO-14 (30-32)

Lab Sample ID: 140-15376-2
Date Collected: 05/23/19 10:40
Matrix: Solid
Date Received: 05/24/19 09:40
Percent Solids: 79.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:40	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 19:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 20:35	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 22:14	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 13:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31255	06/28/19 14:27	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31255	06/28/19 17:53	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:52	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: FGO-2019-1 (23-25)

Lab Sample ID: 140-15376-3
Date Collected: 05/23/19 15:20
Matrix: Solid
Date Received: 05/24/19 09:40

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			31570	07/11/19 10:59	CLJ	TAL KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			30352	05/28/19 16:16	BKD	TAL KNX
	Instrument ID: W3									

Lab Chronicle

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: FGO-2019-1 (23-25)
Date Collected: 05/23/19 15:20
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-3
Matrix: Solid
Percent Solids: 77.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.534 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:47	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 15:40	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31255	06/28/19 16:52	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	31695	07/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31812	07/17/19 12:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			30900	06/17/19 14:29	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			30900	06/17/19 16:03	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31696	07/16/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31812	07/17/19 11:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 19:18	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31697	07/16/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31812	07/17/19 11:53	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 20:41	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 22:20	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 13:24	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: FGO-2019-1 (23-25) Lab Sample ID: 140-15376-3

Date Collected: 05/23/19 15:20 **Matrix: Solid**
Date Received: 05/24/19 09:40 **Percent Solids: 77.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31255	06/28/19 14:32	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31255	06/28/19 17:58	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:54	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank Lab Sample ID: MB 140-30373/11-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 12:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank Lab Sample ID: MB 140-30373/11-B

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:34	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank Lab Sample ID: MB 140-30374/11-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	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			30900	06/17/19 13:48	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30423/11-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	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			30900	06/17/19 15:11	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30453/11-B
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:04	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30453/11-C
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	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31696	07/16/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31812	07/17/19 10:47	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30481/11-B
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 18:27	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30481/11-C
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	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31697	07/16/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31812	07/17/19 11:02	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30529/11-B ^5

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 19:48	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30781/11-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 21:23	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30852/11-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 12:11	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-30853/8-A

Date Collected: N/A **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:06	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31695/2-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	Total			1.000 g	50 mL	31695	07/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31812	07/17/19 11:17	KNC	TAL KNX
	Instrument ID:	DUO								

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30373/12-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 12:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30373/12-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:37	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30374/12-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			30900	06/17/19 13:53	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30423/12-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			30900	06/17/19 15:16	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30453/12-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:09	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30453/12-C

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	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31696	07/16/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31812	07/17/19 10:52	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30481/12-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 18:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30481/12-C

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	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31697	07/16/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31812	07/17/19 11:07	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30529/12-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 19:54	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30781/12-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 21:28	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30852/12-A
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 12:17	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30853/9-A
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:11	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31695/3-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	31695	07/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31812	07/17/19 11:22	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30373/13-A
Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 12:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30373/13-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
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:40	DKW	TAL KNX
	Instrument ID: HG									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30374/13-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	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			30900	06/17/19 13:58	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30423/13-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	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			30900	06/17/19 15:21	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30453/13-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	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:14	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30453/13-C

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	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31696	07/16/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31812	07/17/19 10:57	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30481/13-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	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 18:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30481/13-C

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	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31697	07/16/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31812	07/17/19 11:12	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30529/13-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	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 20:09	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30781/13-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 21:33	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30852/13-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 12:22	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31695/4-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	31695	07/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31812	07/17/19 11:27	KNC	TAL KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Golder Associates Inc. Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Client Sample ID: FGO-15 (25-27) — Lab Sample ID: 140-15376-1 MS

Date Collected: 05/22/19 19:15 — **Matrix: Solid**
Date Received: 05/24/19 09:40 — **Percent Solids: 76.6**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.512 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:32	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: FGO-15 (25-27) — Lab Sample ID: 140-15376-1 MSD

Date Collected: 05/22/19 19:15 — **Matrix: Solid**
Date Received: 05/24/19 09:40 — **Percent Solids: 76.6**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.514 g	50 mL	30853	06/16/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			30900	06/17/19 11:37	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: FGO-15 (25-27) — Lab Sample ID: 140-15376-1 DU

Date Collected: 05/22/19 19:15 — **Matrix: Solid**
Date Received: 05/24/19 09:40

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			30352	05/28/19 16:16	BKD	TAL KNX
	Instrument ID: W3									

Client Sample ID: FGO-15 (25-27) — Lab Sample ID: 140-15376-1 DU

Date Collected: 05/22/19 19:15 — **Matrix: Solid**
Date Received: 05/24/19 09:40 — **Percent Solids: 76.6**

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	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31255	06/28/19 15:29	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31255	06/28/19 16:42	KNC	TAL KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31255	06/28/19 18:45	KNC	TAL KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	30374	05/30/19 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	30422	05/31/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			30900	06/17/19 14:19	KNC	TAL KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	30423	05/31/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	30452	06/03/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			30900	06/17/19 15:53	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: FGO-15 (25-27)
Date Collected: 05/22/19 19:15
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-1 DU
Matrix: Solid
Percent Solids: 76.6

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	30453	06/03/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	30480	06/04/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31197	06/26/19 17:35	KNC	TAL KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	30481	06/04/19 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	30528	06/10/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31197	06/26/19 19:08	KNC	TAL KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	30529	06/10/19 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	30726	06/12/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31197	06/26/19 20:30	KNC	TAL KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	30781	06/15/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31197	06/26/19 21:54	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31255	06/28/19 13:13	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31255	06/28/19 14:22	KNC	TAL KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	30852	06/16/19 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31255	06/28/19 17:48	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: 140-15376-A-1-J DU
Date Collected: 05/22/19 19:15
Date Received: 05/24/19 09:40

Lab Sample ID: 140-15376-A-1-J DU
Matrix: Solid
Percent Solids: 76.6

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	30373	05/30/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30447	05/31/19 12:19	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30491	06/03/19 14:49	DKW	TAL KNX
	Instrument ID: HG									

Laboratory References:
TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Method Summary

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
7470A	SEP Mercury (CVAA) - Total	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL KNX
7470A	Preparation, Mercury	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: Golder Associates Inc.
Job ID: 140-15376-1
Project/Site: Oak Grove FGD Ponds - 7-Step SEP Metals

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-15376-1	FGO-15 (25-27)	Solid	05/22/19 19:15	05/24/19 09:40	
140-15376-2	FGO-14 (30-32)	Solid	05/23/19 10:40	05/24/19 09:40	
140-15376-3	FGO-2019-1 (23-25)	Solid	05/23/19 15:20	05/24/19 09:40	

Eurofins TestAmerica, Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Phone (865) 291-3000 Fax (865) 584-4315

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information	Sampler: Jacob Jarvis	Lab PM: Walker Wasmund, Terry	Carrier Tracking No(s):	COC No: 140-6678-2224.1
Client Contact: Will Vienne	Phone: 361 877 5533	E-Mail: terry.wasmund@testamericainc.com		Page: Page 1 of 1
Company: Golder Associates Inc.				Job #:
Address: 2201 Double Creek Dr Suite 4004	Due Date Requested:			
City: Round Rock	TAT Requested (days):			
State, Zip: TX, 78664				
Phone: 512-671-3434(Tel)	PO #: 19122434-F			
Email: William_Vienne@golder.com	WO #: 1922434-F			
Project Name: Oak Grove FGD Ponds - SEP and Totals	Project #: 14005266			
Site:	SSOW#:			

Analysis Requested

140-15376 Chain of Custody

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - 7-Step SEP (12 metals)	6010B Total B, Cr, Pb, P	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N			
FGD-15 (25-27)	5/22/19	1415	C	S	N		x	x		
FGD-12/ (30-32)	5/23/19	1040	C	ES						
FGD-2019-1 (23-25)	5/23/19	1520	CS	S						

RT: 0.8°C CT: 0.8°C
1 Cooler, Fedex Po
Custody seal intact
trk#1874 5047 1949
KW 5/24/19

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	5/23/19 5:50p		[signature]	5/24/19 0940	TA-Knox
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number: Loc: 140 **15376**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ **Containers, Broken**
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	✓			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : IC68 Correction factor: +0.2	✓			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	✓			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	✓			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	✓			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	✓			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	✓			☐ **Sample Not Listed on COC**
11. Is the client and project name/# identified?	✓			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	✓			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	✓			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	✓			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			✓	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 140S266 PM Instructions:

Sample Receiving Associate: Date: 5/24/19

QA026R31.doc, 112618

APPENDIX C

GROUNDWATER SAMPLING RECORDS

RECORD OF WATER LEVEL READINGS

GOLDER

Project Name: LUMINANT-OGSES-PONDS Location: NEAR FRANKLIN, TX Project No.: 19122262-F

Borehole No.	Date	Time	Measuring Device / Serial No.	Measurement Point (M.P)	Water Level Below M.P.	Correction To Survey Mark	Survey Mark Elevation	Water Level Elevation	By	Comments
FGD-16	5-16-19	[redacted]	SOLINST	TOC	16.37				JTB	
FGD-4	5-16-19			TOC	19.52					
FGD-3	5-16-19			TOC	22.13					
FGD-2	5-16-19			TOC	27.97					
FGD-5	5-16-19			TOC	20.41					
FGD-1	5-16-19			TOC	12.34					
FGD-8	5-16-19			TOC	29.11					
FGD-11	5-16-19			TOC	38.72					
FGD-12	5-16-19			TOC	30.18					

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191|22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-1
Sampling Location (well ID, etc.): FGD-1
Sampled by: JTB
Measuring Point (MP) of Well: TOC|PVC
Screened Interval (ft. BGL): –
Filter Pack Interval (ft. BGL): –

Starting Water Level (ft. BMP): 12.34
Casing Stickup (ft.): –
Starting Water Level (ft. BGL): 12.34
Total Depth (ft. BGL): –
Casing Diameter (In ID): 2.0
Casing Volume (gal.): –

QUALITY ASSURANCE

METHODS (describe):
Cleaning Equipment: alconox & DI rinse
Purging: peristaltic / bladder Sampling: same
Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA
pH Meter: HORIBA Field Calibration: 7-4
Conductivity Meter: HORIBA Field Calibration: 1413
Filter / Filter Size: – Other:

SAMPLING MEASUREMENTS

1412 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1422	–	.2	22.6	6.71	1430	0.71	-26	4.2	12.52
1426		1	22.7	6.64	1460	0.59	-31	4.6	12.53
1433		↓	22.7	6.63	1470	0.58	-32	4.7	12.52

Water Level (ft. BMP) at End of Purge: 12.52 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1450	250mL	P	1	N	–	GEN CHEM
1450	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-2

Sampling Location (well ID, etc.): FGD-2

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): -

Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 27.97

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 27.97

Total Depth (ft. BGL): -

Casing Diameter (in ID): 2.0

Casing Volume (gal.):

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1126									
1136	-	.2	23.1	6.86	1320	0.47	-92	6.2	28.17
1141		"	22.9	6.87	1360	0.39	-91	7.1	28.16
1147		"	22.9	6.86	1370	0.40	-91	6.8	28.16

Water Level (ft. BMP) at End of Purge: 28.16 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1200	250mL	P	1	N	-	GEN CHEM
1200	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-3

Sampling Location (well ID, etc.): FGD-3

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): -

Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 22.13

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 22.13

Total Depth (ft. BGL): -

Casing Diameter (In ID): 2.0

Casing Volume (gal.):

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

1032 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1041	-	.2	23.1	6.71	1620	0.71	-57	6.7	22.31
1047		1	22.7	6.74	1630	0.61	-56	7.1	22.32
1053		↓	22.7	6.73	1630	0.62	-56	7.2	22.31

Water Level (ft. BMP) at End of Purge: 22.31 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1110	250mL	P	1	N	-	GEN CHEM
1110	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-4

Sampling Location (well ID, etc.): FGD-4

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): –

Filter Pack Interval (ft. BGL): –

Starting Water Level (ft. BMP): 19.52

Casing Stickup (ft.): –

Starting Water Level (ft. BGL): 19.52

Total Depth (ft. BGL): –

Casing Diameter (In ID): 2.0

Casing Volume (gal.): –

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: – Other:

SAMPLING MEASUREMENTS

0939 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L /m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
0949	–	.2	22.4	6.59	1730	0.63	-42	3.6	19.71
0954		1	22.6	6.56	1760	0.51	-41	4.1	19.72
0958		↓	22.7	6.57	1770	0.52	-41	4.0	19.71

Water Level (ft. BMP) at End of Purge: 19.71 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1015	250mL	P	1	N	–	GEN CHEM
1015	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191|22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-S
Sampling Location (well ID, etc.): FGD-S
Sampled by: JTB
Measuring Point (MP) of Well: TOC|PVC
Screened Interval (ft. BGL): -
Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 20.41
Casing Stickup (ft.): -
Starting Water Level (ft. BGL): 20.41
Total Depth (ft. BGL): -
Casing Diameter (In ID): 2.0
Casing Volume (gal.):

QUALITY ASSURANCE

METHODS (describe):
Cleaning Equipment: alconox & DI rinse
Purging: peristaltic / bladder Sampling: same
Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA
pH Meter: HORIBA Field Calibration: 7-4
Conductivity Meter: HORIBA Field Calibration: 1413
Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

1315 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O.	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1323	-	.2	22.6	6.41	1620	0.71	-26	7.4	20.69
1329		"	22.8	6.46	1610	0.46	-31	6.7	20.71
1334		"	22.8	6.46	1620	0.51	-31	6.8	20.70

Water Level (ft. BMP) at End of Purge: 20.70
Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1350	250mL	P	1	N	-	GEN CHEM
1350	500mL	P	1	N	HNO3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-6

Sampling Location (well ID, etc.): FGD-6

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 16.37

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 16.37

Total Depth (ft. BGL): —

Casing Diameter (in ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: bailer

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: — Other:

SAMPLING MEASUREMENTS

Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
0843									
0852	—	.2	22.7	6.91	1410	1.06	-31	11	16.61
0857		1	22.8	6.86	1440	0.81	-29	6.6	16.62
0904		↓	22.9	6.85	1450	0.84	-28	6.2	16.61

Water Level (ft. BMP) at End of Purge: 16.61 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0920	250mL	P	1	N	—	GEN CHEM
0920	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191|22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-8

Sampling Location (well ID, etc.): FGD-8

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): -

Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 29.11

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 29.11

Total Depth (ft. BGL): -

Casing Diameter (In ID): 2.0

Casing Volume (gal.): -

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1513									
1522	-	.2	23.1	6.71	1320	0.76	-36	7.4	29.34
1527		↓	22.6	6.68	1340	0.71	-41	7.6	29.34
1534		↓	22.7	6.67	1340	0.70	-42	7.7	29.35

Water Level (ft. BMP) at End of Purge: 29.35 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1545	250mL	P	1	N	-	GEN CHEM
1545	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-11

Sampling Location (well ID, etc.): FGD-11

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): -

Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 38.72

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 38.72

Total Depth (ft. BGL):

Casing Diameter (In ID): 2.0

Casing Volume (gal.):

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on Site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

1606 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1616	-	.2	23.4	6.81	1360	0.91	-47	9.1	38.93
1622		1	23.5	6.82	1340	0.77	-48	6.8	38.94
1627		1	23.5	6.83	1340	0.78	-48	6.9	38.94

Water Level (ft. BMP) at End of Purge: 38.94 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1640	250mL	P	1	N	-	GEN CHEM
1640	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191|22262-F Project Name: LUMINANT - OGSES Date: 5-16-19

Sample Number: FGD-12

Sampling Location (well ID, etc.): FGD-12

Sampled by: JTB

Measuring Point (MP) of Well: TOC|PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 30.18

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 30.18

Total Depth (ft. BGL): —

Casing Diameter (In ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: — Other:

SAMPLING MEASUREMENTS

1703 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L /m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1713	—	.2	23.2	6.96	1530	0.71	-17	7.1	30.31
1717		1	23.0	6.51	1510	0.44	-19	7.7	30.32
1724		1	23.0	6.52	1510	0.46	-19	7.8	30.32

Water Level (ft. BMP) at End of Purge: 30.32 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1735	250mL	P	1	N	—	GEN CHEM
1735	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 5-17-19

Sample Number: FGD-14
Sampling Location (well ID, etc.): FGD-14
Sampled by: HTB
Measuring Point (MP) of Well: TOC/PVC
Screened Interval (ft. BGL): -
Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 15.52
Casing Stickup (ft.): -
Starting Water Level (ft. BGL): 15.52
Total Depth (ft. BGL): -
Casing Diameter (In ID): 2.0
Casing Volume (gal.): -

QUALITY ASSURANCE

METHODS (describe):
Cleaning Equipment: alconox & DI rinse
Purging: peristaltic / bladder Sampling: same
Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)
Water Level: KECK Thermometer: HORIBA
pH Meter: HORIBA Field Calibration: 7-4
Conductivity Meter: HORIBA Field Calibration: 1413
Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

0724 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O.	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
0733	-	.2	22.7	6.63	1410	1.24	-6	4.7	15.81
0738		↓	22.9	6.65	1440	1.07	-7	5.2	15.82
0744		↓	22.9	6.65	1430	1.06	-7	5.7	15.82

Water Level (ft. BMP) at End of Purge: 15.82 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0750	250mL	P	1	N	-	GEN CHEM
0750	500mL	P	1	N	HNO_3	METALS

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 6-6-19

Sample Number:	FGD-15	Starting Water Level (ft. BMP):	25.22
Sampling Location (well ID, etc.):	FGD-15	Casing Stickup (ft.):	–
Sampled by:	JTB	Starting Water Level (ft. BGL):	25.22
Measuring Point (MP) of Well:	TOC/PVC	Total Depth (ft. BGL):	–
Screened Interval (ft. BGL):	–	Casing Diameter (In ID):	2.0
Filter Pack Interval (ft. BGL):	–	Casing Volume (gal.):	–

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level:	KECK	Thermometer:	HORIBA
pH Meter	HORIBA	Field Calibration:	7-4
Conductivity Meter:	HORIBA	Field Calibration:	1413
Filter / Filter Size:	–	Other:	

SAMPLING MEASUREMENTS

1412 Time	Cum. Vol. (gal. or (L))	Purge Rate (gal. or (L/m))	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O.	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1421	–	.2	20.9	6.67	1570	1.29	-17	7.7	25.41
1426		↓	20.7	6.62	1560	1.06	-16	5.2	25.42
1432		↓	20.6	6.62	1560	1.07	-16	5.9	25.41

Water Level (ft. BMP) at End of Purge: Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1445	250mL	P	1	N	–	GEN CHEM
1445	500mL	P	1	N	HNO_3	METALS
1445	1L	P	2	N	HNO_3	

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191 22262-F Project Name: LUMINANT - OGSES Date: 6-6-19

Sample Number: FGD-16

Sampling Location (well ID, etc.): FGD-16

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): -

Filter Pack Interval (ft. BGL): -

Starting Water Level (ft. BMP): 31.06

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 31.06

Total Depth (ft. BGL): -

Casing Diameter (In ID): 2.0

Casing Volume (gal.): -

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: - Other:

SAMPLING MEASUREMENTS

1232 Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L/m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1241	-	.2	21.7	6.74	1760	0.71	-39	5.7	31.27
1246		↓	21.6	6.73	1740	0.56	-31	6.7	31.26
1253		↓	21.6	6.73	1740	0.57	-32	6.9	31.26

Water Level (ft. BMP) at End of Purge: 31.26 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1300	250mL	P	1	N	-	GEN CHEM
1300	500mL	P	1	N	HNO_3	METALS
1300	1L	P	2	N	HNO_3	

Comments:

Pastor, Behling & Wheeler, LLC
2201 Double Creek Dr., Suite 4004
Round Rock, TX 78664
(512) 671-3434 Fax (512) 671-3446

GOLDER

golder.com