REPORT

CCR ASSESSMENT OF CORRECTIVE MEASURES

Martin Lake Steam Electric Station - Ash Pond Area
Rusk County, Texas

Submitted to:

Luminant Generation Company LLC

Submitted by:

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

+1 512 671-3434

19121403

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this assessment of corrective measures (ACM) report on behalf of Luminant Generation Company LLC (Luminant) for the West Ash Pond (WAP), East Ash Pond (EAP), and New Scrubber Pond (NSP) (collectively referred to as the "Ash Pond Area") located at the Martin Lake Steam Electric Station (MLSES) in Rusk 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 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 MLSES operating record in accordance with §257.105(h)(10).

This report also incorporates the results of a site investigation conducted at the Site 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 MLSES is located approximately 5 miles southeast of Tatum, Rusk County, Texas (Figure 1). The MLSES is expected to remain in operation for the foreseeable future, depending on future power demands.

The Ash Pond Area is located immediately east of the MLSES power units (Figure 2). The WAP is constructed with a composite liner consisting of an 18-inch thick compacted clay liner, overlain by two 60-mil HDPE geomembrane liners with a geonet drainage layer between the geomembranes. The EAP is constructed with a composite liner consisting of an 18-inch thick compacted clay liner, overlain by a geotextile, overlain by two 60-mil HDPE geomembrane liners with a geonet drainage layer between the geomembranes. A 4-inch thick concrete revetment mat is installed on top of the upper geomembrane liner in both the WAP and EAP. The WAP and EAP are considered unlined surface impoundments under §257.71(a)(1)(ii) of the CCR Rule (BM 2016).

The NSP is constructed with liner system consisting of two 60-mil HDPE geomembrane liners with a geonet drainage layer between the geomembranes, overlain by a 4-inch thick concrete revetment mat. The NSP is considered an unlined surface impoundment under §257.71(a)(1)(ii) of the CCR Rule (BM 2016).

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2.0 REGIONAL AND SITE SETTING

2.1 Regional Geology

MLSES is located in the outcrop area of the Eocene-aged Wilcox Group (Barnes, 1965). The Wilcox Group in the vicinity of the Site consists mostly of unconsolidated to moderately consolidated clay and silt, with various amounts of interbedded sand and lignite. The depositional environment is associated with fluvial-deltaic processes such as inter-channel crevasse splays, overbank deposits, and localized channel fills. The Wilcox Group is overlain by sands of the Carrizo Formation, which is present only at higher elevations in the area. The Carrizo Formation is not present at the Site.

2.2 Regional Hydrogeology

Groundwater wells completed in the Wilcox Group sands in the area are typically used for domestic, oil and gas supply, or stock watering purposes. Some potable water supply wells in the region are also completed in the Wilcox Group, including two wells at the MLSES that are both located upgradient of the Ash Pond Area and are screened at depths of 300 feet bgs or greater. 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 Wilcox Group 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 Ash Pond Area was established in 2015 using newly installed monitoring wells H-26, H-27, H-28, H-29, H-31, H-32, AND H-33 (Figure 2). Based on soil borings completed at the Site, the geology near the CCR units generally consists of an upper zone composed of an approximately 30- to 40-foot thick low- to medium-plasticity, lean clay to clayey sand unit. The upper zone is underlain by an intermediate zone composed of poorly-graded fine sand and silty sand unit that is generally about 5 to 20 feet thick. The intermediate zone is underlain by a laterally-continuous, silty to sandy confining clay unit. The uppermost aquifer occurs in the intermediate sand and silty sand unit at the Site (PBW 2017a). The CCR monitoring wells are completed in the intermediate zone. Geologic cross sections of the Ash Pond Area are presented on Figures 3, 4, and 5.

Groundwater elevations are generally highest near the western side of the Ash Pond Area with an inferred groundwater flow direction to the east toward Martin Lake. A groundwater potentiometric map constructed using groundwater elevation data collected in May 2019 from the CCR monitoring network is presented on Figure 6. Based on the inferred groundwater flow direction, the location of each CCR monitoring well relative to the Ash Pond Area is as follows:

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Upgradient/Background Wells	Downgradient Wells
H-27 H-26 H-33	H-28 H-29 H-31 H-32

Rising- and falling-head aquifer tests (i.e., slug tests) were conducted at the Site as part of a 2011 assessment for the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) (PBW 2011). Based on the test results, the intermediate zone had an estimated hydraulic conductivity of 1.0E-03 cm/sec and an estimated lateral groundwater flow velocity of 27 feet per year.

Golder performed a survey of water supply wells located in the vicinity of the Ash Pond Area 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 15, 2019. No imminent threats to water wells or potentially affected drinking water wells were identified.

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3.0 NATURE AND EXTENT EVALUATION

3.1 Groundwater Monitoring Summary

Background monitoring of groundwater in the vicinity of the Ash Pond Area began in October 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 §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 performed 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 downgradient wells in January 2019 for beryllium (H-28, and H-29), cobalt (H-28 and H-29), and lithium (H-28); 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 conducted 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). Confidence intervals were calculated for any Appendix IV parameter that historically has had more than one occurrence in excess of the GWPS in any well within the monitoring network. Plots of the confidence intervals for each of those Appendix IV parameters are presented below (SSLs are highlighted in red around the bars):

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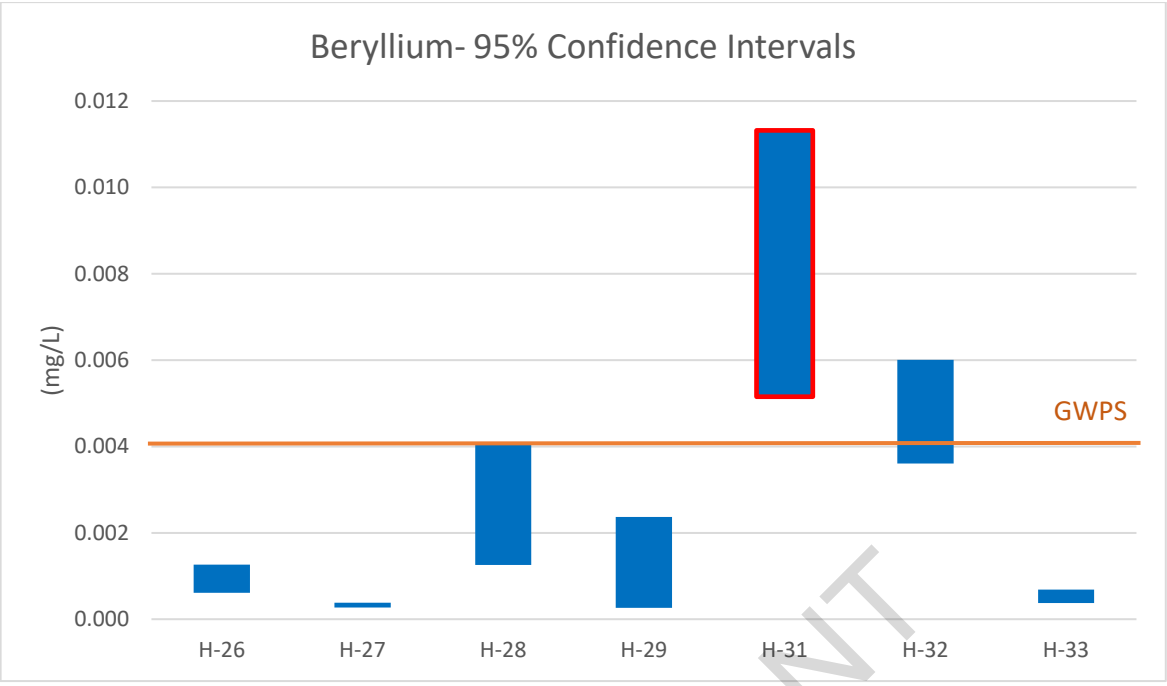
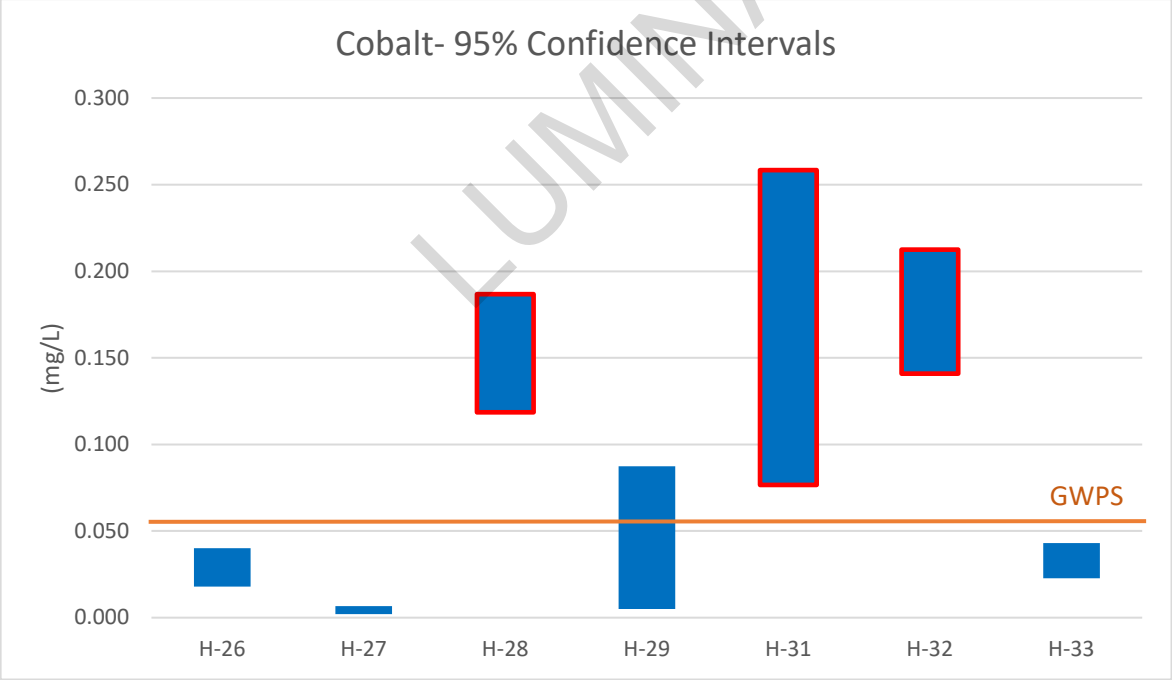

Beryllium- 95% Confidence Intervals
0.012
0.010
0.008
0.006
0.004
0.002
0.000
(mg/L)
GWPS
H-26
H-27
H-28
H-29
H-31
H-32
H-33


Cobalt- 95% Confidence Intervals
0.300
0.250
0.200
0.150
0.100
0.050
0.000
(mg/L)
GWPS
H-26
H-27
H-28
H-29
H-31
H-32
H-33

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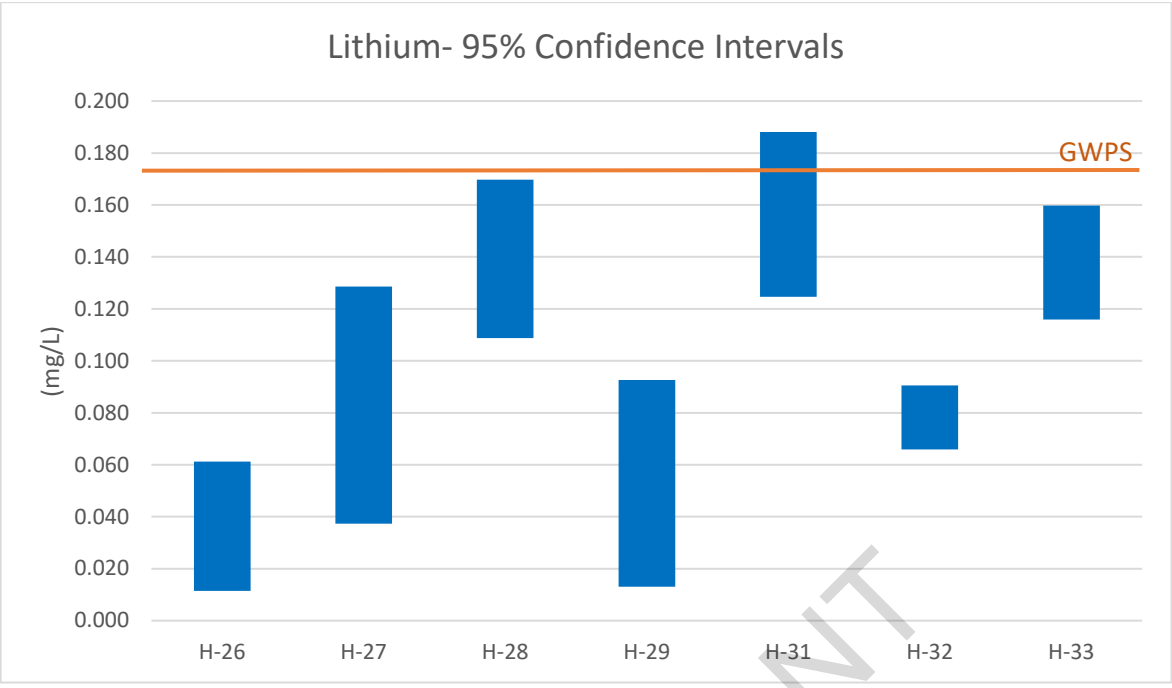

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The previous statistical analysis using data collected during the assessment monitoring period through September 2018 indicated SSLs for beryllium (H-28 and H-29), cobalt (H-28 and H-29), and lithium (H-28) as identified in the February 2019 SSL notification; however, the updated statistical analysis only identified beryllium (H-31) and cobalt (H-28, H-31, and H-32) as having SSLs above GWPSs. The monitoring wells will continue to be monitored to confirm that lithium concentrations remain below SSLs in the future in accordance with the CCR Rule. For the purposes of this ACM evaluation, concentrations are conservatively assumed to be present at SSLs above their respective GWPSs for the following constituents in the wells indicated based on the initial and updated statistical evaluations:

- Beryllium (H-28, H-29, and H-31);
- Cobalt (H-28, H-29, H-31, and H-32); and
- Lithium (H-28).

Figure 7 shows the extent of Appendix IV constituents detected at SSLs above GWPSs based on the initial and updated statistical analysis.

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, a lake sample from Martin Lake, 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 soil boring locations AP-2019-1, AP-2019-2, and AP-2019-3. 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) and determine their potential environmental mobility. For instance, metals bound in the carbonate fraction, or that are exchangeable, are much more likely to become mobile due to changes in groundwater conditions than metals bound within a sulfide or silicate fraction. The total concentration of a metal measured from all seven steps can be compared to the concentration determined from the total metal analysis for compositional accountability.

3.3.3 Groundwater and Surface Water Sampling

Groundwater samples were collected from the CCR monitoring network and one surface water sample was collected from Martin Lake downgradient of the Ash Pond Area in May 2019. Laboratory analytical reports are provided in Appendix B and sampling records, which include field-measured parameters, are presented 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 and uranium 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.

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3.4 Evaluation of Groundwater Water

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. beryllium and cobalt) 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 and Surface Water Data

Groundwater quality data from background wells H-26, H-27, and H-33; downgradient monitoring wells H-28, H-29, H-31, and H-32; and the surface water sample collected from Martin Lake were used for this evaluation. The water quality monitoring data are presented in Appendices B and C and can be summarized as follows:

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General Chemistry Parameters

- pH: The pH of groundwater samples collected from CCR monitoring well network ranged from 6.01 to 6.83 in May 2019. Historically, the pH in the CCR monitoring well network has ranged from 5.8 to 7.0. Isolated values as low as 3.64 and as high as 11.20 have been recorded in some wells; however, these conditions do not persist but pH returns to circumneutral values by the next sampling round. The pH of Martin Lake was 6.79 in May 2019.
- ORP (Redox): Field-measured redox values, corrected to Eh (+200mV), ranged from +113 to +174 mV in the groundwater samples in the CCR monitoring well network.
- Total Dissolved Solids (TDS): Groundwater TDS concentrations were variable in May 2019 in the CCR monitoring well network. The lowest TDS concentration (453 mg/L) occurred in groundwater at CCR monitoring well H-26 (upgradient) and the highest TDS value (4,230 mg/L) was observed at CCR monitoring well H-31 (downgradient). The TDS concentration measured in Martin Lake water was 119 mg/L.
- Major ion chemistry: A Piper plot was generated for groundwater and Martin Lake samples to facilitate the identification of water types and source contributions (Figure 8a). Two distinct groupings of wells are apparent based on their relative major ion proportions. Upgradient wells H-26 and H-33 show close similarity with the water sample from Martin Lake, indicating potential influences of Martin Lake on the groundwater in these locations. Groundwater composition in upgradient well H-27, in contrast, is more closely related to that of the downgradient wells. Based on the molar ratios of calcium, sodium, and sulfate (Figure 8b), all groundwater samples and the Martin Lake water sample generally plot as one group.

- Iron: Oxidized iron (ferric iron - Fe^{+3}) concentrations were variable, ranging from non-detect (<0.05 mg/L) to 8.81 mg/L in May 2019 (Appendix B). Reduced iron (ferrous iron - Fe^{+2}) concentrations were non-detect (<0.05 mg/L) in the groundwater at all CCR monitoring wells except H-31 and H-32. The highest concentration of ferrous iron in groundwater was 49.5 mg/L observed in monitoring well H-31, over 40 times higher than any other monitoring well. This value corresponded to the highest measured beryllium, cobalt, and lithium concentrations in groundwater at the Ash Pond area. Ferric iron in water from Martin Lake was measured at 0.365 mg/L while ferrous iron was non-detect (<0.05 mg/L).
- Nutrients: Nitrate (nitrate as N) was present in groundwater at variable levels, ranging from non-detect (< 0.1 mg/L as N) to 272 mg/L as N at H-32 in May 2019 (Appendix B). Nitrate in CCR monitoring well H-32 at 272 mg/L as N, was orders of magnitude higher than in other monitoring wells, in which nitrate ranged from non-detect (<0.1 mg/L as N) to 0.658 mg/L as N. Nitrate was not detected in Martin Lake water. Phosphate concentrations in groundwater ranged from near non-detect (0.03 mg/L as P) to 0.126 mg/L as P in CCR monitoring wells. Phosphate was not detected in the water of Martin Lake in May 2019. No spatial trend was apparent in the nitrate or phosphate distribution in groundwater.

Constituents Identified in February 2019 SSL Notification

- Beryllium: Beryllium concentrations in groundwater samples historically have exceeded the GWPS (0.004 mg/L) in CCR monitoring wells H-28, H-29, H-31, and H-32 on at least one occasion since October 2015 (Figure 9a). However, due to the variability of beryllium concentrations in groundwater at these wells, only H-31 currently has beryllium at an SSL. As of May 2019, beryllium concentrations in H-31 and H-32 were above the GWPS, at 0.00713 mg/L and 0.00928 mg/L, respectively. The highest beryllium concentration in groundwater was measured in H-31 in December 2016. Beryllium was not detected in the Martin Lake water sample (<0.0003 mg/L). Beryllium is likely present in groundwater as the divalent cation Be^{+2} based on the pH and Eh of groundwater (Figure 10a).
- Cobalt: Cobalt concentrations in groundwater samples historically have exceeded the GWPS (0.0564 mg/L) in all CCR monitoring wells except H-27 on at least one occasion since October 2015 (Figure 9b). All CCR network monitoring wells have also reported groundwater cobalt concentrations below the GWPS on at least one occasion since October 2015, indicating variability in cobalt In May 2019, all wells except H-27 had cobalt concentrations in groundwater above the GWPS. Cobalt was not detected in water from Martin Lake in May 2019 (<0.003 mg/L). Cobalt is likely present in groundwater as the divalent cation Co^{+2} based on the pH and Eh of groundwater (Figure 10b).
- Lithium: Lithium concentrations in groundwater have exceeded the GWPS (0.040 mg/L) since October 2015 in four wells: H-27 (upgradient), H-28, H-31, and H-33 (Figure 9c). In May 2019, only the sample from CCR monitoring well H-31 exceeded the GWPS for lithium. Based on an evaluation of the 95% confidence intervals, the GWPS exceedances for lithium at H-27. H-28. H-31, and H-33 are not at an SSL above the GWPS. Water from Martin Lake did not contain lithium above its detection limit (<0.005 mg/L) in May 2019.

The groundwater analytical results indicate that the Ash Pond Area may be the potential source for the cobalt and/or beryllium concentrations observed at SSLs in monitoring wells H-28, H-31 and H-32. However, the data also indicates that lithium concentrations are not present at SSLs in any of the monitoring wells at the Site.

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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 (AP-2019-1, AP-2019-2, and AP-2019-3). 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 of soil from borehole samples at the Ash Pond Area identified quartz as the predominant mineral, with varying amounts of albite in all three boreholes. Soil samples from boreholes AP-2019-1 and AP-2019-2 (ranging 30' below ground surface (bgs) to 31' bgs and 35' bgs to 36' bgs) also contained small or trace amounts of the silicate minerals K-felspar, chlorite, muscovite, kaolinite, vermiculite, illite, and montmorillonite. Analytical reports for the XRD samples are provided in Appendix B. These minerals were not identified in the shallower borehole samples of AP-2019-1 (18' bgs to 19' bgs), indicating potentially a greater abundance of clay minerals (kaolinite, vermiculite, illite, montmorillonite) in deeper samples.

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 Ash Pond Area, 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 14,244 to 33,160 mg/kg, and the environmentally-available fraction ranged from 1,044 (AP-2019-3) to 1,989 mg/kg (AP-2019-2). Aluminum in the soil at the site is, therefore, largely (~84% to 87%) present in the residual, or silicate-bound fraction. This fraction is likely at least partially represented by hydrous aluminum phyllosilicate

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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 5,192 (AP-2019-3) to 13,933 mg/kg (AP-2019-2). In all samples, the non-environmentally available (sulfide and residual) fractions accounted for the largest proportion of total iron (54% to 64%) and, as such, most of the iron is not environmentally available. The remainder of the iron in the samples is present across the exchangeable (except AP-2019-1), carbonate (only in AP-2019-2), amorphous metal, and metal hydroxide phases. These phases, part of the labile fraction in steps 1 through 5, can generally be considered representative of the amount of iron in soil that may be available as a sorbing medium and can, therefore, be important for potential attenuation of beryllium and cobalt.

Constituents Identified in February 2019 SSL Notification

- Beryllium: Total beryllium in soil ranged from 0.23 to 0.68 mg/kg, of which 16% to 75% of the beryllium was present in the environmentally-available fraction. The non-environmentally available fraction of beryllium (25% to 84% of total) is also indicative of naturally occurring beryllium in soil at the Ash Pond Area. All of the environmentally-available beryllium resorted in the amorphous metal and metal hydroxide fractions, indicating potential attenuation of beryllium from groundwater (Smith 1999).
- Cobalt: Total cobalt in soil ranged from 1.68 to 6.29 mg/kg while the environmentally-available fraction ranged from 1.4 mg/kg in AP-2019-3 to 4.39 mg/kg in AP-2019-2, representing from 58% to 83% of total cobalt. The majority of the environmentally-available cobalt was present in the metal hydroxide fractions in soils samples AP-2019-1 and AP-2019-2, while the exchangeable fraction hosted the largest proportion of cobalt in soils sample AP-2019-3. Soil sample AP-2019-2 contained cobalt in every fraction of the sequential extraction test, indicating potential attenuation of cobalt from groundwater, and the potential presence of naturally occurring cobalt in soil.
- Lithium: Total lithium in soil ranged from 7.15 to 17.3 mg/kg, of which between only 7% (AP-2019-3) and 24% (AP-2019-2) resorted in the environmentally-available fraction. Lithium that was environmentally available (0.53 to 4.2 mg/kg) was all contained in the metal hydroxide fraction. This indicates the likelihood of the presence of naturally-occurring lithium at the site that is contained within non-environmentally available fractions while attenuation of lithium by metal hydroxide minerals also appears to be occurring.

The results of the soil analysis indicate the following:

- A naturally-occurring source of beryllium, cobalt, and lithium is present in the vicinity of the Ash Pond Area at the MLSES.
- Attenuation of beryllium, cobalt, and lithium in groundwater is likely occurring in the vicinity of the Ash Pond Area.

3.6 Summary of Site Characterization

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

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- Beryllium: Beryllium concentrations statistically exceeded the GWPS in groundwater from only one CCR monitoring well (H-31). Beryllium concentrations in groundwater monitoring well H-31 were the highest in December 2016, followed by a stable or decreasing trend since that occurrence. Beryllium was not detected in water from Martin Lake. Sequential extraction results indicate the potential for attenuation of beryllium by amorphous metals and metal hydroxides (Smith 1999). Beryllium should, therefore, be considered for further evaluation as part of an ACM as a viable candidate for monitored natural attenuation based on the results of this initial assessment (USEPA 2007a, b).
- Cobalt: Historical data from CCR monitoring wells in which cobalt concentrations in groundwater exceeded the GWPS indicate a stable or decreasing concentrations since the highest measured cobalt in groundwater of 0.434 mg/L in October 2015. Cobalt concentrations in groundwater currently statistically exceed the GWPS in three CCR monitoring wells (H-28, H-31 and H-32). Cobalt was not detected in water from Martin Lake. Cobalt was present in nearly every fraction of soil as determined from sequential extraction, indicating the strong potential for cobalt attenuation by soils (Smith 1999). Cobalt should, therefore, be considered for further evaluation as part of an ACM as a viable candidate for monitored natural attenuation based on the results of this initial assessment (USEPA 2007a, b).
- Lithium: Recent data indicates that lithium concentrations in groundwater statistically no longer exceed the GWPS at any monitoring well location. Lithium was not detected in water from Martin Lake. Based on the data collected to date, lithium concentrations in groundwater 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 H-31 based on the February 2019 SSL notification.

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4.0 ASSESSMENT OF CORRECTIVE MEASURES

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

- cobalt concentrations in monitoring wells H-28, H-31 and H-32;
- beryllium concentrations in monitoring well H-31; and
- lithium concentrations in monitoring well H-31.

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

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 MLSES Ash Ponds are an integral part of

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the CCR management system at the plant. As a result, any potential source control technology must keep the WAP, EAP and NSP in operation.

The WAP, EAP and NSP are considered unlined surface impoundments under the CCR Rule. As a result, the WAP, EAP and NSP will be retrofitted with new composite liner systems that comply with the requirements of §257.71(a)(1)(ii) of the CCR Rule to improve the level of source control in the ponds. The new liner systems will be installed in general accordance with the following procedures:

- The ponds will be retrofitted one at a time;
- Water will be removed from the pond being retrofitted and transferred to the other Ash Ponds;
- Solids in the ponds will be dewatered, removed and transported to the MLSES A1 Area Landfill for disposal.
- A minimum of 2 feet of compacted clay liner will be placed at the base of each pond;
- A 60-mil HDPE geomembrane liner will be installed over the 2 feet of compacted clay liner;
- A protective layer of soil, ash or other material will be placed over the geomembrane liner.

Retrofitting the WAP, EAP and NSP with new composite liner systems is assumed to serve as the source control component of the potential corrective measures for the Ash Ponds. The estimated time to retrofit the WAP, EAP and NSP is estimated to be approximately 1 to 2 years per pond, including design and construction.

4.3 Potential Groundwater Response Technologies

For the purposes of this ACM, cobalt, beryllium 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 the Ash 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).

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MNA has been demonstrated effective in reducing cobalt and beryllium 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). Beryllium is removed through adsorption or coprecipitation (DOD 2014). The removal mechanisms for lithium are not identified in the professional literature. As described in Section 3.6 of this report, the Site is a good candidate for MNA, since natural attenuation of cobalt, lithium and beryllium is ongoing at the Site.

MNA would be effective in remediating groundwater beneath t and downgradient of the Ash 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 Ash 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 Martin Lake 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).
- Beryllium - activated alumina, ion exchange, lime softening, coagulation/filtration, and reverse osmosis (USEPA 2003)

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 Ash 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.

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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.

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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 Ash Ponds, the vertical hydraulic barrier would be constructed along the downgradient edge of the ponds to provide hydraulic control of the target Appendix IV constituent 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 the ash Ponds, a PRB system would be constructed along the downgradient edge of the ponds to provide control of the target Appendix IV 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).
- Beryllium – potentially removed through in-situ biomass sorption (Goldemund and Robb 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.

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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 and beryllium can potentially be removed through in-situ biomass sorption (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 Ash Ponds and the chemical reagents would be injected to provide control of the target Appendix IV constituent groundwater plumes.

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.

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 and beryllium 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 Ash 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 may 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.

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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 Ash Ponds. The screening results for each potential source technology are summarized in Table 3. 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 Ash 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 Liners in WAP, EAP and NSP with Monitored Natural Attenuation
- Retrofit Liners in WAP, EAP and NSP with Groundwater Extraction and Treatment
- Retrofit Liners in WAP, EAP and NSP 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 4.

4.5 Remedy Selection

The corrective measure alternative proposed as the remedy for the Ash 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, beryllium 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, lithium concentrations are no longer considered to be present at SSLs above the GWPS based on recent data and naturally occurring sources of cobalt, beryllium and lithium exist in the vicinity of the Ash Ponds. Cobalt, beryllium 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.

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Signature Page

Golder Associates Inc.

Patrick J. Behling, P.E.
Principal Engineer

William F. Vienne, P.G.
Senior Hydrogeologist

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TABLES

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TABLE 1
APPENDIX IV GROUNDWATER ANALYTICAL DATA SUMMARY
MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA

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 Comb.^ (pCi/L)
GWPS:		0.006	0.01	2	0.004	0.005	0.1	0.0564	4	0.015	0.177	0.002	0.1	0.05	0.002	--	--	5
Upgradient Wells																		
H-26	10/21/15	<0.0008	0.00364 J	0.0785	0.000349 J	<0.0003	<0.002	0.0385	<0.1	<0.0003	0.0139	<0.00008	<0.002	<0.002	<0.0005	0.919	<1.64	2.56
	12/14/15	<0.0008	<0.002	0.0401	0.000458 J	<0.0003	<0.002	0.0244	<0.1	<0.0003	0.0769	<0.00008	<0.002	<0.002	<0.0005	0.619	<1.95	2.57
	02/23/16	<0.0008	<0.002	0.0423	<0.0003	<0.0003	0.0077	0.00813	0.151 J	0.000315 J	0.0124	<0.00008	0.00248 J	0.0022 J	<0.0005	0.37	<2.06	2.43
	04/05/16	<0.0008	<0.002	0.0408	<0.0003	<0.0003	0.00798	0.0125	0.199 J	<0.0003	0.0121	<0.00008	<0.002	<0.002	<0.0005	<0.243	<1.06	<1.303
	06/07/16	<0.0008	<0.002	0.0467	0.000721 J	<0.0003	<0.002	0.0217	<0.1	<0.0003	0.0132	<0.00008	<0.002	<0.002	<0.0005	0.245	1.67	1.92
	08/09/16	<0.0008	0.0029 J	0.0431	0.00136	<0.0003	<0.002	0.0352	<0.1	<0.0003	0.0155	<0.00008	<0.002	<0.002	<0.0005	<0.2	<0.932	<1.132
	10/18/16	<0.0008	<0.002	0.0497	0.000709 J	<0.0003	<0.002	0.0214	0.127 J	<0.0003	0.0136	<0.00008	<0.002	0.00265 J	<0.0005	0.243	<0.622	0.87
	12/11/16	<0.0008	<0.002	0.0468	0.00146	<0.0003	0.00311 J	0.0275	0.161 J	0.000358 J	0.014	<0.00008	<0.002	<0.002	<0.0005	0.248	1.82	2.07
	06/13/18	<0.0008	<0.002	0.0659	0.0016	<0.0003	0.00213 J	0.0261	<0.100	<0.0003	0.032	<0.00008	<0.002	<0.002	<0.0005	<0.297	3.72	4.017
	09/07/18	NA	<0.002	0.0470	0.00155	<0.0003	0.00319 J	0.0247	<0.100	<0.0003	0.0489	NA	NA	<0.002	NA	<0.473	<0.665	<1.138
	05/14/19	<0.0008	0.0041 J	0.1900	0.00147	<0.0003	0.0406	0.0795	0.140 J	0.000972 J	0.147	<0.00008	<0.002	0.00222 J	<0.0005	1.43	0.598	2.028
H-27	10/21/15	<0.0008	<0.002	0.0378	<0.0003	<0.0003	<0.002	0.00432 J	<0.1	<0.0003	0.0607	<0.00008	<0.002	<0.002	<0.0005	<0.553	<1.67	<2.223
	12/14/15	<0.0008	0.0021 J	0.039	<0.0003	<0.0003	<0.002	0.00326 J	0.156 J	0.000339 J	0.0624	<0.00008	<0.002	<0.002	<0.0005	0.468	<1.68	2.15
	02/23/16	<0.0008	<0.002	0.0266	<0.0003	<0.0003	<0.002	<0.003	0.101 J	<0.0003	0.0601	<0.00008	<0.002	<0.002	<0.0005	0.921	<1.62	2.54
	04/05/16	<0.0008	<0.002	0.0245	<0.0003	<0.0003	<0.002	<0.003	0.124 J	<0.0003	0.0573	<0.00008	<0.002	<0.002	<0.0005	0.269	<2.05	2.32
	06/07/16	<0.0008	<0.002	0.0342	0.000609 J	<0.0003	<0.002	0.016	<0.1	<0.0003	0.0107	<0.00008	<0.002	<0.002	<0.0005	0.269	<0.658	0.927
	08/09/16	<0.0008	<0.002	0.0241	<0.0003	<0.0003	<0.002	<0.003	<0.1	<0.0003	0.0616	<0.00008	<0.002	<0.002	<0.0005	0.408	<0.632	1.04
	10/18/16	<0.0008	<0.002	0.0248	<0.0003	<0.0003	<0.002	<0.003	0.144J	<0.0003	0.0576	<0.00008	<0.002	<0.002	<0.0005	<0.178	1.07	1.25
	12/11/16	<0.0008	<0.002	0.0236	<0.0003	<0.0003	<0.002	<0.003	0.161 J	<0.0003	0.0606	<0.00008	<0.002	<0.002	<0.0005	0.143	1.54	1.68
	06/13/18	<0.0008	<0.002	0.0237	<0.0003	<0.0003	0.00964	<0.003	0.208 J	<0.0003	0.108	<0.00008	<0.002	<0.002	<0.0005	0.267	<1.4	1.667
	09/07/18	NA	<0.002	0.0196	<0.0003	<0.0003	0.0453	<0.003	0.140 J	<0.0003	0.306	NA	NA	0.00773	NA	<0.285	1.43	1.715
	05/14/19	<0.0008	<0.002	0.0208	<0.0003	<0.0003	<0.002	<0.003	0.159 J	<0.0003	0.0678	<0.00008	<0.002	<0.002	<0.0005	1.10	0.928	2.028
H-33	10/20/15	<0.0008	0.00208 J	0.0586	0.000351 J	<0.0003	<0.002	0.0274	<0.1	<0.0003	0.0814	<0.00008	<0.002	<0.002	<0.0005	1.76	1.64	3.40
	12/14/15	<0.0008	0.00205 J	0.0473	0.000382 J	<0.0003	<0.002	0.0293	0.136 J	<0.0003	0.0903	<0.00008	<0.002	<0.002	<0.0005	1.94	<1.79	3.73
	02/23/16	<0.0008	<0.002	0.0529	0.000311 J	<0.0003	0.0194	0.0163	0.125 J	<0.0003	0.182	<0.00008	<0.002	<0.002	<0.0005	0.906	<2.32	3.23
	04/05/16	<0.0008	<0.002	0.0576	0.000302 J	<0.0003	0.0171	0.016	0.14 J	<0.0003	0.16	<0.00008	<0.002	<0.002	<0.0005	0.328	1.08	1.41
	06/07/16	<0.0008	<0.002	0.0774	0.000604 J	<0.0003	0.0153	0.0196	<0.1	<0.0003	0.163	<0.00008	<0.002	<0.002	<0.0005	0.276	0.897	1.17
	08/09/16	<0.0008	<0.002	0.0424	0.000519 J	<0.0003	0.00291 J	0.0284	<0.1	<0.0003	0.102	<0.00008	<0.002	<0.002	<0.0005	<0.149	0.649	0.80
	10/18/16	<0.0008	0.00347 J	0.0464	0.000617 J	<0.0003	0.0309	0.0644	<0.1	0.000329 J	0.118	<0.00008	<0.002	<0.002	<0.0005	0.096	<0.517	0.61
	12/11/16	<0.0008	0.00218 J	0.0537	0.000865 J	<0.0003	0.0368	0.0408	0.132 J	0.000495 J	0.115	<0.00008	<0.002	<0.002	<0.0005	0.159	1.29	1.45
	06/13/18	<0.0008	0.00283 J	0.0741	0.0004 J	<0.0003	0.0182	0.0266	0.105 J	0.0009 J	0.183	<0.00008	<0.002	<0.002	<0.0005	0.795	<0.712	1.507
	09/07/18	NA	0.00239 J	0.0757	0.0003 J	<0.0003	0.0105	0.0288	0.135 J	<0.0003	0.160	NA	NA	<0.002	NA	0.334	<0.645	0.979
	05/14/19	<0.0008	0.00355 J	0.158	0.00114	<0.0003	0.0342	0.0648	0.166 J	0.000772 J	0.161	<0.00008	<0.002	<0.002	<0.0005	0.850	1.35	2.200
Downgradient Wells																		
H-28	10/21/15	<0.0008	0.00278 J	0.0396	0.00148	0.00121	<0.002	0.188	<0.1	0.000491 J	0.154	<0.00008	<0.002	0.00682	<0.0005	<0.558	<1.65	<2.208
	12/14/15	<0.0008	<0.002	0.0224	<0.0003	0.000572 J	<0.002	0.0225	<0.1	<0.0003	0.021	<0.00008	<0.002	<0.002	<0.0005	0.707	<1.18	1.89
	02/23/16	<0.0008	0.00225 J	0.0202	0.00133	0.00151	<0.002	0.201	<0.1	0.00053 J	0.159	<0.00008	<0.002	0.00222 J	<0.0005	<0.396	2.24	2.64
	04/05/16	<0.0008	<0.002	0.0173	0.0011	0.00252	<0.002	0.199	<0.1	0.00087 J	0.15	<0.00008	<0.002	0.00237 J	<0.0005	<0.231	1.76	1.99
	06/07/16	<0.0008	<0.002	0.0468	0.000934 J	0.000664 J	<0.002	0.0944	<0.1	<0.0003	0.0959	<0.00008	<0.002	<0.002	<0.0005	0.310	1.48	1.79
	08/09/16	<0.0008	<0.002	0.0155	0.00275	0.0016	<0.002	0.195	<0.1	0.000774 J	0.155	<0.00008	<0.002	0.00286 J	<0.0005	<0.451	1.41	1.86
	10/18/16	<0.0008	0.00284J	0.0174	0.00685	0.000744 J	<0.002	0.169	0.165J	0.00108	0.155	<0.00008	<0.002	0.00273 J	<0.0005	<0.228	0.645	0.87
	12/11/16	<0.0008	<0.002	0.0471	0.000698 J	0.000668 J	<0.002	0.0924	0.114 J	<0.0003	0.0869	<0.00008	<0.002	<0.002	<0.0005	<0.149	1.13	1.28
	06/13/18	<0.0008	<0.002	0.0186	0.00393	0.0038	<0.002	0.169	0.126 J	0.000448 J	0.18	<0.00008	<0.002	<0.002	<0.0005	0.327	<1.56	1.887
	09/07/18	NA	<0.002	0.0192	0.00704	0.00115	<0.002	0.162	<0.100	0.00118 J	0.203	NA	NA	0.00281 J	NA	<0.243	0.845	1.088
	05/14/19	<0.0008	<0.002	0.0141	0.00281	0.00212	<0.002	0.187	<0.100	0.000595 J	0.172	<0.00008	<0.002	0.00619	<0.0005	0.444	0.615	1.059
H-29	10/21/15	<0.0008	<0.002	0.159	0.000359 J	<0.0003	<0.002	0.0301	<0.1	<0.0003	0.0156	<0.00008	<0.002	<0.002	<0.0005	0.464	1.82	2.28
	12/14/15	<0.0008	<0.002	0.277	<0.0003	<0.0003	0.062	<0.003	0.56	0.000542 J	0.0202	<0.00008	0.00819	0.0282	<0.0005	<0.53	<1.25	<1.78
	02/23/16	<0.0008	0.00203 J	0.151	<0.0003	<0.0003	0.019	<0.003	0.239 J	<0.0003	0.0135	<0.00008	0.00603	0.0148	<0.0005	<0.374	<2.22	<2.594
	04/05/16	<0.0008	<0.002	0.167	<0.0003	<0.0003	0.042	<0.003	0.363 J	<0.0003	0.0175	<0.00008	0.00697	0.0232	<0.0005	<0.228	<0.897	<1.125
	06/07/16	<0.0008	<0.002	0.136	<0.0003	<0.0003	0.0274	<0.003	0.27 J	<0.0003	0.0188	<0.00008	0.00551	0.0152	<0.0005	0.173	<0.834	1.01
	08/09/16	<0.0008	0.00995	0.315	<0.0003	<0.0003	0.00297 J	0.00473 J	<0.1	<0.0003	0.0143	<0.00008	<0.002	<0.002	<0.0005	0.261	<0.578	0.84
	10/18/16	<0.0008	<0.002	0.118	<0.0003	<0.0003	0.00412 J	<0.003	1.15	0.000427J	0.0056 J	<0.00008	0.00305 J	0.0681	<0.0005	0.155	<0.439	0.59
	12/11/16	<0.0008	<0.002	0.0779	<0.0003	<0.0003	<0.002	<0.003	1.4	<0.0003	<0.005	<0.00008	0.00307 J	0.0642	<0.0005	<0.113	<0.599	<0.712
	06/13/18	<0.0008	<0.002	0.0157	0.00345	0.00318	<0.002	0.153	0.123 J	0.000779 J	0.153	<0.00008	<0.002	<0.002	<0.0005	<0.274	<1.62	<1.894
	09/07/18	NA	<0.002	0.0374	0.00513	0.000938	<0.002	0.119	<0.100	0.00172	0.145	NA	NA	0.00374 J	NA	<0.371	<0.71	<1.081
	5/14/2019	<0.0008	<0.002	0.0138	0.00341	0.00219	<0.002	0.183	0.104 J	0.000543 J	0.173	<0.00008	<0.002	0.00616	<0.0005	<0.339	<0.707	<1.046

DRAFT

TABLE 1
APPENDIX IV GROUNDWATER ANALYTICAL DATA SUMMARY
MARTIN LAKE STEAM ELECTRIC STATION
ASH POND AREA

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 Comb.^ (pCi/L)
GWPS:		0.006	0.01	2	0.004	0.005	0.1	0.0564	4	0.015	0.177	0.002	0.1	0.05	0.002	--	--	5
H-31	10/20/15	<0.0008	0.0168	0.0732	0.0126	0.0032	0.00687	0.434	0.889	<0.0003	0.137	<0.00008	<0.002	0.116	<0.0005	0.943	<1.88	2.82
	12/14/15	<0.0008	0.00513	0.0388	0.00702	<0.0003	0.00456 J	0.0651	0.692	<0.0003	0.149	<0.00008	<0.002	0.0231	<0.0005	1.61	<1.29	2.90
	02/23/16	<0.0008	0.00436 J	0.0243	0.0101	<0.0003	<0.002	0.0594	0.921	<0.0003	0.146	<0.00008	<0.002	0.0209	<0.0005	<0.419	<1.64	<2.059
	04/05/16	<0.0008	0.00514	0.0241	0.00925	<0.0003	0.00435 J	0.0685	1.36	<0.0003	0.146	<0.00008	<0.002	0.0226	<0.0005	<0.334	<0.897	<1.231
	06/07/16	<0.0008	0.0038 J	0.0242	0.00789	<0.0003	<0.002	0.0406	0.783	<0.0003	0.157	<0.00008	<0.002	0.0307	<0.0005	0.257	<0.555	0.81
	08/09/16	<0.0008	0.00886	0.0191	0.00734	<0.0003	<0.002	0.286	0.216 J	<0.0003	0.17	<0.00008	<0.002	0.0202	<0.0005	1.31	0.900	2.21
	10/18/16	<0.0008	0.00351 J	0.0215	0.00167 J	<0.0003	<0.002	0.0304 J	0.298 J	<0.0003	0.165	<0.00008	<0.002	0.00567 J	<0.0005	0.169	1.18	1.35
	12/11/16	<0.0008	0.00875 J	0.0189	0.0197	<0.0003	0.00386 J	0.23 J	0.892	<0.0003	0.198	<0.00008	<0.002	0.0365	<0.0005	0.195	<0.754	0.95
	06/12/18	<0.0008	0.00532	0.0194	0.00545	<0.0003	0.003 J	0.236	0.646	<0.0003	0.214	<0.00008	<0.002	0.00475 J	<0.0005	<0.26	<0.597	<0.857
	09/07/18	NA	<0.002	0.0287	<0.0003	<0.0003	<0.002	0.00353 J	0.275 J	<0.0003	0.0187	NA	NA	0.00424 J	NA	<0.261	<0.567	<0.828
	05/14/19	<0.0008	0.00675	0.0163	0.00928	<0.0003	0.00315 J	0.389	0.96	<0.0003	0.219	<0.0004	<0.002	0.0261	<0.0005	2.62	<0.789	3.409
H-32	10/20/15	<0.0008	0.0028 J	0.16	0.00266	<0.0003	<0.002	0.163	0.374 J	<0.0003	0.0788	<0.00008	<0.002	0.00303 J	<0.0005	1.05	<1.90	2.95
	12/14/15	<0.0008	0.0123	0.0384	0.00313	<0.0003	<0.002	0.155	0.619	<0.0003	0.0733	<0.00008	<0.002	<0.002	<0.0005	0.712	<2.21	2.92
	02/23/16	<0.0008	0.00712	0.0277	0.00452	<0.0003	<0.002	0.188	0.701	0.000326 J	0.0821	<0.00008	<0.002	<0.002	<0.0005	1.12	1.60	2.72
	04/05/16	<0.0008	0.00648	0.0237	0.00527	0.00128	<0.002	0.208	1.05	0.00182	0.0818	<0.00008	<0.002	<0.002	<0.0005	<0.364	<1.15	<1.514
	06/07/16	<0.0008	0.00446 J	0.0238	0.00583	0.000997 J	<0.002	0.207	0.858	0.00168	0.087	<0.00008	<0.002	0.00298 J	<0.0005	<0.165	0.613	0.778
	08/09/16	<0.0008	0.00344 J	0.0234	0.00548	0.000713 J	<0.002	0.19	0.68	0.00115	0.0774	<0.00008	<0.002	0.00281 J	<0.0005	2.56	<0.446	3.01
	10/18/16	<0.0008	0.00289 J	0.02	0.00567	0.00254	<0.002	0.204	0.904	0.00332	0.0834	<0.00008	<0.002	0.00267 J	<0.0005	<0.139	0.683	0.82
	12/11/16	<0.0008	0.00246 J	0.0205	0.00609	0.00108	<0.002	0.208	1	0.00137	0.0838	<0.00008	<0.002	0.00237 J	<0.0005	<0.163	<0.753	<0.916
	06/12/18	<0.0008	<0.002	0.0175	0.00681	0.000586 J	<0.002	0.215	1.02	0.000701 J	0.0957	<0.00008	<0.002	<0.002	<0.0005	<0.275	0.917	1.192
	09/07/18	NA	<0.002	0.0404	<0.0003	<0.0003	<0.002	0.00347 J	0.551	<0.0003	0.0195	NA	NA	0.0157	NA	0.343	1.25	1.593
	05/14/19	<0.0008	0.002 J	0.0162	0.00713	0.000366 J	<0.002	0.202	1.15	0.000574 J	0.0978	<0.00008	<0.002	0.00675	<0.0005	0.303	<0.546	<0.849

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 - concentration is below method quantitation limit; result is an estimate.
4. NA = Not analyzed.

LUMINANT

Table 2

Screening of Potential Groundwater Response Technologies
Martin Lake Steam Electric Station
Ash 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 Martin Lake 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

PRELIMINARY

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

LUMINANT

Table 3

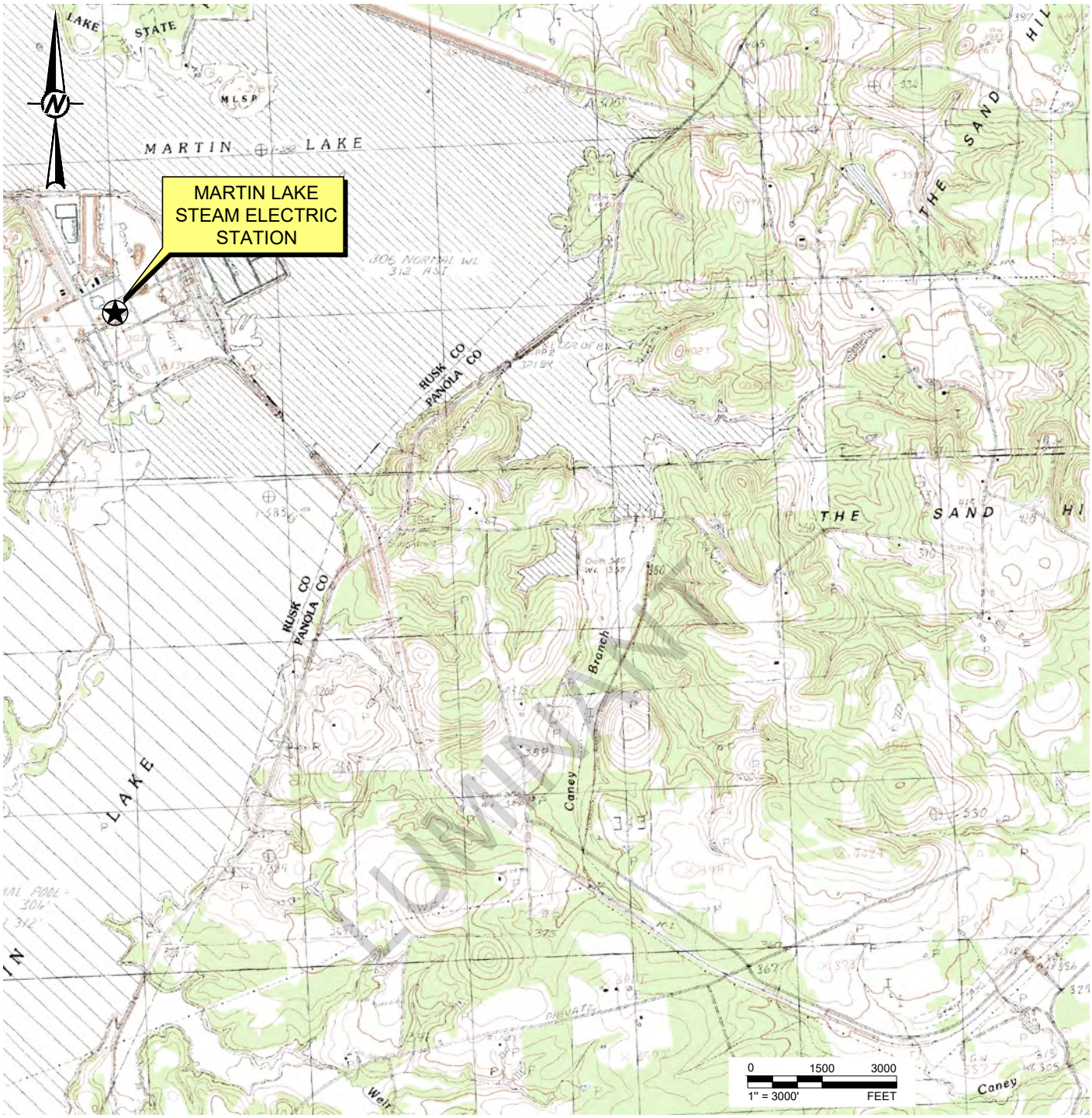
Evaluation of Corrective Measures Alternatives
Martin Lake Steam Electric Station
Ash Ponds

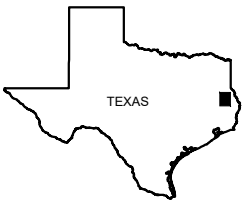
Corrective Measures Alternative	Description	Performance	Reliability	Ease of Implementation	Potential Impacts	Time Requirements	Institutional Requirements
Retrofit Liners in WAP, EAP and NSP with Monitored Natural Attenuation	New Liners in WAP, EAP and NSP. MNA to remove CCR constituents from groundwater and control migration. Groundwater monitoring to verify MNA effectiveness.	New Liners in WAP, EAP and NSP 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 per pond. MNA Implementation: 2-3 years. Groundwater modelling required to assess remediation timeframe.	Minimal regulatory requirements.
Retrofit Liners in WAP, EAP and NSP with Groundwater Extraction and Treatment	New Liners in WAP, EAP and NSP. 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 Martin Lake or re-injected into aquifer. Groundwater monitoring to verify system effectiveness.	New Liners in WAP, EAP and NSP 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 per pond. 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 Liners in WAP, EAP and NSP with Vertical Hydraulic Barrier and Groundwater Extraction and Treatment	New Liners in WAP, EAP and NSP. 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 Liners in WAP, EAP and NSP 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 per pond. 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.

LUMINANT

FIGURES

LUMINANT





QUADRANGLE LOCATION

REFERENCE(S)

BASE MAP TAKEN FROM TNRIS.GOV, TATUM, TX 7.5 MIN. USGS QUADRANGLE DATED 1983.

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
SITE LOCATION MAP

CONSULTANT

GOLDER

YYYY-MM-DD	2019-08-28
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

Last Edited By: adiamond Date: 2019-08-28 Time:12:07:47 PM | Printed By: adiamond Date: 2019-08-28 Time:12:09:57 PM
Path: \\texarkanadata\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 1 - Site Location Map.dwg

LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL
- LAKE WATER/GROUNDWATER MIXING ZONE SAMPLE
- MNA SOIL SAMPLE
- A —— A' CROSS SECTION LOCATION

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/6/17.

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
DETAILED SITE PLAN - ASH POND AREA

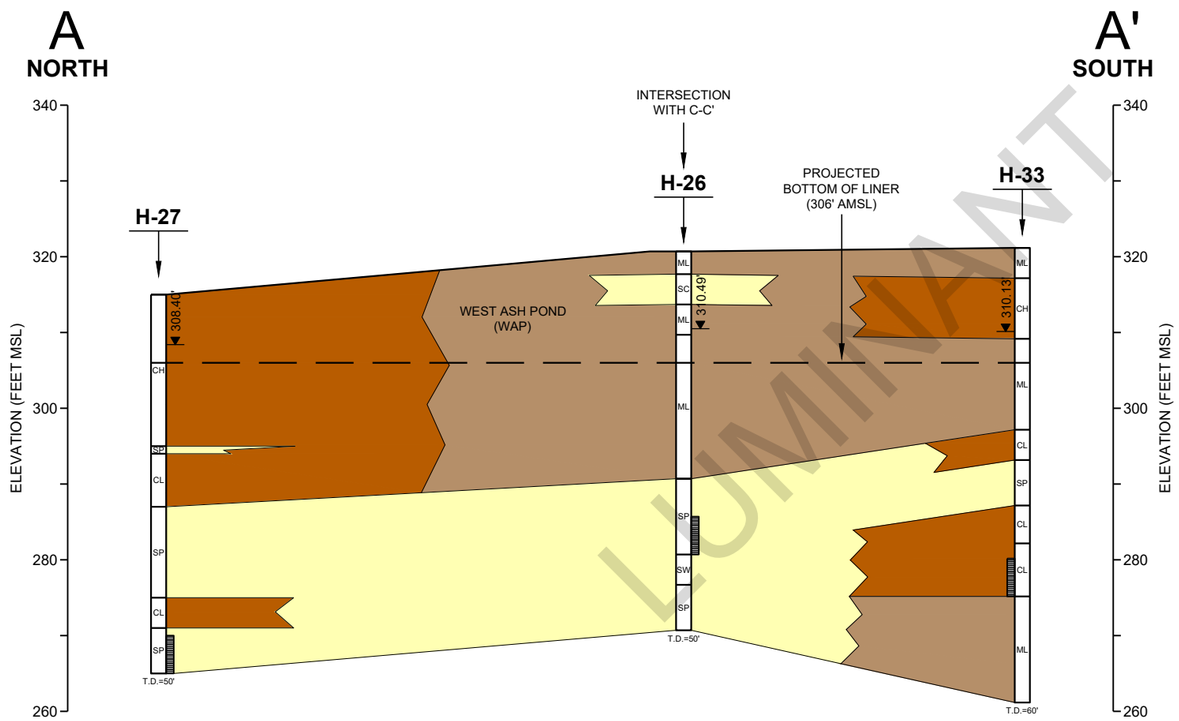
CONSULTANT

GOLDER

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

PROJECT NO.	REV.	FIGURE
19121403	0	2

Last Edited By: adiamond Date: 2019-08-28 Time:12:16:40 PM | Printed By: adiamond Date: 2019-08-28 Time:12:33:09 PM
Path: \\texarkanadata\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 2 - Detailed Site Plan (Ash Pond Area).dwg
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

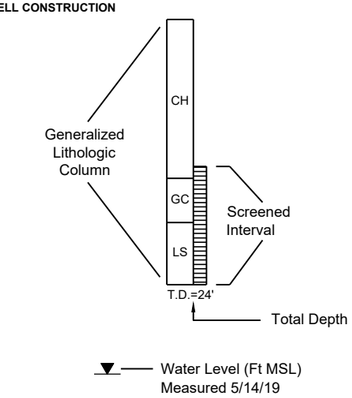


LUMINANT

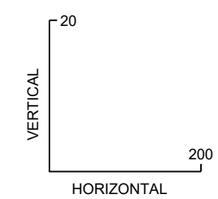
LEGEND

- FILL
- SAND
- CLAY
- SILT

MONITORING WELL CONSTRUCTION



SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
ASH POND AREA - GEOLOGIC CROSS SECTION A-A'
WEST SIDE OF WEST ASH POND
THROUGH PROCESS WATER POND

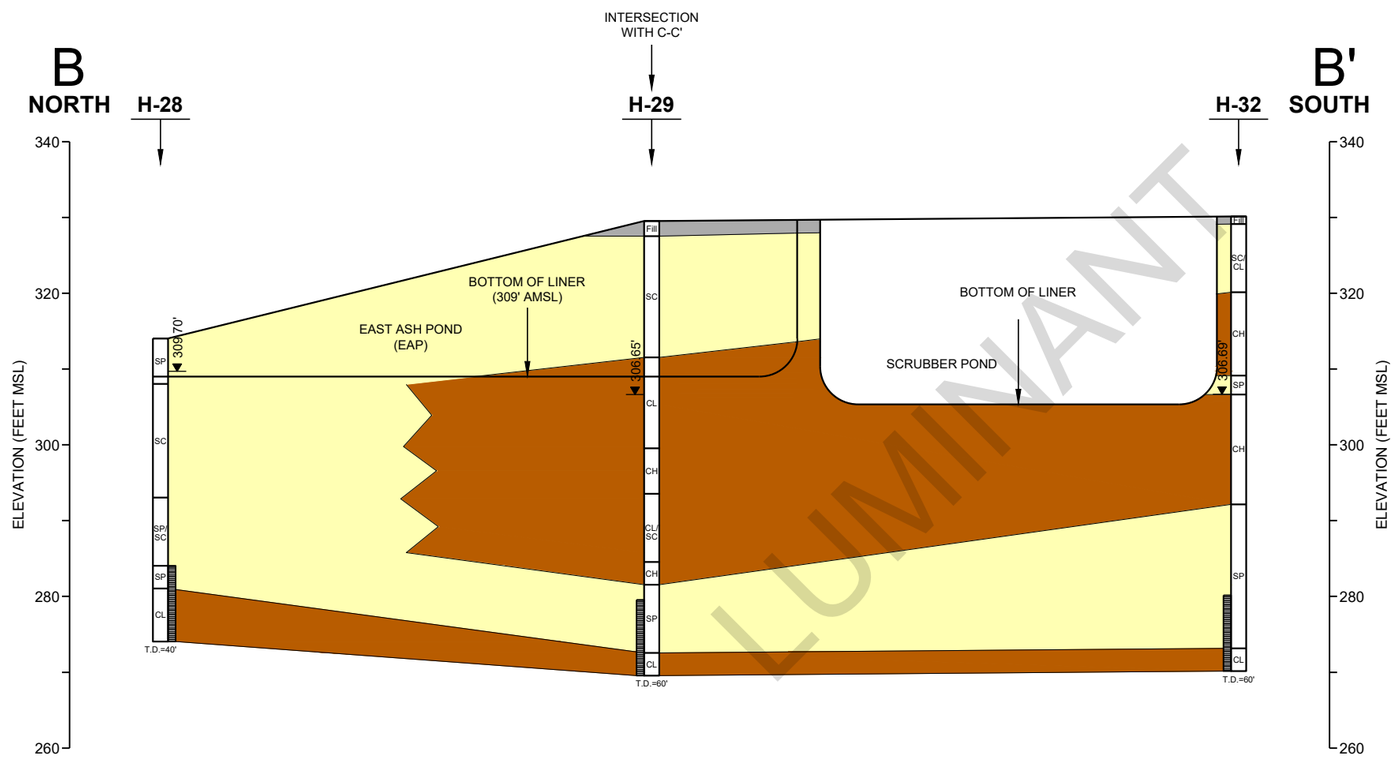
CONSULTANT

GOLDER

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

PROJECT NO.	REV.	FIGURE
19121403	0	3

Path: \\eurkana\data\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 3-5 - Cross Sections.dwg | Last Edited By: adiamond Date: 2019-08-28 Time:2:30:44 PM | Printed By: adiamond Date: 2019-08-28 Time:2:52:58 PM
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
1 in
0

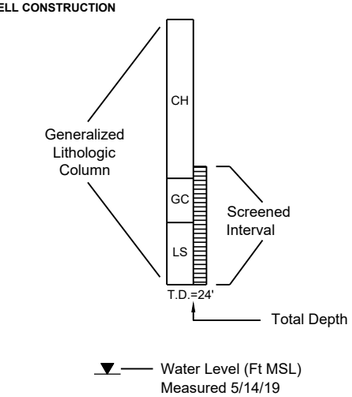


LUMINANT

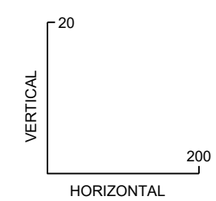
LEGEND

- FILL
- SAND
- CLAY
- SILT

MONITORING WELL CONSTRUCTION



SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
ASH POND AREA - GEOLOGIC CROSS SECTION B-B'
EAST SIDE OF ASH POND THROUGH SCRUBBER POND

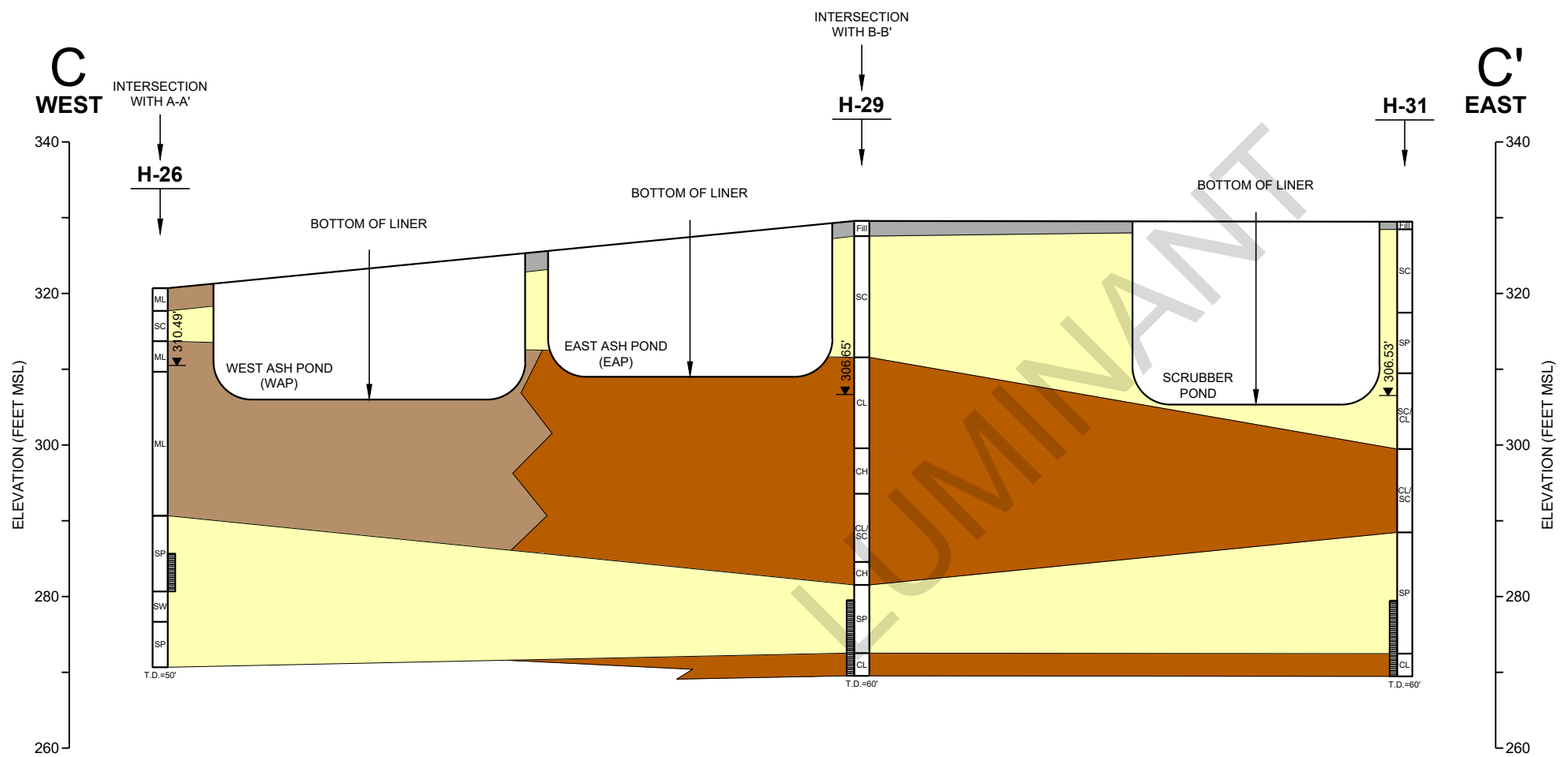
CONSULTANT
GOLDER

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

PROJECT NO.	REV.	FIGURE
19121403	0	4

Path: \\texarkana\data\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 3-5 - Cross Sections.dwg | Last Edited By: adiamond Date: 2019-08-28 Time:2:30:44 PM | Printed By: adiamond Date: 2019-08-28 Time:2:53:35 PM

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

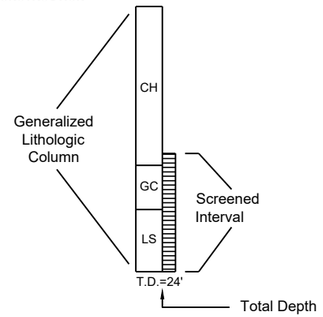


LUMINANT

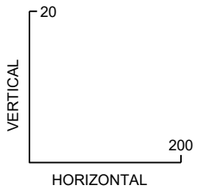
LEGEND

- FILL
- SAND
- CLAY
- SILT

MONITORING WELL CONSTRUCTION



SCALE IN FEET



10x Vertical Exaggeration

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
ASH POND AREA - GEOLOGIC CROSS SECTION C-C' THROUGH WEST ASH POND AND EAST ASH POND

CONSULTANT

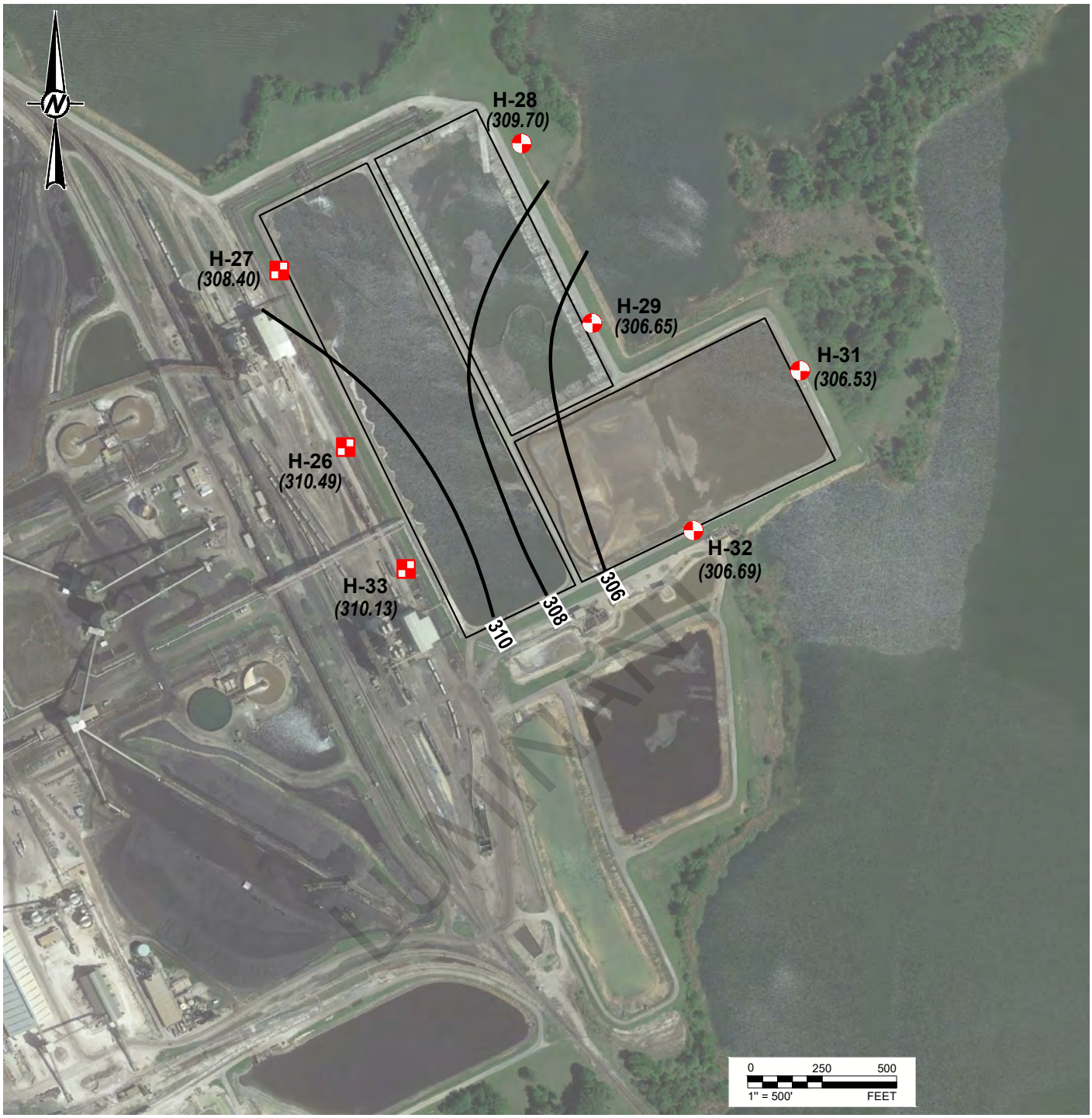
GOLDER

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

PROJECT NO.	REV.	FIGURE
19121403	0	5

Path: \\texarkana\data\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 3-5 - Cross Sections.dwg | Last Edited By: adiamond Date: 2019-08-28 Time:2:30:44 PM | Printed By: adiamond Date: 2019-08-28 Time:2:54:02 PM

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



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL
- (308.70) GROUNDWATER POTENTIOMETRIC SURFACE (FT MSL)
- 308 GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR (C.I. = 1 FT)

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/6/17.

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

TITLE
ASH POND AREA
POTENTIOMETRIC SURFACE MAP
MAY 14, 2019

CONSULTANT

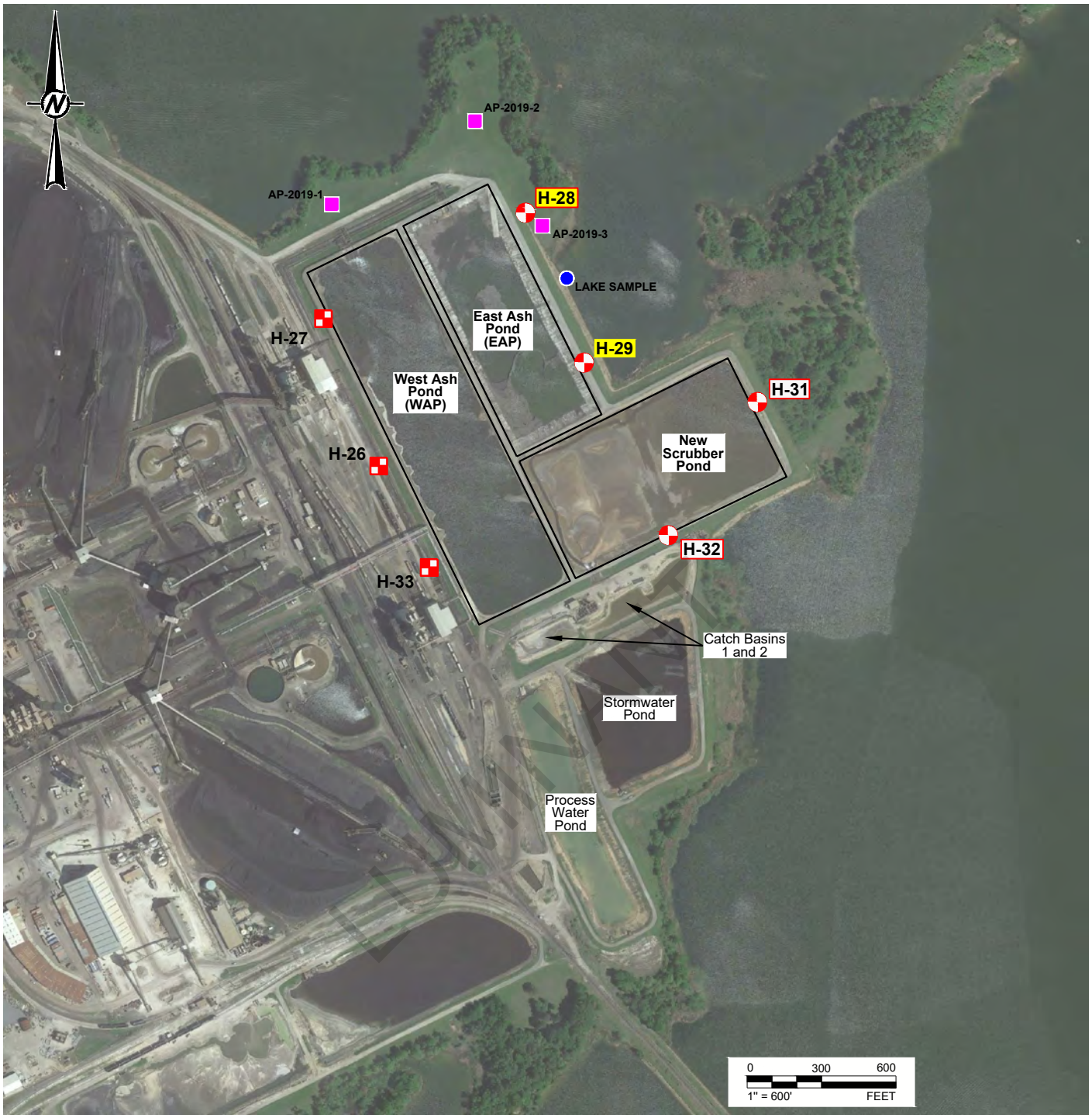
GOLDER

YYYY-MM-DD	2019-06-24
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19122449	0	6

Last Edited By: pmcbride Date: 2019-06-26 Time:12:45:32 PM | Printed By: PMcBride Date: 2019-07-15 Time:11:20:29 AM
Path: \\texarkana.golder.gds\data\Projects - Round Rock\19122449 - Luminant\Martin Lake\ | File Name: FIG 3 - POT Surface Map-Ash Pond Area (May 2019).dwg

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



LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL
- LAKE WATER/GROUNDWATER MIXING ZONE SAMPLE
- MNA SOIL SAMPLE
- SSLs FOR ONE OR MORE APPENDIX IV CONSTITUENTS IN DOWNGRADIENT WELLS BASED ON INITIAL STATISTICAL EVALUATION
- SSLs FOR ONE OR MORE APPENDIX IV CONSTITUENTS IN DOWNGRADIENT WELLS BASED ON UPDATED STATISTICAL EVALUATION

REFERENCE(S)

BASE MAP TAKEN FROM GOOGLE EARTH, IMAGERY DATED 4/6/17.

CLIENT
LUMINANT

PROJECT
MARTIN LAKE STEAM ELECTRIC STATION
TATUM, TEXAS

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

CONSULTANT

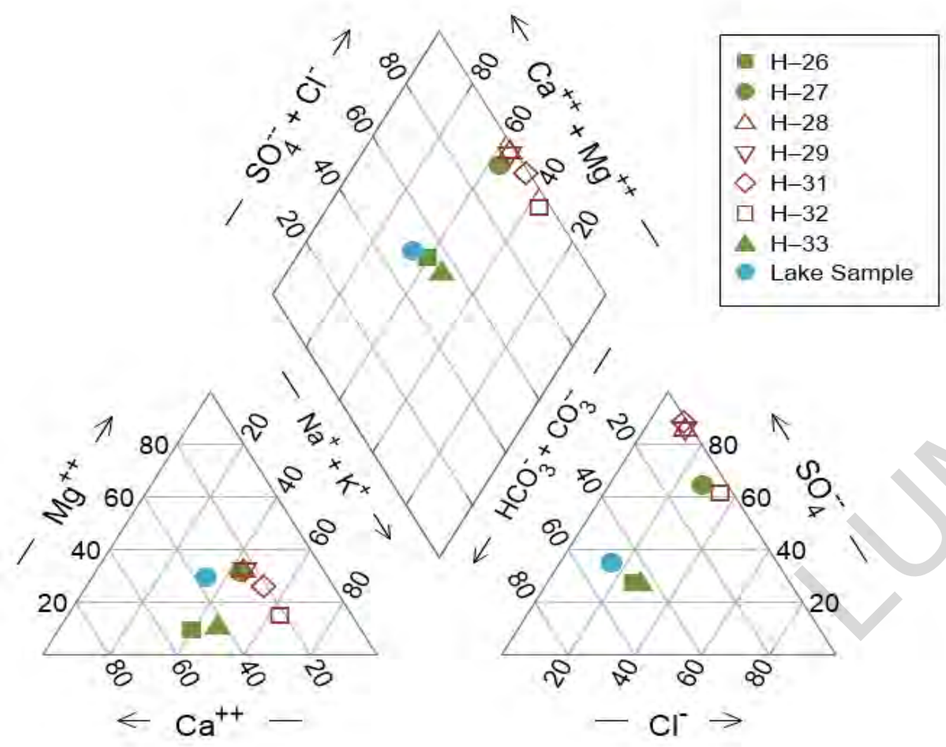
GOLDER

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

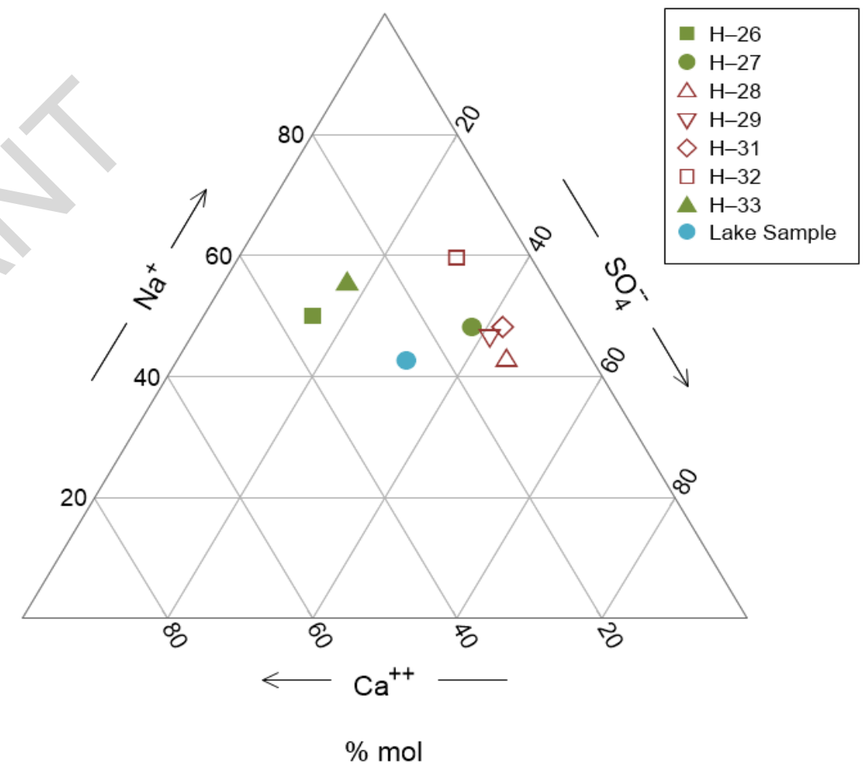
PROJECT NO.	REV.	FIGURE
19121403	0	7

Last Edited By: adiamond Date: 2019-08-29 Time:10:32:26 AM | Printed By: adiamond Date: 2019-08-29 Time:10:42:05 AM
Path: \\texarkanadata\Projects - Round Rock\19121403 - Luminant\Martin Lake Ash Pond Area\ | File Name: FIG 7 - Extent of App IV Constituents (Ash Pond Area).dwg
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

(a)



(b)



LUMINANT

CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

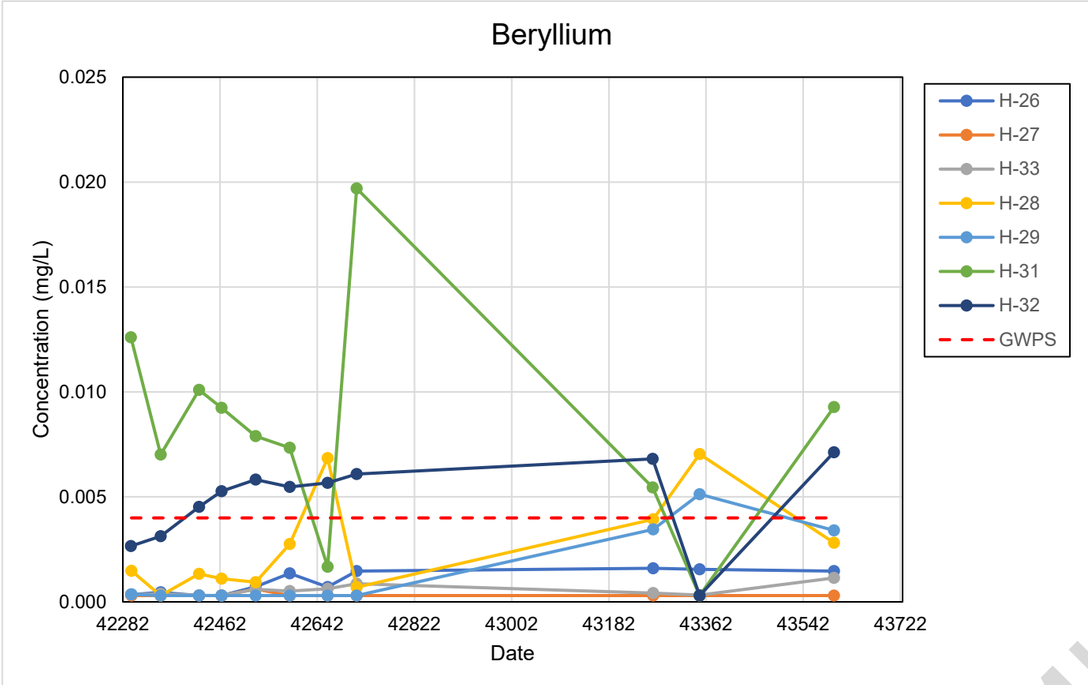
CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

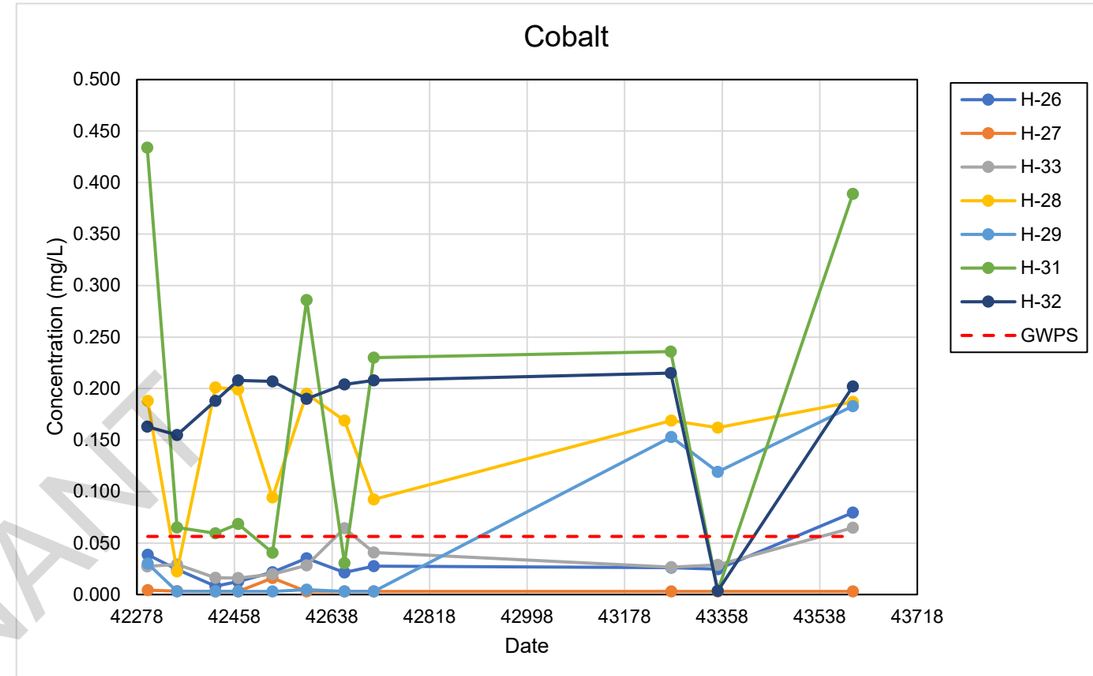
TITLE
MAJOR GROUNDWATER CEHMISTRY (A)
AND SELECT RELATIVE ION ABUNDANCE (B)
IN GROUNDWATER AT MONITORING WELLS

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	8a-b

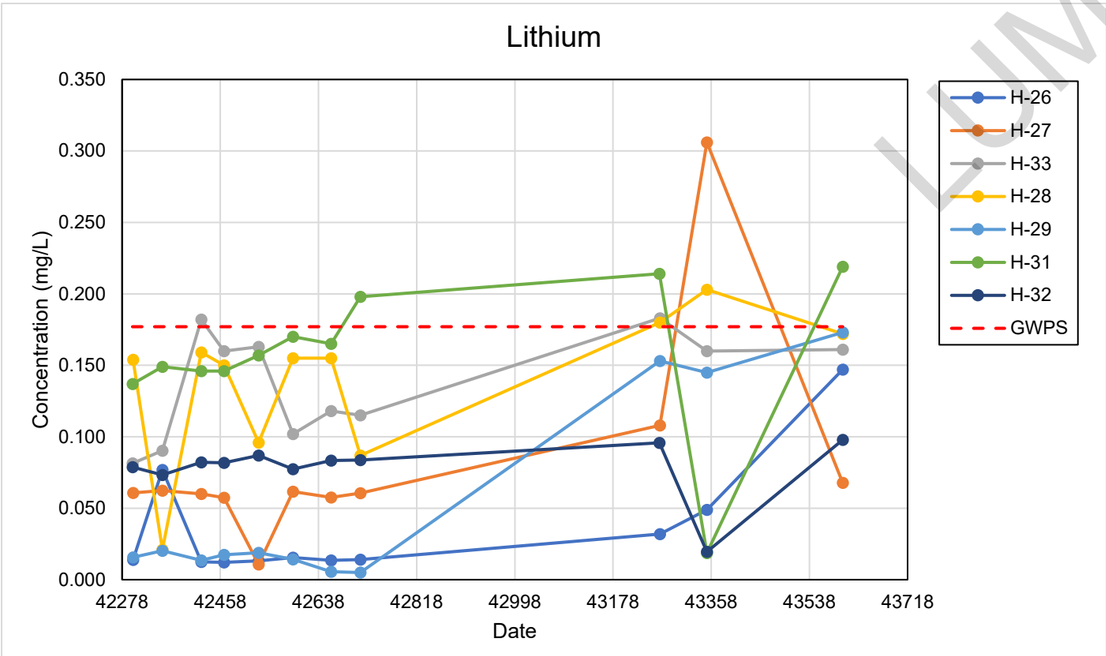
(a)



(b)



(c)



LUMINANT

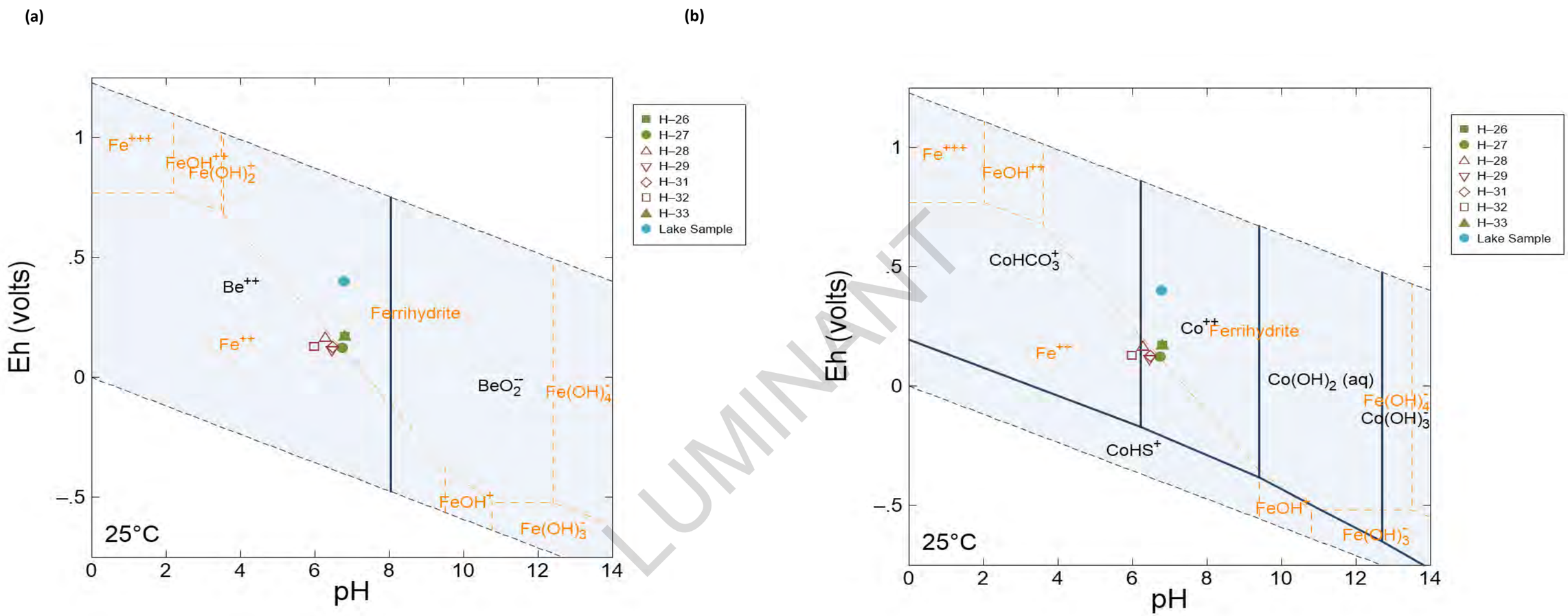
CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
HISTORICAL TRENDS OF BERYLLIUM (A), COBALT (B), AND LITHIUM (C), IN GROUNDWATER AT MONITORING WELLS

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	9a-c



LUMINANT

CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

CONSULTANT
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
SPECIATION OF BERYLLIUM (A), AND
COBALT (B), IN GROUNDWATER

PROJECT NO.	PHASE	REV.	FIGURE
164817101	01	A	10a-b

APPENDIX A

BORING LOGS

LUMINANT

Luminant

Log of Boring: H-26

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	50
Driller's License:	5814M	TOC Elevation (ft. AMSL):	323.701
Logged By:	Ryan Francis	Northing:	1042229019.685
Sampling Method:	4"x10' Core barrel	Easting:	2907068.36

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0			
		CL	(0 - 3) Silty CLAY, dark brown, dry, soft to firm, weak cementation, low plasticity
4	10.0/10.0		(3 - 7) Sandy CLAY, red/orange with gray clay ribbons, dry, soft to firm, weak cementation, medium plasticity, minor rounded pebbles
8		SM	(7 - 11) Silty SAND, gray, dry, soft, weak cementation, subrounded, sharp contact
12	10.0/10.0		
16			
20		SC	(11 - 30) Clayey silty SAND, tan with red and gray ribbons, moist to wet, soft, weak cementation, medium plasticity
24	10.0/10.0		
28			
32			
36	10.0/10.0	SP	(30 - 40) SAND, tan and orange, fine grained, higher clay content (31'-34'), wet, very soft to soft, low to medium plasticity
40		SW	(40 - 44) SAND, red, wet, soft to firm, moderate cementation, heavy iron content, iron concretions ("rocky" texture)
44	10.0/10.0	SP	(44 - 50) SAND, red and gray, wet, soft, fine grained, subrounded, gradual color change to dark brown/black (47'-50'), moisture content decreases with depth, hard sand (48'-50')
48			
52			

LUMINANT

PBW

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

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

Well Materials
(0-35) Casing, 2" Sch 40 FJT PVC
(35-40) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-31') Grout
(31'-33') Bentonite pellets
(33'-40') 20/40 sand

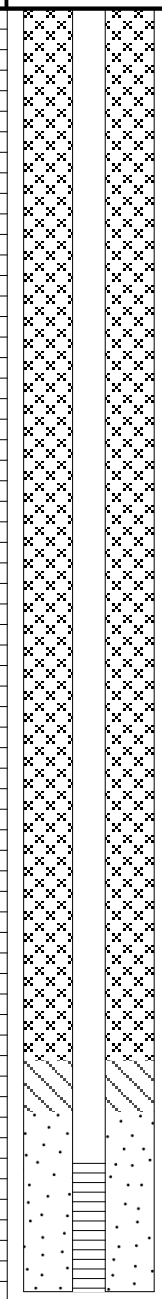
Luminant

Log of Boring: H-27

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	50
Driller's License:	5814M	TOC Elevation (ft. AMSL):	330.423
Logged By:	Ryan Francis	Northing:	1038229615.42
Sampling Method:	4"x10' Core barrel	Easting:	2906850.991

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		10.0/10.0	CL	(0 - 20) CLAY, orange and brown mottling, minor black streaking, blocky, moist, soft to hard, low to high plasticity, dry and variable sand content (5'-7'), wet at 20'
4				
8				
12		10.0/10.0		
16				
20			SP	(20 - 21) SAND, gray, moist, soft, subrounded, sharp contact
24		10.0/10.0	CL	(21 - 28) CLAY, gray and orange, blocky, moist, firm to hard, moderate cementation, low plasticity
28			SP	(28 - 40) SAND, light gray to tan/orange, moist to wet, soft, none to low plasticity, minor clay content decreasing with depth
32		10.0/10.0		
36				
40			CL	(40 - 44) Sandy CLAY, orange and gray, moist, firm, low to medium plasticity, sharp contact, very hard and little to no sand at 43'
44		10.0/10.0	SC	(44 - 50) Clayey SAND, orange and gray, wet, soft, low plasticity, fine grained, decreasing clay content with depth, sharp contact, color change to brown at 48'
48				
52				

LUMINANT

PBW

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

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

Well Materials
(0-45) Casing, 2" Sch 40 FJT PVC
(45-50) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-41') Grout
(41'-43') Bentonite pellets
(43'-50') 20/40 sand

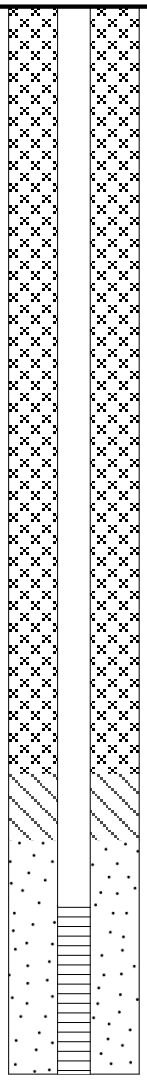
Luminant

Log of Boring: H-28

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/15/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	40
Driller's License:	5814M	TOC Elevation (ft. AMSL):	316.821
Logged By:	Ryan Francis	Northing:	1030230033.689
Sampling Method:	4"x10' Core barrel	Easting:	2907668.815

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0		10.0/10.0		(0 - 6) Soil with SAND, tan, dry, firm, moderate cementation, hard packed, abundant organics
10		10.0/10.0	SC	(6 - 21) Clayey SAND, moist, soft to firm, weak cementation, none to low plasticity, 6" gray fine to very fine sand lense at 10', gray and orange mottling (11'-21'), fine grained
20		10.0/10.0		(21 - 30) Clayey SAND, tan and orange, wet, soft to firm, low plasticity, none to weak cementation, variation in clay content with depth, highest clay content at 21', more orange and less clay (29'-30')
30			SP	(30 - 33) SAND, orange and gray, fine grained, wet, soft, low plasticity, minor clay content, color change from tan to brown to dark gray
34		10.0/10.0	CL	(33 - 40) Silty CLAY, dark gray, moderate sand, dry, hard, weak cementation
40				

LUMINANT

PBW

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

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

Well Materials
(0-27) Casing, 2" Sch 40 FJT PVC
(27-32) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-23') Grout
(23'-25') Bentonite pellets
(25'-32') 20/40 sand

Luminant

Log of Boring: H-29

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/23/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	329.255
Logged By:	Ryan Francis	Northing:	1026229427.784
Sampling Method:	4"x10' Core barrel	Easting:	2907899.511

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0			FILL	(0 - 2) Hard rock road bed, dry
4		10.0/10.0	SC	(2 - 18) Clayey SAND, orange and gray mottling, very fine grained, dry to moist, firm, weak cementation, low to medium plasticity, increasing clay content with depth
8				
12		10.0/10.0		
16				
20			CL	(18 - 30) CLAY, orange, moist, firm, low to medium plasticity, very little sand or silt, black striping at 22', increasing sand content with depth (28'-30')
24		10.0/10.0		
28				
32			CH	(30 - 36) CLAY, orange, moist, soft, friable, high plasticity, minor silt
36		10.0/10.0		
40			CL/SC	(36 - 45) Sandy CLAY/Clayey SAND, orange/gray/red mottling, friable, wet, soft to firm, low to medium plasticity, increasing clay content with depth
44		10.0/10.0		
48			CH	(45 - 48) CLAY with sand, orange and gray mottling, wet, soft, high plasticity
52			SP	(48 - 57) SAND, gray, wet, soft, no to low plasticity, some black roots/ organics, interspersed clay lenses
56		10.0/10.0		
60			CL	(57 - 60) Silty CLAY, gray/brown, dry, hard, weak cementation, sharp contact

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

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

Well Materials
(0-52) Casing, 2" Sch 40 FJT PVC
(52-57) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-48') Grout
(48'-50') Bentonite pellets
(50'-57') 20/40 sand

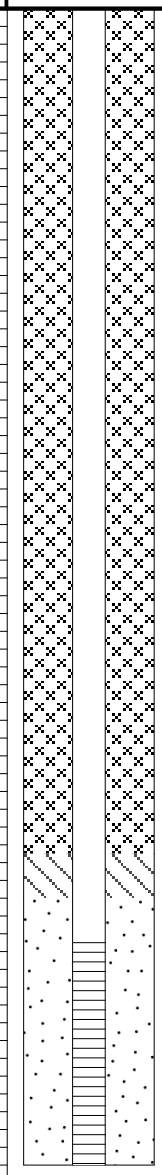
Luminant

Log of Boring: H-31

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/24/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	329.258
Logged By:	Ryan Francis	Northing:	1035229262.289
Sampling Method:	4"x10' Core barrel	Easting:	2908596.681

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0			FILL	(0 - 1) Hard, packed gravel road bed, dry
4, 8		10.0/10.0	SC	(1 - 12) Clayey SAND, orange, dry to moist, soft to firm, low plasticity, fine grained, increasing clay content with depth, gray clay ribbons at 10'
12, 16		5.0/10.0	SP	(12 - 20) SAND, orange with red and gray mottling, dry to moist, soft, none to low plasticity, weak cementation, fine grained, very little clay
20, 24, 28		10.0/10.0	CL	(20 - 30) Sandy CLAY, orange, dry to moist, firm, crumbly, color variation with depth, low plasticity, some gray sand lenses, very fine grained, color change to gray at 29'
32, 36, 40		10.0/10.0	CL/SC	(30 - 41) Sandy CLAY/ Clayey SAND, gray and tan, moist, soft, fine grained, low plasticity, variations in clay content and firmness with depth, moisture content changes to wet at 35'
44, 48, 52, 56		10.0/10.0 10.0/10.0	SP	(41 - 57) SAND, orange/tan, wet, very soft, fine grained, subrounded, increasing red color with depth starting at 52', hard iron concretion layer with some black staining at 55'
60			CL	(57 - 60) Sandy CLAY, gray, dry to moist, hard, fine grained, weak cementation, low plasticity

LUMINANT

PBW

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

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

Well Materials
(0-42) Casing, 2" Sch 40 FJT PVC
(42-52) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-38') Grout
(38'-40') Bentonite pellets
(40'-52') 20/40 sand

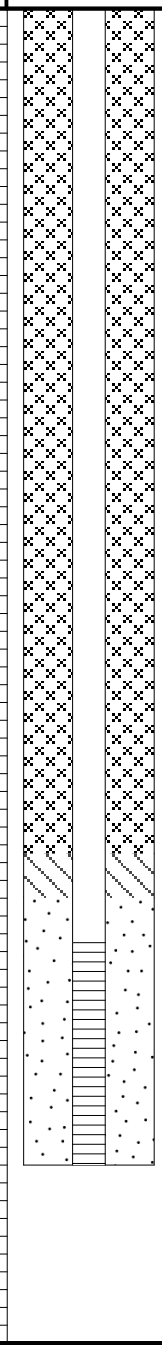
Luminant

Log of Boring: H-32

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/24/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	329.854
Logged By:	Ryan Francis	Northing:	1034228728.295
Sampling Method:	4"x10' Core barrel	Easting:	2908232.588



Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0		FILL	(0 - 1) Hard, packed gravel road bed, dry
4, 8	10.0/10.0	SC/CL	(1 - 10) Sandy CLAY/Clayey SAND, orange/tan, dry, firm, fine grained, low plasticity, weak cementation
12, 16, 20	10.0/10.0	CH	(10 - 21) CLAY with minor silt/sand, orange with some black streaks, moist, firm, high plasticity, gradual contact
20		SP	(21 - 23.5) SAND, gray, dry, soft to firm, friable, fine grained
24, 28, 32, 36	10.0/10.0, 10.0/10.0	CH	(23.5 - 38) CLAY, orange/tan/gray, moist, soft to firm, high plasticity, minor sand at 30', tan and gray with orange stripes (30'-38'), sharp contact
40, 44, 48, 52, 56	10.0/10.0, 10.0/10.0, 10.0/10.0	SP	(38 - 57) SAND, orange/tan, moist to wet, very soft to soft, fine grained, subrounded, minor clay, low plasticity, no clay content at 42', gradual coarsening of sand grains (48'-55'), some gray streakings at 49', color change to reddish brown at 52'
60		CL	(57 - 60) Sandy CLAY, dark red and brown, wet, soft, low plasticity, layer of dark red concretions at 57', weak cementation

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

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

Well Materials
(0-42) Casing, 2" Sch 40 FJT PVC
(42-52) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-38') Grout
(38'-40') Bentonite pellets
(40'-52') 20/40 sand

Luminant

Log of Boring: H-33

Martin Lake Steam Electric Station
Tatum, TX

PBW Project No. 5164B

Completion Date:	9/14/2015	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6.5
Driller:	Timmy Beach	Total Depth (ft):	60
Driller's License:	5814M	TOC Elevation (ft. AMSL):	323.845
Logged By:	Ryan Francis	Northing:	1041228608.597
Sampling Method:	4"x10' Core barrel	Easting:	2907267.556

Depth (ft)	Well Materials	Recovery (ft/ft)	USCS	Lithologic Description
0			CL	(0 - 4) Silty CLAY, minor sand, red and orange with gray ribbons, dry, soft to firm, low to medium plasticity
4		10.0/10.0	CH	(4 - 12) CLAY, red with gray concretions, moist, soft to firm, high plasticity, gradual contact
8				
12		10.0/10.0	ML	(12 - 24) Sandy SILT, gray and red, dry, soft, weak cementation, sharp contact, red and gray clay lens at 19'
16				
20		10.0/10.0	CL	(24 - 28) CLAY, red, moist to wet, soft to firm, high plasticity, pebbles present
24				
28		10.0/10.0	SP	(28 - 34) SAND, gray, wet, soft to firm, minor clay, low to medium plasticity, subrounded, increasing clay content with depth, sharp contact
32				
36		10.0/10.0	CL	(34 - 39) CLAY, orange and gray mottling, dry, very hard, moderate cementation, low plasticity
40				(39 - 46) Sandy CLAY, orange and gray, moist to wet, firm, medium plasticity, weak cementation, increasing sand content with depth
44		10.0/10.0		
48		10.0/10.0	ML	(46 - 60) Sandy SILT, dark gray, dry, hard
52				
56				
60				

LUMINANT

PBW

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

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

Well Materials
(0-41) Casing, 2" Sch 40 FJT PVC
(41-46) Screen, 2" Sch 40 FJT PVC, 0.010" slot

Annular Materials
(0'-37') Grout
(37'-39') Bentonite pellets
(39'-46') 20/40 sand

Luminant

Log of Boring: AP-2019-1

Big Brown Steam Electric Station
Franklin, TX

Golder Project No. 19122434E

Completion Date:	6/3/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	40
Driller's License:	60059	TOC Elevation (ft. AMSL):	
Logged By:	Kelsey Worley	Northing:	3570888
Sampling Method:	4"x10' Core barrel	Easting:	352661.3

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0			(0 - 1) Silty CLAY, brown, roots present, low plasticity, slightly moist
5	10.0/10.0	CL	(1 - 8) Silty CLAY, brown to orange, moist, moderate plasticity, soft to hard
10		SC	(8 - 12.5) Clayey SAND, orange and brown, moist, soft, clay content increases with depth, moderate plasticity
15	10.0/10.0	CH	(12.5 - 22) CLAY, gray to light brown, blocky, moist, firm to stiff, low plasticity
20			
25	10.0/10.0	SW	(22 - 34) SAND, light brown to gray and orange, moist, very fine to fine grained, subrounded, soft to firm, iron staining 22'-23.5', color change to light gray and light brown at 24', saturated at 30'
30			
35	10.0/10.0	SC	(34 - 40) Clayey SAND, gray and tan, becomes gray to dark gray at 35.5', stiff, moist, variations in clay content and firmness with depth
40			

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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.

Luminant

Log of Boring: AP-2019-2

Big Brown Steam Electric Station
Franklin, TX

Golder Project No. 19122434E

Completion Date:	6/3/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	40
Driller's License:	60059	TOC Elevation (ft. AMSL):	
Logged By:	Kelsey Worley	Northing:	3570800
Sampling Method:	4"x10' Core barrel	Easting:	352739.4

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0	10.0/10.0	CL	(0 - 6) Silty CLAY, brown to gray, soft to firm, damp, low plasticity
5			
			(6 - 11) Sandy CLAY, red and orange with gray, clay ribbons, damp, soft to firm, weak cementation, moderate plasticity
10	10.0/10.0	SC	(11 - 20) Clayey Silty SAND, tan with red and gray, clay ribbons, moist, firm, weak cementation, moderate plasticity
15			
20		SW	(20 - 22) SAND, light brown, moist to wet, fine grained, subrounded, soft
25	10.0/10.0	SC	(22 - 34) Clayey SAND, gray and tan, becomes gray to dark, gray at 26', stiff, moist, brown clay ribbons from 27'-29.5'
30			
35	10.0/10.0	SW	(34 - 40) SAND, gray, very fine to fine grained, wet, subrounded, soft to firm, saturated 35'-38', black organics at 38.8'-40.0'
40			

LUMINANT

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.

Luminant

Log of Boring: AP-2019-3

Big Brown Steam Electric Station
Franklin, TX

Golder Project No. 19122434E

Completion Date:	6/3/2019	Drilling Method:	Sonic
Drilling Company:	Walker-Hill Environmental	Borehole Diameter (in.):	6
Driller:	Rodney Labrosse	Total Depth (ft):	30
Driller's License:	60059	TOC Elevation (ft. AMSL):	
Logged By:	Kelsey Worley	Northing:	352739.4
Sampling Method:	4"x10' Core barrel	Easting:	3570800

Depth (ft)	Recovery (ft/ft)	USCS	Lithologic Description
0		SM	(0 - 6) Silty SAND, light brown, firm, moderate cementation, roots present 0'-1.5'
5	10.0/10.0		
			(6 - 11) Clayey SAND, orange to brown, moist, soft to firm, no plasticity, weak cementation, gray sand lense, fine grained, at 11', fine to very fine grained
10		SC	
15	10.0/10.0		(11 - 18) Clayey SAND, wet, gray and tan to orange, soft to firm, sand content increases with depth
20		SP	(18 - 25) SAND, orange and gray, saturated, fine grained, soft, no cementation
25	10.0/10.0	CL	(25 - 30) Silty CLAY, dark gray, dry, hard, moderate sand content, weak cementation
30			

LUMINANT

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

LUMINANT

June 14, 2019

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

Order No.: 1905168

RE: Luminant-MLSES Ash Ponds

Dear Will Vienne:

DHL Analytical, Inc. received 7 sample(s) on 5/15/2019 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

LUMINANT

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

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Subcontract Report 1905168 57

LUMINANT

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

№ 86479

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: 5-14-19 PAGE 1 OF 1
PO #:
DHL WORK ORDER #: 1905168
PROJECT LOCATION OR NAME: LUMINANT- MLSES ASH PONDS
CLENT PROJECT #: 19122262-C COLLECTOR: J. BRAYTON

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

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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	ANALYSES																							FIELD NOTES
												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 PCB ☐	8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐	8321 HERB ☐ T PHOS, AMMONIA ☐	METALS 6020 ☐ METALS 2008 ☐ 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, NO_3, + POT, Na, Mg, K	FERROUS & FERRIC IRON	
H-31	01	5-14-19	0740	W		7				X																					X	X	X		
H-32	02		0825	W		7				X																					X	X	X		
H-27	03		0940	W		7				X																					X	X	X		
H-29	04		1125	W		7				X																					X	X	X		
H-28	05		1230	W		7				X																					X	X	X		
H-26	06		1425	W		7				X																					X	X	X		
H-33	07		1530	W		7				X																					X	X	X		

LUMINANT

RELINQUISHED BY: (Signature) DATE/TIME 5-14-19 RECEIVED BY: (Signature) Fed Ex
RELINQUISHED BY: (Signature) Fed Ex DATE/TIME 5/15/19 0943 RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (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: 4.5/3.0°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

LUMINANT

ORIGIN ID:GGGA (512) 671-3436
J . BRAYTON
GOLDER
2201 DOUBLE CREEK DR

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 14MAY19
ACTWGT: 48.70 LB
CAD: 006994186/SSFE2002
DIMS: 23x13x13 IN

BILL THIRD PARTY

Part # 156287-998224-FEDEX 10/19

TO

DHL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664
(512) 388-8222 REF:
INV:
PO: DEPT:

FedEx Express

J1910100701 AR

4 of 4

MPS# 0263 7872 5506 5879

Mstr# 7872 5506 5846 0201

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US AUS

ORIGINAL

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

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 14MAY19
ACTWGT: 50.90 LB
CAD: 006994166/SSFE2002
DIMS: 23x14x14 IN

BILL THIRD PARTY

Part # 156297 DHL: 7872 5506 5857 10/19

TO

DHL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664
(512) 388-6222 REF:
INV:
PO: DEPT:

FedEx Express

J101010101010

2 of 4

MPS# 0263 7872 5506 5857

Mstr# 7872 5506 5846 0201

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US AUS

LAMINATE

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder

Date Received: 5/15/2019

Work Order Number 1905168

Received by EL

Checklist completed by: Signature 5/15/2019 Date

Reviewed by DL Initials 5/15/2019 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 ☐	4.5 °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

LUMINANT

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

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Page 1 of 1

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.

LUMINANT

LOG IN

The samples were received and log-in performed on 5/15/19. A total of 7 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 5/20/19 and 5/21/19 the matrix spike and matrix spike duplicate recoveries were out of control limits for a total of four 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 peformed on 5/20/19 LCVL6-190520 was slightly above control limits for Sodium. This is flagged accordingly. The associated CCV6-190520 was within control limits for this analyte. No further corrective actions were taken.

ANIONS ANALYSIS

For Anions analysis performed on 5/15/19 (batch 90908) the matrix spike and matrix spike duplicate recoveries (1905167-02 MS/MSD) were out of control limits for Chloride and Sulfate. This was due to matrix effect. 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.

FERRIC IRON (CALCULATION)

For Ferric Iron calculation the Ferrous Iron result was slightly higher than the total Iron result for sample H-31. This is within the acceptable variation limits. No further corrective actions were taken.

LUMINANT

DHL Analytical, Inc.

Date: *14-Jun-19*

CLIENT: Golder
Project: Luminant-MLSES Ash Ponds
Lab Order: 1905168

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905168-01	H-31		05/14/19 07:40 AM	5/15/2019
1905168-02	H-32		05/14/19 08:25 AM	5/15/2019
1905168-03	H-27		05/14/19 09:40 AM	5/15/2019
1905168-04	H-29		05/14/19 11:25 AM	5/15/2019
1905168-05	H-28		05/14/19 12:30 PM	5/15/2019
1905168-06	H-26		05/14/19 02:25 PM	5/15/2019
1905168-07	H-33		05/14/19 03:30 PM	5/15/2019

LUMINANT

DHL Analytical, Inc.

14-Jun-19

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905168-01A	H-31	05/14/19 07:40 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
	H-31	05/14/19 07:40 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-01B	H-31	05/14/19 07:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-31	05/14/19 07:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-31	05/14/19 07:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-31	05/14/19 07:40 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
	H-31	05/14/19 07:40 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-01C	H-31	05/14/19 07:40 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-31	05/14/19 07:40 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-31	05/14/19 07:40 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-31	05/14/19 07:40 AM	Aqueous	E300	Anion Preparation	05/16/19 09:16 AM	90935
	H-31	05/14/19 07:40 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-31	05/14/19 07:40 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-02A	H-32	05/14/19 08:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
	H-32	05/14/19 08:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-02B	H-32	05/14/19 08:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-32	05/14/19 08:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-32	05/14/19 08:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-32	05/14/19 08:25 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-02C	H-32	05/14/19 08:25 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-32	05/14/19 08:25 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-32	05/14/19 08:25 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-32	05/14/19 08:25 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-32	05/14/19 08:25 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-03A	H-27	05/14/19 09:40 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-03B	H-27	05/14/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-27	05/14/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-27	05/14/19 09:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905168-03B	H-27	05/14/19 09:40 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-03C	H-27	05/14/19 09:40 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-27	05/14/19 09:40 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-27	05/14/19 09:40 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-27	05/14/19 09:40 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-27	05/14/19 09:40 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-04A	H-29	05/14/19 11:25 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-04B	H-29	05/14/19 11:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-29	05/14/19 11:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-29	05/14/19 11:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-29	05/14/19 11:25 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-04C	H-29	05/14/19 11:25 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-29	05/14/19 11:25 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-29	05/14/19 11:25 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-29	05/14/19 11:25 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-29	05/14/19 11:25 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-05A	H-28	05/14/19 12:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-05B	H-28	05/14/19 12:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-28	05/14/19 12:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-28	05/14/19 12:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-28	05/14/19 12:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-05C	H-28	05/14/19 12:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-28	05/14/19 12:30 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-28	05/14/19 12:30 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-28	05/14/19 12:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-28	05/14/19 12:30 PM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-06A	H-26	05/14/19 02:25 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-06B	H-26	05/14/19 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905168-06B	H-26	05/14/19 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-26	05/14/19 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-26	05/14/19 02:25 PM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-06C	H-26	05/14/19 02:25 PM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-26	05/14/19 02:25 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-26	05/14/19 02:25 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-26	05/14/19 02:25 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-26	05/14/19 02:25 PM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905168-07A	H-33	05/14/19 03:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905168-07B	H-33	05/14/19 03:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-33	05/14/19 03:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-33	05/14/19 03:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/17/19 08:40 AM	90959
	H-33	05/14/19 03:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905168-07C	H-33	05/14/19 03:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	H-33	05/14/19 03:30 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-33	05/14/19 03:30 PM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	H-33	05/14/19 03:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	H-33	05/14/19 03:30 PM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905168-01A	H-31	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-31	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:55 PM	UV/VIS_2_190520A
	H-31	Aqueous	M3500-Fe D	Ferrous Iron	91002	100	05/20/19 04:11 PM	UV/VIS_2_190520A
1905168-01B	H-31	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:16 AM	CETAC2_HG_190522A
	H-31	Aqueous	SW7470A	Mercury Total: Aqueous	91017	5	05/22/19 11:21 AM	CETAC2_HG_190522A
	H-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:43 PM	ICP-MS4_190520B
	H-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	50	05/21/19 12:54 PM	ICP-MS5_190521A
	H-31	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:51 PM	ICP-MS5_190521A
1905168-01C	H-31	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:13 PM	TITRATOR_190516A
	H-31	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 02:27 PM	IC2_190515A
	H-31	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 05:55 PM	IC2_190515A
	H-31	Aqueous	E300	Anions by IC method - Water	90935	100	05/16/19 05:42 PM	IC4_190516A
	H-31	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 02:47 PM	UV/VIS_2_190515B
	H-31	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905168-02A	H-32	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-32	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:55 PM	UV/VIS_2_190520A
	H-32	Aqueous	M3500-Fe D	Ferrous Iron	91002	5	05/20/19 04:11 PM	UV/VIS_2_190520A
1905168-02B	H-32	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:27 AM	CETAC2_HG_190522A
	H-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:53 PM	ICP-MS5_190521A
	H-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	10	05/21/19 12:56 PM	ICP-MS5_190521A
	H-32	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:45 PM	ICP-MS4_190520B
1905168-02C	H-32	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:15 PM	TITRATOR_190516A
	H-32	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 02:43 PM	IC2_190515A
	H-32	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 06:11 PM	IC2_190515A
	H-32	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:49 PM	UV/VIS_2_190515B
	H-32	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905168-03A	H-27	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-27	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:56 PM	UV/VIS_2_190520A
1905168-03B	H-27	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:29 AM	CETAC2_HG_190522A
	H-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:47 PM	ICP-MS4_190520B
	H-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	10	05/21/19 12:59 PM	ICP-MS5_190521A
	H-27	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:14 PM	ICP-MS5_190521A
1905168-03C	H-27	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:20 PM	TITRATOR_190516A
	H-27	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 02:59 PM	IC2_190515A
	H-27	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 06:27 PM	IC2_190515A
	H-27	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:49 PM	UV/VIS_2_190515B
	H-27	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905168-04A	H-29	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-29	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:56 PM	UV/VIS_2_190520A
1905168-04B	H-29	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:31 AM	CETAC2_HG_190522A
	H-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:49 PM	ICP-MS4_190520B
	H-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:55 PM	ICP-MS5_190521A
	H-29	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	20	05/21/19 01:01 PM	ICP-MS5_190521A
1905168-04C	H-29	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:23 PM	TITRATOR_190516A
	H-29	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 03:15 PM	IC2_190515A
	H-29	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 06:43 PM	IC2_190515A
	H-29	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:49 PM	UV/VIS_2_190515B
	H-29	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905168-05A	H-28	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-28	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:57 PM	UV/VIS_2_190520A
1905168-05B	H-28	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:34 AM	CETAC2_HG_190522A
	H-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	20	05/21/19 01:03 PM	ICP-MS5_190521A

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905168-05B	H-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:57 PM	ICP-MS5_190521A
	H-28	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:51 PM	ICP-MS4_190520B
1905168-05C	H-28	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:27 PM	TITRATOR_190516A
	H-28	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 03:31 PM	IC2_190515A
	H-28	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 06:59 PM	IC2_190515A
	H-28	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:50 PM	UV/VIS_2_190515B
	H-28	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905168-06A	H-26	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-26	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:57 PM	UV/VIS_2_190520A
1905168-06B	H-26	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:36 AM	CETAC2_HG_190522A
	H-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:53 PM	ICP-MS4_190520B
	H-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	10	05/21/19 01:05 PM	ICP-MS5_190521A
	H-26	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:16 PM	ICP-MS5_190521A
1905168-06C	H-26	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:42 PM	TITRATOR_190516A
	H-26	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 03:47 PM	IC2_190515A
	H-26	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 07:15 PM	IC2_190515A
	H-26	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:50 PM	UV/VIS_2_190515B
	H-26	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905168-07A	H-33	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	H-33	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:58 PM	UV/VIS_2_190520A
1905168-07B	H-33	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:38 AM	CETAC2_HG_190522A
	H-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/20/19 03:54 PM	ICP-MS4_190520B
	H-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	10	05/21/19 01:08 PM	ICP-MS5_190521A
	H-33	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90959	1	05/21/19 02:19 PM	ICP-MS5_190521A
1905168-07C	H-33	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:49 PM	TITRATOR_190516A
	H-33	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 04:03 PM	IC2_190515A
	H-33	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 07:31 PM	IC2_190515A

LUMINANT

Lab Order: 1905168
Client: Golder
Project: Luminant-MLSES Ash Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905168-07C	H-33	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 12:50 PM	UV/VIS_2_190515B
	H-33	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D

LUMINANT

DHL Analytical, Inc.

Date: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-31
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-01
Project No:	19122262-C	**Collection Date:**	05/14/19 07:40 AM
Lab Order:	1905168	**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	05/20/19 03:43 PM
Arsenic	0.00675	0.00200	0.00500		mg/L	1	05/20/19 03:43 PM
Barium	0.0163	0.00300	0.0100		mg/L	1	05/20/19 03:43 PM
Beryllium	0.00928	0.000300	0.00100		mg/L	1	05/20/19 03:43 PM
Boron	20.0	0.500	1.50		mg/L	50	05/21/19 12:54 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:43 PM
Calcium	234	5.00	15.0		mg/L	50	05/21/19 12:54 PM
Chromium	0.00315	0.00200	0.00500	J	mg/L	1	05/20/19 03:43 PM
Cobalt	0.389	0.00300	0.00500		mg/L	1	05/20/19 03:43 PM
Iron	48.7	1.50	5.00		mg/L	50	05/21/19 12:54 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:43 PM
Lithium	0.219	0.00500	0.0100		mg/L	1	05/20/19 03:43 PM
Magnesium	170	5.00	15.0		mg/L	50	05/21/19 12:54 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:51 PM
Potassium	6.18	0.100	0.300		mg/L	1	05/20/19 03:43 PM
Selenium	0.0261	0.00200	0.00500		mg/L	1	05/20/19 03:43 PM
Sodium	672	5.00	15.0		mg/L	50	05/21/19 12:54 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:43 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.000400	0.000400	0.00100		mg/L	5	05/22/19 11:21 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	225	3.00	10.0		mg/L	10	05/15/19 02:27 PM
Fluoride	0.960	0.100	0.400		mg/L	1	05/15/19 05:55 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/15/19 05:55 PM
Sulfate	2470	100	300		mg/L	100	05/16/19 05:42 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	33.9	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:13 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:13 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:13 PM
Alkalinity, Total (As CaCO3)	33.9	20.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:13 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	49.5	5.00	10.0	N	mg/L	100	05/20/19 04:11 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-31
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-01
Project No:	19122262-C	**Collection Date:**	05/14/19 07:40 AM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0770	0.0300	0.100	J	mg/L	1	05/15/19 02:47 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4230	50.0	50.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-32
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-02
Project No:	19122262-C	**Collection Date:**	05/14/19 08:25 AM
Lab Order:	1905168	**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	05/20/19 03:45 PM
Arsenic	0.00202	0.00200	0.00500	J	mg/L	1	05/20/19 03:45 PM
Barium	0.0162	0.00300	0.0100		mg/L	1	05/20/19 03:45 PM
Beryllium	0.00713	0.000300	0.00100		mg/L	1	05/20/19 03:45 PM
Boron	2.08	0.100	0.300		mg/L	10	05/21/19 12:56 PM
Cadmium	0.000366	0.000300	0.00100	J	mg/L	1	05/20/19 03:45 PM
Calcium	45.2	1.00	3.00		mg/L	10	05/21/19 12:56 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:45 PM
Cobalt	0.202	0.00300	0.00500		mg/L	1	05/20/19 03:45 PM
Iron	1.81	0.0300	0.100		mg/L	1	05/20/19 03:45 PM
Lead	0.000574	0.000300	0.00100	J	mg/L	1	05/20/19 03:45 PM
Lithium	0.0978	0.00500	0.0100		mg/L	1	05/20/19 03:45 PM
Magnesium	18.5	0.100	0.300		mg/L	1	05/20/19 03:45 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:53 PM
Potassium	2.57	0.100	0.300		mg/L	1	05/20/19 03:45 PM
Selenium	0.00675	0.00200	0.00500		mg/L	1	05/20/19 03:45 PM
Sodium	151	1.00	3.00		mg/L	10	05/21/19 12:56 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:45 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:27 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	135	3.00	10.0		mg/L	10	05/15/19 02:43 PM
Fluoride	1.15	0.100	0.400		mg/L	1	05/15/19 06:11 PM
Nitrate-N	273	1.00	5.00		mg/L	10	05/15/19 02:43 PM
Sulfate	320	10.0	30.0		mg/L	10	05/15/19 02:43 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 1.76	1	05/16/19 04:15 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 1.76	1	05/16/19 04:15 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 1.76	1	05/16/19 04:15 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 1.76	1	05/16/19 04:15 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.640	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	1.17	0.250	0.500	N	mg/L	5	05/20/19 04:11 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-32
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-02
Project No:	19122262-C	**Collection Date:**	05/14/19 08:25 AM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0600	0.0300	0.100	J	mg/L	1	05/15/19 12:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	910	50.0	50.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-27
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-03
Project No:	19122262-C	**Collection Date:**	05/14/19 09:40 AM
Lab Order:	1905168	**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	05/20/19 03:47 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:47 PM
Barium	0.0208	0.00300	0.0100		mg/L	1	05/20/19 03:47 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:47 PM
Boron	0.350	0.0100	0.0300		mg/L	1	05/21/19 02:14 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:47 PM
Calcium	61.8	1.00	3.00		mg/L	10	05/21/19 12:59 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:47 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/20/19 03:47 PM
Iron	0.0711	0.0300	0.100	J	mg/L	1	05/20/19 03:47 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:47 PM
Lithium	0.0678	0.00500	0.0100		mg/L	1	05/20/19 03:47 PM
Magnesium	47.3	1.00	3.00		mg/L	10	05/21/19 12:59 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:14 PM
Potassium	3.01	0.100	0.300		mg/L	1	05/20/19 03:47 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:47 PM
Sodium	123	1.00	3.00		mg/L	10	05/21/19 12:59 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:47 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:29 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	132	3.00	10.0		mg/L	10	05/15/19 02:59 PM
Fluoride	0.159	0.100	0.400	J	mg/L	1	05/15/19 06:27 PM
Nitrate-N	0.658	0.100	0.500		mg/L	1	05/15/19 06:27 PM
Sulfate	406	10.0	30.0		mg/L	10	05/15/19 02:59 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	49.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:20 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:20 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:20 PM
Alkalinity, Total (As CaCO3)	49.0	20.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:20 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0711	0.0500	0.100	JN	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:56 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-27
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-03
Project No:	19122262-C	**Collection Date:**	05/14/19 09:40 AM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.126	0.0300	0.100		mg/L	1	05/15/19 12:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	897	10.0	10.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-29
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-04
Project No:	19122262-C	**Collection Date:**	05/14/19 11:25 AM
Lab Order:	1905168	**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	05/20/19 03:49 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:49 PM
Barium	0.0138	0.00300	0.0100		mg/L	1	05/20/19 03:49 PM
Beryllium	0.00341	0.000300	0.00100		mg/L	1	05/20/19 03:49 PM
Boron	8.12	0.200	0.600		mg/L	20	05/21/19 01:01 PM
Cadmium	0.00219	0.000300	0.00100		mg/L	1	05/20/19 03:49 PM
Calcium	95.9	2.00	6.00		mg/L	20	05/21/19 01:01 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:49 PM
Cobalt	0.183	0.00300	0.00500		mg/L	1	05/20/19 03:49 PM
Iron	0.0521	0.0300	0.100	J	mg/L	1	05/20/19 03:49 PM
Lead	0.000543	0.000300	0.00100	J	mg/L	1	05/20/19 03:49 PM
Lithium	0.173	0.00500	0.0100		mg/L	1	05/20/19 03:49 PM
Magnesium	80.5	2.00	6.00		mg/L	20	05/21/19 01:01 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:55 PM
Potassium	2.01	0.100	0.300		mg/L	1	05/20/19 03:49 PM
Selenium	0.00616	0.00200	0.00500		mg/L	1	05/20/19 03:49 PM
Sodium	211	2.00	6.00		mg/L	20	05/21/19 01:01 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:49 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:31 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	81.8	3.00	10.0		mg/L	10	05/15/19 03:15 PM
Fluoride	0.104	0.100	0.400	J	mg/L	1	05/15/19 06:43 PM
Nitrate-N	0.121	0.100	0.500	J	mg/L	1	05/15/19 06:43 PM
Sulfate	780	10.0	30.0		mg/L	10	05/15/19 03:15 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:23 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:23 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:23 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:23 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0521	0.0500	0.100	JN	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:56 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-29
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-04
Project No:	19122262-C	**Collection Date:**	05/14/19 11:25 AM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0570	0.0300	0.100	J	mg/L	1	05/15/19 12:49 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1400	50.0	50.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-28
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-05
Project No:	19122262-C	**Collection Date:**	05/14/19 12:30 PM
Lab Order:	1905168	**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	05/20/19 03:51 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:51 PM
Barium	0.0141	0.00300	0.0100		mg/L	1	05/20/19 03:51 PM
Beryllium	0.00281	0.000300	0.00100		mg/L	1	05/20/19 03:51 PM
Boron	8.51	0.200	0.600		mg/L	20	05/21/19 01:03 PM
Cadmium	0.00212	0.000300	0.00100		mg/L	1	05/20/19 03:51 PM
Calcium	99.7	2.00	6.00		mg/L	20	05/21/19 01:03 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:51 PM
Cobalt	0.187	0.00300	0.00500		mg/L	1	05/20/19 03:51 PM
Iron	0.0715	0.0300	0.100	J	mg/L	1	05/20/19 03:51 PM
Lead	0.000595	0.000300	0.00100	J	mg/L	1	05/20/19 03:51 PM
Lithium	0.172	0.00500	0.0100		mg/L	1	05/20/19 03:51 PM
Magnesium	81.4	2.00	6.00		mg/L	20	05/21/19 01:03 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:57 PM
Potassium	2.06	0.100	0.300		mg/L	1	05/20/19 03:51 PM
Selenium	0.00619	0.00200	0.00500		mg/L	1	05/20/19 03:51 PM
Sodium	210	2.00	6.00		mg/L	20	05/21/19 01:03 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:51 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:34 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	98.9	3.00	10.0		mg/L	10	05/15/19 03:31 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/19 06:59 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/15/19 06:59 PM
Sulfate	935	10.0	30.0		mg/L	10	05/15/19 03:31 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:27 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:27 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:27 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:27 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.0715	0.0500	0.100	JN	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:57 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-28
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-05
Project No:	19122262-C	**Collection Date:**	05/14/19 12:30 PM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0460	0.0300	0.100	J	mg/L	1	05/15/19 12:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1680	50.0	50.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-26
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-06
Project No:	19122262-C	**Collection Date:**	05/14/19 02:25 PM
Lab Order:	1905168	**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	05/20/19 03:53 PM
Arsenic	0.00410	0.00200	0.00500	J	mg/L	1	05/20/19 03:53 PM
Barium	0.190	0.00300	0.0100		mg/L	1	05/20/19 03:53 PM
Beryllium	0.00147	0.000300	0.00100		mg/L	1	05/20/19 03:53 PM
Boron	0.0507	0.0100	0.0300		mg/L	1	05/21/19 02:16 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:53 PM
Calcium	85.2	1.00	3.00		mg/L	10	05/21/19 01:05 PM
Chromium	0.0406	0.00200	0.00500		mg/L	1	05/20/19 03:53 PM
Cobalt	0.0795	0.00300	0.00500		mg/L	1	05/20/19 03:53 PM
Iron	8.81	0.0300	0.100		mg/L	1	05/20/19 03:53 PM
Lead	0.000972	0.000300	0.00100	J	mg/L	1	05/20/19 03:53 PM
Lithium	0.147	0.00500	0.0100		mg/L	1	05/20/19 03:53 PM
Magnesium	9.31	0.100	0.300		mg/L	1	05/20/19 03:53 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:16 PM
Potassium	11.6	0.100	0.300		mg/L	1	05/20/19 03:53 PM
Selenium	0.00222	0.00200	0.00500	J	mg/L	1	05/20/19 03:53 PM
Sodium	69.5	1.00	3.00		mg/L	10	05/21/19 01:05 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:53 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:36 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	61.7	3.00	10.0		mg/L	10	05/15/19 03:47 PM
Fluoride	0.140	0.100	0.400	J	mg/L	1	05/15/19 07:15 PM
Nitrate-N	0.239	0.100	0.500	J	mg/L	1	05/15/19 07:15 PM
Sulfate	88.2	1.00	3.00		mg/L	1	05/15/19 07:15 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	157	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:42 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:42 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:42 PM
Alkalinity, Total (As CaCO3)	157	20.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:42 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	8.81	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:57 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-26
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-06
Project No:	19122262-C	**Collection Date:**	05/14/19 02:25 PM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.0310	0.0300	0.100	J	mg/L	1	05/15/19 12:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	453	10.0	10.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-33
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-07
Project No:	19122262-C	**Collection Date:**	05/14/19 03:30 PM
Lab Order:	1905168	**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	05/20/19 03:54 PM
Arsenic	0.00355	0.00200	0.00500	J	mg/L	1	05/20/19 03:54 PM
Barium	0.158	0.00300	0.0100		mg/L	1	05/20/19 03:54 PM
Beryllium	0.00114	0.000300	0.00100		mg/L	1	05/20/19 03:54 PM
Boron	0.0592	0.0100	0.0300		mg/L	1	05/21/19 02:19 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/19 03:54 PM
Calcium	68.6	1.00	3.00		mg/L	10	05/21/19 01:08 PM
Chromium	0.0342	0.00200	0.00500		mg/L	1	05/20/19 03:54 PM
Cobalt	0.0648	0.00300	0.00500		mg/L	1	05/20/19 03:54 PM
Iron	7.61	0.0300	0.100		mg/L	1	05/20/19 03:54 PM
Lead	0.000772	0.000300	0.00100	J	mg/L	1	05/20/19 03:54 PM
Lithium	0.161	0.00500	0.0100		mg/L	1	05/20/19 03:54 PM
Magnesium	10.6	0.100	0.300		mg/L	1	05/20/19 03:54 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 02:19 PM
Potassium	13.2	0.100	0.300		mg/L	1	05/20/19 03:54 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/20/19 03:54 PM
Sodium	79.5	1.00	3.00		mg/L	10	05/21/19 01:08 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/19 03:54 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:38 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	80.4	3.00	10.0		mg/L	10	05/15/19 04:03 PM
Fluoride	0.166	0.100	0.400	J	mg/L	1	05/15/19 07:31 PM
Nitrate-N	0.287	0.100	0.500	J	mg/L	1	05/15/19 07:31 PM
Sulfate	104	10.0	30.0		mg/L	10	05/15/19 04:03 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	181	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:49 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:49 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:49 PM
Alkalinity, Total (As CaCO3)	181	20.0	20.0		mg/L @ pH 4.51	1	05/16/19 04:49 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	7.61	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:58 PM

LUMINANT

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: *14-Jun-19*

CLIENT:	Golder	**Client Sample ID:**	H-33
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905168-07
Project No:	19122262-C	**Collection Date:**	05/14/19 03:30 PM
Lab Order:	1905168	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	0.123	0.0300	0.100		mg/L	1	05/15/19 12:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	559	10.0	10.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190522A

The QC data in batch 91017 applies to the following samples: 1905168-01B, 1905168-02B, 1905168-03B, 1905168-04B, 1905168-05B, 1905168-06B, 1905168-07B

Sample ID **MB-91017** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **MBLK** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 10:02:31 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID **LCS-91017** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCS** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 10:04:46 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00187	0.000200	0.00200	0	93.5	85	115			

Sample ID **LCSD-91017** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCSD** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 10:07:02 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00186	0.000200	0.00200	0	93.0	85	115	0.536	15	

Sample ID **1905168-01B MS** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **MS** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 11:23:23 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.00100	0.00200	0	97.8	80	120			

Sample ID **1905168-01B MSD** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **MSD** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 11:25:39 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00194	0.00100	0.00200	0	97.0	80	120	0.770	15	

Sample ID **1905168-01B SD** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **SD** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 11:27:56 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.00200	0.00500	0	0				0	10	

Sample ID **1905168-01B PDS** Batch ID: **91017** TestNo: **SW7470A** Units: **mg/L**
SampType: **PDS** Run ID: **CETAC2_HG_190522A** Analysis Date: **5/22/2019 11:30:13 AM** Prep Date: **5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0122	0.00100	0.0125	0	97.6	85	115			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **CETAC2_HG_190522A**

Sample ID	**ICV-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 9:57:56 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00383	0.000200	0.00400	0	95.8	90	110			

Sample ID	**CCV1-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 10:41:04 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00202	0.000200	0.00200	0	101	90	110			

Sample ID	**CCV2-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:08:23 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV3-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 2:51:11 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	90	110			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

The QC data in batch 90959 applies to the following samples: 1905168-01B, 1905168-02B, 1905168-03B, 1905168-04B, 1905168-05B, 1905168-06B, 1905168-07B

Sample ID	**MB-90959**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:23:00 PM**	Prep Date:	**5/17/2019**

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								
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								
Potassium	<0.100	0.300								
Selenium	<0.00200	0.00500								
Sodium	<0.100	0.300								
Thallium	<0.000500	0.00150								

Sample ID	**LCS-90959**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:27:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.190	0.00250	0.200	0	94.8	80	120			
Arsenic	0.204	0.00500	0.200	0	102	80	120			
Barium	0.190	0.0100	0.200	0	94.9	80	120			
Beryllium	0.211	0.00100	0.200	0	105	80	120			
Cadmium	0.192	0.00100	0.200	0	95.8	80	120			
Calcium	4.65	0.300	5.00	0	93.1	80	120			
Chromium	0.195	0.00500	0.200	0	97.7	80	120			
Cobalt	0.203	0.00500	0.200	0	101	80	120			
Iron	5.14	0.100	5.00	0	103	80	120			
Lead	0.187	0.00100	0.200	0	93.6	80	120			
Lithium	0.217	0.0100	0.200	0	108	80	120			
Magnesium	5.03	0.300	5.00	0	101	80	120			
Potassium	5.02	0.300	5.00	0	100	80	120			
Selenium	0.204	0.00500	0.200	0	102	80	120			
Sodium	5.07	0.300	5.00	0	101	80	120			
Thallium	0.199	0.00150	0.200	0	99.7	80	120			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID	**LCSD-90959**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:29:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.7	80	120	2.98	15	
Arsenic	0.201	0.00500	0.200	0	100	80	120	1.34	15	
Barium	0.194	0.0100	0.200	0	97.2	80	120	2.37	15	
Beryllium	0.210	0.00100	0.200	0	105	80	120	0.345	15	
Cadmium	0.198	0.00100	0.200	0	98.8	80	120	3.14	15	
Calcium	4.68	0.300	5.00	0	93.5	80	120	0.492	15	
Chromium	0.198	0.00500	0.200	0	99.1	80	120	1.40	15	
Cobalt	0.200	0.00500	0.200	0	100	80	120	1.46	15	
Iron	5.15	0.100	5.00	0	103	80	120	0.209	15	
Lead	0.190	0.00100	0.200	0	95.0	80	120	1.54	15	
Lithium	0.211	0.0100	0.200	0	106	80	120	2.37	15	
Magnesium	5.15	0.300	5.00	0	103	80	120	2.30	15	
Potassium	5.07	0.300	5.00	0	101	80	120	1.08	15	
Selenium	0.200	0.00500	0.200	0	99.9	80	120	1.96	15	
Sodium	5.10	0.300	5.00	0	102	80	120	0.502	15	
Thallium	0.200	0.00150	0.200	0	100	80	120	0.279	15	

Sample ID	**1905178-02C SD**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:37:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	10	
Arsenic	0.0115	0.0250	0	0.0113				1.19	10	
Barium	0.0249	0.0500	0	0.0269				7.62	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Chromium	0.0104	0.0250	0	0.0104				0.596	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Iron	0.313	0.500	0	0.303				3.55	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0378	0.0500	0	0.0361				4.57	10	
Potassium	1.53	1.50	0	1.52				0.244	10	
Selenium	<0.0100	0.0250	0	0				0	10	
Thallium	<0.00250	0.00750	0	0				0	10	

Sample ID	**1905178-02C PDS**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:56:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.193	0.00250	0.200	0	96.4	80	120			
Arsenic	0.209	0.00500	0.200	0.0113	98.9	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

LUMINANT

CLIENT: Golder
Work Order: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID	**1905178-02C PDS**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:56:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.214	0.0100	0.200	0.0269	93.7	80	120			
Beryllium	0.184	0.00100	0.200	0	91.9	80	120			
Cadmium	0.184	0.00100	0.200	0	91.8	80	120			
Chromium	0.198	0.00500	0.200	0.0104	93.6	80	120			
Cobalt	0.193	0.00500	0.200	0	96.5	80	120			
Iron	5.19	0.100	5.00	0.303	97.7	80	120			
Lead	0.185	0.00100	0.200	0	92.4	80	120			
Lithium	0.224	0.0100	0.200	0.0361	93.9	80	120			
Potassium	6.27	0.300	5.00	1.52	94.9	80	120			
Selenium	0.195	0.00500	0.200	0	97.6	80	120			
Thallium	0.203	0.00150	0.200	0	101	80	120			

Sample ID	**1905178-02C MS**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 3:58:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.3	80	120			
Arsenic	0.217	0.00500	0.200	0.0113	103	80	120			
Barium	0.223	0.0100	0.200	0.0269	97.8	80	120			
Beryllium	0.187	0.00100	0.200	0	93.6	80	120			
Cadmium	0.185	0.00100	0.200	0	92.5	80	120			
Calcium	65.6	0.300	5.00	62.5	62.2	80	120			S
Chromium	0.198	0.00500	0.200	0.0104	93.7	80	120			
Cobalt	0.196	0.00500	0.200	0	98.1	80	120			
Iron	5.25	0.100	5.00	0.303	98.9	80	120			
Lead	0.188	0.00100	0.200	0	93.9	80	120			
Lithium	0.221	0.0100	0.200	0.0361	92.5	80	120			
Magnesium	65.8	0.300	5.00	63.5	45.8	80	120			S
Potassium	6.56	0.300	5.00	1.52	101	80	120			
Selenium	0.204	0.00500	0.200	0	102	80	120			
Sodium	223	0.300	5.00	229	-120	80	120			S
Thallium	0.201	0.00150	0.200	0	100	80	120			

Sample ID	**1905178-02C MSD**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 4:00:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.4	80	120	1.06	15	
Arsenic	0.214	0.00500	0.200	0.0113	101	80	120	1.22	15	
Barium	0.228	0.0100	0.200	0.0269	100	80	120	2.27	15	
Beryllium	0.186	0.00100	0.200	0	92.8	80	120	0.831	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

LUMINANT

CLIENT: Golder
Work Order: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID	**1905178-02C MSD**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 4:00:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.188	0.00100	0.200	0	94.1	80	120	1.65	15	
Calcium	65.6	0.300	5.00	62.5	61.4	80	120	0.058	15	S
Chromium	0.197	0.00500	0.200	0.0104	93.2	80	120	0.455	15	
Cobalt	0.195	0.00500	0.200	0	97.6	80	120	0.571	15	
Iron	5.20	0.100	5.00	0.303	97.9	80	120	0.922	15	
Lead	0.186	0.00100	0.200	0	93.1	80	120	0.842	15	
Lithium	0.227	0.0100	0.200	0.0361	95.5	80	120	2.65	15	
Magnesium	66.6	0.300	5.00	63.5	62.8	80	120	1.28	15	S
Potassium	6.53	0.300	5.00	1.52	100	80	120	0.365	15	
Selenium	0.201	0.00500	0.200	0	101	80	120	1.07	15	
Sodium	224	0.300	5.00	229	-105	80	120	0.347	15	S
Thallium	0.205	0.00150	0.200	0	103	80	120	2.13	15	

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID	**ICV-190520**	Batch ID:	**R104182**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 11:23:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0968	0.00250	0.100	0	96.8	90	110			
Arsenic	0.0991	0.00500	0.100	0	99.1	90	110			
Barium	0.0948	0.0100	0.100	0	94.8	90	110			
Beryllium	0.102	0.00100	0.100	0	102	90	110			
Cadmium	0.0974	0.00100	0.100	0	97.4	90	110			
Calcium	2.44	0.300	2.50	0	97.7	90	110			
Chromium	0.102	0.00500	0.100	0	102	90	110			
Cobalt	0.101	0.00500	0.100	0	101	90	110			
Iron	2.61	0.100	2.50	0	104	90	110			
Lead	0.0932	0.00100	0.100	0	93.2	90	110			
Lithium	0.106	0.0100	0.100	0	106	90	110			
Magnesium	2.50	0.300	2.50	0	100	90	110			
Potassium	2.53	0.300	2.50	0	101	90	110			
Selenium	0.0979	0.00500	0.100	0	97.9	90	110			
Sodium	2.59	0.300	2.50	0	104	90	110			
Thallium	0.0911	0.00150	0.100	0	91.1	90	110			

Sample ID	**LCVL-190520**	Batch ID:	**R104182**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190520B**	Analysis Date:	**5/20/2019 11:29:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00176	0.00250	0.00200	0	87.9	70	130			
Arsenic	0.00489	0.00500	0.00500	0	97.7	70	130			
Barium	0.00432	0.0100	0.00500	0	86.5	70	130			
Beryllium	0.000893	0.00100	0.00100	0	89.3	70	130			
Cadmium	0.000871	0.00100	0.00100	0	87.1	70	130			
Calcium	0.0919	0.300	0.100	0	91.9	70	130			
Chromium	0.00481	0.00500	0.00500	0	96.1	70	130			
Cobalt	0.00485	0.00500	0.00500	0	97.0	70	130			
Iron	0.107	0.100	0.100	0	107	70	130			
Lead	0.000831	0.00100	0.00100	0	83.1	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Magnesium	0.0970	0.300	0.100	0	97.0	70	130			
Potassium	0.0964	0.300	0.100	0	96.4	70	130			
Selenium	0.00489	0.00500	0.00500	0	97.8	70	130			
Sodium	0.0958	0.300	0.100	0	95.8	70	130			
Thallium	0.000816	0.00150	0.00100	0	81.6	70	130			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID **CCV5-190520** Batch ID: **R104182** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_190520B** Analysis Date: **5/20/2019 2:53:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.195	0.00250	0.200	0	97.6	90	110			
Arsenic	0.203	0.00500	0.200	0	102	90	110			
Barium	0.193	0.0100	0.200	0	96.5	90	110			
Beryllium	0.202	0.00100	0.200	0	101	90	110			
Cadmium	0.197	0.00100	0.200	0	98.4	90	110			
Calcium	4.64	0.300	5.00	0	92.9	90	110			
Chromium	0.195	0.00500	0.200	0	97.5	90	110			
Cobalt	0.201	0.00500	0.200	0	100	90	110			
Iron	5.06	0.100	5.00	0	101	90	110			
Lead	0.192	0.00100	0.200	0	96.1	90	110			
Lithium	0.206	0.0100	0.200	0	103	90	110			
Magnesium	5.06	0.300	5.00	0	101	90	110			
Potassium	5.03	0.300	5.00	0	101	90	110			
Selenium	0.205	0.00500	0.200	0	102	90	110			
Sodium	5.17	0.300	5.00	0	103	90	110			
Thallium	0.199	0.00150	0.200	0	99.7	90	110			

Sample ID **LCVL5-190520** Batch ID: **R104182** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_190520B** Analysis Date: **5/20/2019 3:01:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00174	0.00250	0.00200	0	87.2	70	130			
Arsenic	0.00487	0.00500	0.00500	0	97.5	70	130			
Barium	0.00423	0.0100	0.00500	0	84.6	70	130			
Beryllium	0.00110	0.00100	0.00100	0	110	70	130			
Cadmium	0.000921	0.00100	0.00100	0	92.1	70	130			
Calcium	0.0952	0.300	0.100	0	95.2	70	130			
Chromium	0.00485	0.00500	0.00500	0	97.1	70	130			
Cobalt	0.00489	0.00500	0.00500	0	97.9	70	130			
Iron	0.108	0.100	0.100	0	108	70	130			
Lead	0.000805	0.00100	0.00100	0	80.5	70	130			
Lithium	0.0108	0.0100	0.0100	0	108	70	130			
Magnesium	0.0983	0.300	0.100	0	98.3	70	130			
Potassium	0.0975	0.300	0.100	0	97.5	70	130			
Selenium	0.00517	0.00500	0.00500	0	103	70	130			
Sodium	0.102	0.300	0.100	0	102	70	130			
Thallium	0.000787	0.00150	0.00100	0	78.7	70	130			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190520B**

Sample ID **CCV6-190520** Batch ID: **R104182** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS4_190520B** Analysis Date: **5/20/2019 4:02:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.194	0.00250	0.200	0	96.9	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.192	0.0100	0.200	0	96.2	90	110			
Beryllium	0.199	0.00100	0.200	0	99.7	90	110			
Cadmium	0.193	0.00100	0.200	0	96.3	90	110			
Calcium	4.67	0.300	5.00	0	93.4	90	110			
Chromium	0.194	0.00500	0.200	0	96.8	90	110			
Cobalt	0.203	0.00500	0.200	0	101	90	110			
Iron	5.07	0.100	5.00	0	101	90	110			
Lead	0.195	0.00100	0.200	0	97.6	90	110			
Lithium	0.204	0.0100	0.200	0	102	90	110			
Magnesium	5.01	0.300	5.00	0	100	90	110			
Potassium	4.98	0.300	5.00	0	99.6	90	110			
Selenium	0.205	0.00500	0.200	0	103	90	110			
Sodium	5.14	0.300	5.00	0	103	90	110			
Thallium	0.205	0.00150	0.200	0	102	90	110			

Sample ID **LCVL6-190520** Batch ID: **R104182** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS4_190520B** Analysis Date: **5/20/2019 4:06:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00178	0.00250	0.00200	0	89.2	70	130			
Arsenic	0.00492	0.00500	0.00500	0	98.4	70	130			
Barium	0.00435	0.0100	0.00500	0	87.0	70	130			
Beryllium	0.00105	0.00100	0.00100	0	105	70	130			
Cadmium	0.000933	0.00100	0.00100	0	93.3	70	130			
Calcium	0.0988	0.300	0.100	0	98.8	70	130			
Chromium	0.00475	0.00500	0.00500	0	95.0	70	130			
Cobalt	0.00485	0.00500	0.00500	0	97.1	70	130			
Iron	0.107	0.100	0.100	0	107	70	130			
Lead	0.000828	0.00100	0.00100	0	82.8	70	130			
Lithium	0.0104	0.0100	0.0100	0	104	70	130			
Magnesium	0.0986	0.300	0.100	0	98.6	70	130			
Potassium	0.0940	0.300	0.100	0	94.0	70	130			
Selenium	0.00483	0.00500	0.00500	0	96.6	70	130			
Sodium	0.131	0.300	0.100	0	131	70	130			S
Thallium	0.000822	0.00150	0.00100	0	82.2	70	130			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

The QC data in batch 90959 applies to the following samples: 1905168-01B, 1905168-02B, 1905168-03B, 1905168-04B, 1905168-05B, 1905168-06B, 1905168-07B

Sample ID **MB-90959** Batch ID: **90959** TestNo: **SW6020A** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:36:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								
Molybdenum	<0.00200	0.00500								

Sample ID **LCS-90959** Batch ID: **90959** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:38:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.201	0.0300	0.200	0	101	80	120			
Molybdenum	0.195	0.00500	0.200	0	97.3	80	120			

Sample ID **LCSD-90959** Batch ID: **90959** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:41:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.208	0.0300	0.200	0	104	80	120	3.23	15	
Molybdenum	0.192	0.00500	0.200	0	96.2	80	120	1.18	15	

Sample ID **1905178-02C SD** Batch ID: **90959** TestNo: **SW6020A** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:47:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<1.00	3.00	0	0.525				0	10	
Calcium	70.4	30.0	0	68.2				3.15	10	
Magnesium	63.5	30.0	0	63.5				0.085	10	
Molybdenum	<0.200	0.500	0	0				0	10	
Sodium	227	30.0	0	233				2.75	10	

Sample ID **1905178-02C PDS** Batch ID: **90959** TestNo: **SW6020A** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 1:14:00 PM** Prep Date: **5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	4.53	0.600	4.00	0.525	100	80	120			
Calcium	170	6.00	100	68.2	102	80	120			
Magnesium	161	6.00	100	63.5	97.1	80	120			
Molybdenum	3.64	0.100	4.00	0	90.9	80	120			
Sodium	331	6.00	100	233	98.2	80	120			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**1905178-02C MS**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 1:17:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.866	0.600	0.200	0.525	170	80	120			S
Molybdenum	0.192	0.100	0.200	0	96.0	80	120			

Sample ID	**1905178-02C MSD**	Batch ID:	**90959**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 1:19:00 PM**	Prep Date:	**5/17/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.750	0.600	0.200	0.525	112	80	120	14.3	15	
Molybdenum	0.189	0.100	0.200	0	94.3	80	120	1.76	15	

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**ICV-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 12:10:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.103	0.0300	0.100	0	103	90	110			
Calcium	2.52	0.300	2.50	0	101	90	110			
Iron	2.60	0.100	2.50	0	104	90	110			
Magnesium	2.49	0.300	2.50	0	99.7	90	110			
Molybdenum	0.0930	0.00500	0.100	0	93.0	90	110			
Sodium	2.56	0.300	2.50	0	103	90	110			

Sample ID	**LCVL-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 12:15:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0223	0.0300	0.0200	0	111	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Iron	0.0979	0.100	0.100	0	97.9	70	130			
Magnesium	0.0983	0.300	0.100	0	98.3	70	130			
Molybdenum	0.00464	0.00500	0.00500	0	92.8	70	130			
Sodium	0.0960	0.300	0.100	0	96.0	70	130			

Sample ID	**CCV1-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 1:26:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.196	0.0300	0.200	0	98.1	90	110			
Calcium	4.90	0.300	5.00	0	98.0	90	110			
Iron	5.04	0.100	5.00	0	101	90	110			
Magnesium	4.94	0.300	5.00	0	98.8	90	110			
Molybdenum	0.193	0.00500	0.200	0	96.3	90	110			
Sodium	4.93	0.300	5.00	0	98.6	90	110			

Sample ID	**LCVL1-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 1:30:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0245	0.0300	0.0200	0	123	70	130			
Calcium	0.0976	0.300	0.100	0	97.6	70	130			
Iron	0.0980	0.100	0.100	0	98.0	70	130			
Magnesium	0.0940	0.300	0.100	0	94.0	70	130			
Molybdenum	0.00478	0.00500	0.00500	0	95.6	70	130			
Sodium	0.0986	0.300	0.100	0	98.6	70	130			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**CCV2-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 2:05:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.208	0.0300	0.200	0	104	90	110			
Molybdenum	0.201	0.00500	0.200	0	101	90	110			

Sample ID	**LCVL2-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 2:09:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0258	0.0300	0.0200	0	129	70	130			
Molybdenum	0.00474	0.00500	0.00500	0	94.7	70	130			

Sample ID	**CCV3-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 2:34:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.199	0.0300	0.200	0	99.5	90	110			
Molybdenum	0.199	0.00500	0.200	0	99.7	90	110			

Sample ID	**LCVL3-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 2:46:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0227	0.0300	0.0200	0	113	70	130			
Molybdenum	0.00484	0.00500	0.00500	0	96.8	70	130			

Sample ID	**CCV4-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:00:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.199	0.00500	0.200	0	99.7	90	110			

Sample ID	**LCVL4-190521**	Batch ID:	**R104204**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:05:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.00483	0.00500	0.00500	0	96.6	70	130			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC2_190515A**

The QC data in batch 90908 applies to the following samples: 1905168-01C, 1905168-02C, 1905168-03C, 1905168-04C, 1905168-05C, 1905168-06C, 1905168-07C

Sample ID	**MB-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:10:50 AM**	Prep Date:	**5/15/2019**

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-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:26:50 AM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110			
Fluoride	4.00	0.400	4.000	0	99.9	90	110			
Nitrate-N	5.09	0.500	5.000	0	102	90	110			
Sulfate	30.4	3.00	30.00	0	101	90	110			

Sample ID	**LCSD-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:42:50 AM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.674	20	
Fluoride	4.05	0.400	4.000	0	101	90	110	1.26	20	
Nitrate-N	5.08	0.500	5.000	0	102	90	110	0.146	20	
Sulfate	30.9	3.00	30.00	0	103	90	110	1.55	20	

Sample ID	**1905167-01CMS**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:07:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	222	10.0	200.0	12.69	105	90	110			
Fluoride	211	4.00	200.0	0	106	90	110			
Nitrate-N	45.6	5.00	45.16	0	101	90	110			
Sulfate	239	30.0	200.0	41.32	98.7	90	110			

Sample ID	**1905167-01CMSD**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:23:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	221	10.0	200.0	12.69	104	90	110	0.308	20	
Fluoride	210	4.00	200.0	0	105	90	110	0.286	20	
Nitrate-N	45.8	5.00	45.16	0	101	90	110	0.495	20	

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC2_190515A**

Sample ID	**1905167-01CMSD**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:23:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	237	30.0	200.0	41.32	97.7	90	110	0.821	20	

Sample ID	**1905167-02CMS**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:55:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	686	10.0	200.0	528.8	78.8	90	110			S
Fluoride	229	4.00	200.0	24.26	102	90	110			
Nitrate-N	56.2	5.00	45.16	10.55	101	90	110			
Sulfate	2520	30.0	200.0	0	1260	90	110			S

Sample ID	**1905167-02CMSD**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 2:11:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	688	10.0	200.0	528.8	79.8	90	110	0.292	20	S
Fluoride	229	4.00	200.0	24.26	102	90	110	0.251	20	
Nitrate-N	57.3	5.00	45.16	10.55	103	90	110	1.85	20	
Sulfate	<10.0	30.0	200.0	0	0	90	110	0	20	S

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_190515A

Sample ID	**ICV-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 9:38:50 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.8	1.00	25.00	0	103	90	110			
Fluoride	10.3	0.400	10.00	0	103	90	110			
Nitrate-N	13.0	0.500	12.50	0	104	90	110			
Sulfate	77.8	3.00	75.00	0	104	90	110			

Sample ID	**CCV1-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 4:51:36 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110			
Fluoride	4.15	0.400	4.000	0	104	90	110			
Nitrate-N	5.13	0.500	5.000	0	103	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

Sample ID	**CCV2-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 8:35:35 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.6	1.00	10.00	0	106	90	110			
Fluoride	4.20	0.400	4.000	0	105	90	110			
Nitrate-N	5.20	0.500	5.000	0	104	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC4_190516A**

The QC data in batch 90935 applies to the following samples: 1905168-01C

Sample ID	**MB-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:26:21 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	<1.00	3.00								

Sample ID	**LCS-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:42:21 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	29.5	3.00	30.00	0	98.3	90	110			

Sample ID	**LCSD-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:58:21 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	29.8	3.00	30.00	0	99.2	90	110	0.935	20	

Sample ID	**1905167-02CMS**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:10:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	4830	300	2000	2897	96.9	90	110			

Sample ID	**1905167-02CMSD**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:26:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	4880	300	2000	2897	99.1	90	110	0.920	20	

Sample ID	**1905168-01CMS**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:58:26 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	4380	300	2000	2468	95.6	90	110			

Sample ID	**1905168-01CMSD**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 6:14:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	4390	300	2000	2468	96.2	90	110	0.273	20	

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC4_190516A**

Sample ID	**ICV-190516**	Batch ID:	**R104119**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 9:54:21 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	74.5	3.00	75.00	0	99.4	90	110			

Sample ID	**CCV1-190516**	Batch ID:	**R104119**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 9:10:26 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sulfate	30.2	3.00	30.00	0	101	90	110			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_190516A**

The QC data in batch 90940 applies to the following samples: 1905168-01C, 1905168-02C, 1905168-03C, 1905168-04C, 1905168-05C, 1905168-06C, 1905168-07C

Sample ID **MB-90940** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.47**
SampType: **MBLK** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:00:00 PM** Prep Date: **5/16/2019**

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-90940** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.08**
SampType: **LCS** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:04:00 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.3	20.0	50.00	0	105	74	129			

Sample ID **1905134-01C DUP** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.52**
SampType: **DUP** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:15:00 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	205	20.0	0	205.8				0.536	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)	205	20.0	0	205.8				0.536	20	

Sample ID **1905168-05C DUP** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.51**
SampType: **DUP** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 4:30:00 PM** Prep Date: **5/16/2019**

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

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_190516A**

Sample ID	**ICV-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.34**
SampType:	**ICV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 1:58:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.64	20.0	0							
Alkalinity, Carbonate (As CaCO3)	89.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.9	20.0	100.0	0	97.9	98	102			

Sample ID	**CCV1-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.25**
SampType:	**CCV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 3:39:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	21.7	20.0	0							
Alkalinity, Carbonate (As CaCO3)	76.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.5	20.0	100.0	0	98.5	90	110			

Sample ID	**CCV2-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.21**
SampType:	**CCV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 4:35:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	17.7	20.0	0							
Alkalinity, Carbonate (As CaCO3)	81.3	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			

Sample ID	**CCV3-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.39**
SampType:	**CCV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 4:54:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	20.3	20.0	0							
Alkalinity, Carbonate (As CaCO3)	77.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.4	20.0	100.0	0	97.4	90	110			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190515B**

The QC data in batch 90921 applies to the following samples: 1905168-01C, 1905168-02C, 1905168-03C, 1905168-04C, 1905168-05C, 1905168-06C, 1905168-07C

Sample ID	**MB-90921**	Batch ID:	**90921**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:42:00 PM**	Prep Date:	**5/15/2019**

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

Sample ID	**LCS-90921**	Batch ID:	**90921**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:43:00 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.513	0.100	0.5000	0	103	80	120			

Sample ID	**LCSD-90921**	Batch ID:	**90921**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:43:00 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.504	0.100	0.5000	0	101	80	120	1.77	15	

Sample ID	**1905168-01CMS**	Batch ID:	**90921**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:45:00 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.587	0.100	0.5000	0.07700	102	80	120			

Sample ID	**1905168-01CMSD**	Batch ID:	**90921**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:45:00 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.525	0.100	0.5000	0.07700	89.6	80	120	11.2	15	

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190515B**

Sample ID	**ICV-190515**	Batch ID:	**R104071**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:41:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.204	0.100	0.2000	0	102	85	115			

Sample ID	**CCV1-190515**	Batch ID:	**R104071**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:51:00 PM**	Prep Date:	

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	85	115			

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190520A**

The QC data in batch 91002 applies to the following samples: 1905168-01A, 1905168-02A, 1905168-03A, 1905168-04A, 1905168-05A, 1905168-06A, 1905168-07A

Sample ID	**MB-91002**	Batch ID:	**91002**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:53:00 PM**	Prep Date:	**5/20/2019**

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

Sample ID	**LCS-91002**	Batch ID:	**91002**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:53:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0888	0.100	0.1000	0	88.8	85	115			N

Sample ID	**LCSD-91002**	Batch ID:	**91002**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:53:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0879	0.100	0.1000	0	87.9	85	115	1.05	15	N

Sample ID	**1905185-11AMS**	Batch ID:	**91002**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 4:03:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0860	0.100	0.1000	0	86.0	85	115			N

Sample ID	**1905185-11AMSD**	Batch ID:	**91002**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 4:03:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0861	0.100	0.1000	0	86.1	85	115	0.116	15	N

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190520A**

Sample ID	**ICV-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:52:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0875	0.100	0.1000	0	87.5	85	115			N

Sample ID	**CCV1-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:59:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.197	0.100	0.2000	0	98.4	85	115			N

Sample ID	**CCV2-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 4:12:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.183	0.100	0.2000	0	91.7	85	115			N

LUMINANT

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: 1905168
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **WC_190517D**

The QC data in batch 90953 applies to the following samples: 1905168-01C, 1905168-02C, 1905168-03C, 1905168-04C, 1905168-05C, 1905168-06C, 1905168-07C

Sample ID	**MB-90953**	Batch ID:	**90953**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**WC_190517D**	Analysis Date:	**5/17/2019 11:40:00 AM**	Prep Date:	**5/16/2019**

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-90953**	Batch ID:	**90953**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**WC_190517D**	Analysis Date:	**5/17/2019 11:40:00 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	745	10.0	745.6	0	99.9	90	113			

Sample ID	**1905167-02C-DUP**	Batch ID:	**90953**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190517D**	Analysis Date:	**5/17/2019 11:40:00 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	5340	50.0	0	5375				0.747	5	

Sample ID	**1905168-02C-DUP**	Batch ID:	**90953**	TestNo:	**M2540C**	Units:	**mg/L**
SampType:	**DUP**	Run ID:	**WC_190517D**	Analysis Date:	**5/17/2019 11:40:00 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	940	50.0	0	910.0				3.24	5	

LUMINANT

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

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ANALYTICAL REPORT

June 10, 2019

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3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

DHL Analytical, Inc.

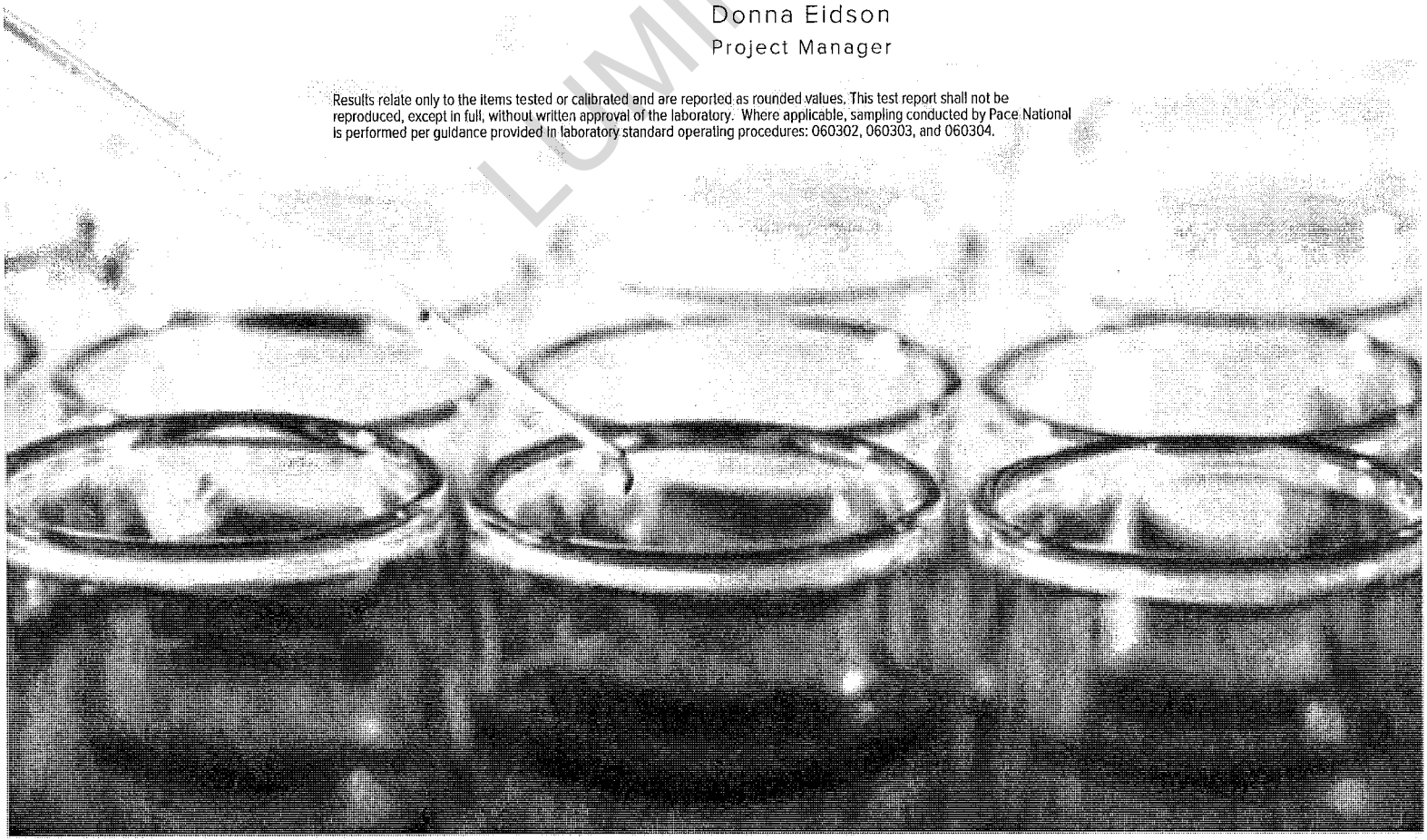
Sample Delivery Group:	L1100989
Samples Received:	05/21/2019
Project Number:	1905168
Description:	
Report To:	John DuPont 2300 Double Creek Drive Round Rock, TX 78664

LUMINANT

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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H-31 L1100989-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 07:40	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

H-32 L1100989-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 08:25	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

H-27 L1100989-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 09:40	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

H-29 L1100989-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 11:25	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

H-28 L1100989-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 12:30	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

H-26 L1100989-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 14:25	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

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	Collected by	Collected date/time	Received date/time
H-33 L1100989-07 Non-Potable Water		05/14/19 15:30	05/21/19 10:10

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1285651	1	05/24/19 09:05	05/31/19 11:10	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1287234	1	05/29/19 08:27	06/03/19 17:48	RGT	Mt. Juliet, TN

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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

LUMINANT

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.531		0.515	0.789	05/31/2019 11:10	WG1285651
(T) Barium	*120*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*93.0*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	3.15		1.09	0.978	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	2.62		0.578	0.189	06/03/2019 17:48	WG1287234
(T) Barium-133	*104*			*30.0-143*	*06/03/2019 17:48*	WG1287234

LUMINANT

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.147		0.380	0.546	05/31/2019 11:10	WG1285651
(T) Barium	*100*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*109*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.450		0.625	0.833	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.303		0.245	0.287	06/03/2019 17:48	WG1287234
(T) Barium-133	*105*			*30.0-143*	*06/03/2019 17:48*	WG1287234

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.928		0.365	0.563	05/31/2019 11:10	WG1285651
(T) Barium	*96.7*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*98.1*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.03		0.814	0.854	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.10		0.449	0.291	06/03/2019 17:48	WG1287234
(T) Barium-133	*85.4*			*30.0-143*	*06/03/2019 17:48*	WG1287234

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.352		0.428	0.707	05/31/2019 11:10	WG1285651
(T) Barium	*116*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*96.5*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.474		0.641	1.05	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.122		0.213	0.339	06/03/2019 17:48	WG1287234
(T) Barium-133	*72.2*			*30.0-143*	*06/03/2019 17:48*	WG1287234

LUMINANT

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.615		0.370	0.575	05/31/2019 11:10	WG1285651
(T) Barium	*106*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*95.5*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.06		0.634	0.777	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.444		0.264	0.202	06/03/2019 17:48	WG1287234
(T) Barium-133	*90.7*			*30.0-143*	*06/03/2019 17:48*	WG1287234

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.598		0.330	0.545	05/31/2019 11:10	WG1285651
(T) Barium	*98.4*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*113*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.03		0.761	0.783	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.43		0.431	0.238	06/03/2019 17:48	WG1287234
(T) Barium-133	*103*			*30.0-143*	*06/03/2019 17:48*	WG1287234

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.35		0.414	0.627	05/31/2019 11:10	WG1285651
(T) Barium	*97.4*			*62.0-143*	*05/31/2019 11:10*	WG1285651
(T) Yttrium	*96.3*			*79.0-136*	*05/31/2019 11:10*	WG1285651

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.20		0.764	0.846	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.850		0.350	0.219	06/03/2019 17:48	WG1287234
(T) Barium-133	*102*			*30.0-143*	*06/03/2019 17:48*	WG1287234

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QUALITY CONTROL SUMMARY

L1100989-01,02,03,04,05,06,07

Method Blank (MB)

(MB) R3417363-1 05/30/19 12:10

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	-0.0581		0.396
(T) Barium	*105*		
(T) Yttrium	*110*		

L1100977-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1100977-01 05/30/19 12:10 • (DUP) R3417363-5 05/30/19 12:10

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	-0.0695	0.650	1	200	0.741		20	3
(T) Barium	*109*	*111*						
(T) Yttrium	*113*	*107*						

Laboratory Control Sample (LCS)

(LCS) R3417363-2 05/30/19 12:10

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.29	106	80.0-120	
(T) Barium			*104*		
(T) Yttrium			*114*		

L1100989-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1100989-01 05/31/19 11:10 • (MS) R3417363-3 05/30/19 12:10 • (MSD) R3417363-4 05/30/19 12:10

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	20.0	0.531	20.9	19.5	102	94.8	1	70.0-130			7.08		20
(T) Barium		*120*			*102*	*115*							
(T) Yttrium		*93.0*			*117*	*114*							

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Method Blank (MB)

(MB) R3419580-1 06/03/19 17:43

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.00994		0.0573
(T) Barium-133	*67.4*		

L1103100-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1103100-01 06/03/19 17:43 • (DUP) R3419580-7 06/03/19 17:43

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.267	1.33	1	133	2.21		20	3
(T) Barium-133	*110*	*102*						

Laboratory Control Sample (LCS)

(LCS) R3419580-2 06/03/19 17:43

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.10	102	80.0-120	
(T) Barium-133			*56.0*		

L1101875-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1101875-03 06/03/19 17:43 • (MS) R3419580-3 06/03/19 17:43 • (MSD) R3419580-6 06/03/19 17:43

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	0.637	17.9	20.3	86.0	97.8	1	75.0-125			12.4		20
(T) Barium-133		*83.3*			*53.7*	*71.3*							

L1101881-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1101881-03 06/03/19 17:43 • (MS) R3419580-4 06/03/19 17:43 • (MSD) R3419580-5 06/03/19 17:43

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	0.522	21.1	19.2	102	93.1	1	75.0-125			9.23		20
(T) Barium-133		*105*			*89.6*	*99.7*							

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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.

LEGIMIAN

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
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	LAO00356
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

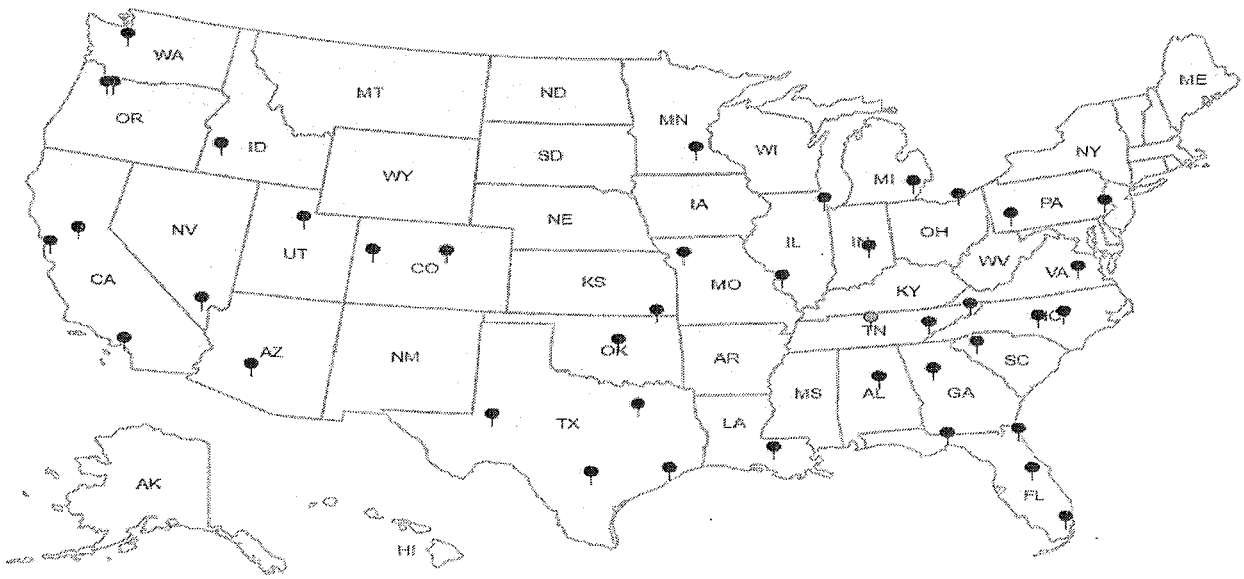
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

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

LUMINAIT

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: DHLRETX	SDG#:	1100989	
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?		✓	

LUMINANT

Kelsey Stephenson

Pace Analytical®
National Center for Testing & Innovation

Login #: L1100989	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#

LEGITIMANT

Login Comments: 1 of 2 H-32 was received with a pH of 6. pH adj in login 1511 5/21

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

Login Instructions:

Noted 5/21/19 1547

1100989

CHAIN-OF-CUSTODY RECORD

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

H007

Work Order: 1905168

Subcontractor:
Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

15-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests			
					<2	<2				
H-31	Aqueous	-01D	05/14/19 07:40 AM	1LHDPEHNO3		1				01
H-31	Aqueous	-01E	05/14/19 07:40 AM	1LHDPEHNO3	1					02
H-32	Aqueous	-02D	05/14/19 08:25 AM	1LHDPEHNO3		1				03
H-32	Aqueous	-02E	05/14/19 08:25 AM	1LHDPEHNO3	1					04
H-27	Aqueous	-03D	05/14/19 09:40 AM	1LHDPEHNO3		1				05
H-27	Aqueous	-03E	05/14/19 09:40 AM	1LHDPEHNO3	1					06
H-29	Aqueous	-04D	05/14/19 11:25 AM	1LHDPEHNO3		1				07
H-29	Aqueous	-04E	05/14/19 11:25 AM	1LHDPEHNO3	1					
H-28	Aqueous	-05D	05/14/19 12:30 PM	1LHDPEHNO3		1				
H-28	Aqueous	-05E	05/14/19 12:30 PM	1LHDPEHNO3	1					
H-26	Aqueous	-06D	05/14/19 02:25 PM	1LHDPEHNO3		1				
H-26	Aqueous	-06E	05/14/19 02:25 PM	1LHDPEHNO3	1					
H-33	Aqueous	-07D	05/14/19 03:30 PM	1LHDPEHNO3		1				
H-33	Aqueous	-07E	05/14/19 03:30 PM	1LHDPEHNO3	1					

LOWRANT

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: 14

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

RAD SCREEN: <0.5 mR/hr

pH adj @ 1511

May 30, 2019

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

Order No.: 1905167

RE: Luminant-MLSES Ash Ponds

Dear Will Vienne:

DHL Analytical, Inc. received 2 sample(s) on 5/15/2019 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

LUMINANT

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

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LUMINANT

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

№ 86480

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: 5-14-19 PAGE 1 OF 1
PO #:
DHL WORK ORDER #: 1905167
PROJECT LOCATION OR NAME: LUMINANT - MLSES ASH PONDS
CLENT PROJECT #: 19122262-C COLLECTOR: J. BRAYTON

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

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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	PRESERVATION HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED	ANALYSES: APPENDIX III & IV, ALK, NO3, PO4, Na, Mg, K, FERROUS & FERRIC IRON	FIELD NOTES
LAKE SAMPLE	01	5-14-19	1005	W		7		X		X		X X X	
POND SAMPLE	02	5-14-19	1020	W		7		X		X		X X X	

LUMINANT

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	5-14-19 1800	FedEx
FedEx	5/15/19 0943	[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: 4.5°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

LUMINANT

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

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 14MAY19
ACTWGT: 50.90 LB
CAD: 006994166/SSFE2002
DIMS: 23x14x14 IN

BILL THIRD PARTY

Part # 156287-490423-1 Rev 10/19

TO

DHL
2300 DOUBLE CREEK DR

ROUND ROCK TX 78664
(512) 388-8222
INV:
PO:
REF:
DEPT:

FedEx
Express

J1910190107DIAV

2 of 4

MPS# 0263 7872 5506 5857
Mstr# 7872 5506 5846

0201

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

A8 BSMA

78664
TX-US AUS

PRELIMINARY

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name Golder | Date Received: 5/15/2019

Work Order Number 1905167 | Received by EL

Checklist completed by: _____ Signature | 5/15/2019 Date | Reviewed by DL Initials | 5/15/2019 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 ☐	4.5 °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 _____

LUMINANT

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

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Page 1 of 1

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.

LUMINANT

LOG IN

The samples were received and log-in performed on 5/15/19. A total of 2 samples were received. The samples arrived in good condition and were properly packaged.

METALS ANALYSIS

For Metals analysis performed on 5/21/19 the matrix spike and matrix spike duplicate recoveries were below control limits for Calcium and 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 these analytes. No further corrective actions were taken.

For Metals analysis performed on 5/21/19 the RPD for the serial dilution was slightly above control limits for Potassium. This is flagged accordingly. The PDS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 5/21/19 the PDS recovery was out of control limits for three analytes. These are flagged accordingly. The serial dilution was within control limits for these analytes. No further corrective actions were taken.

For Metals analysis peformed on 5/21/19 three LCVLs were out of control limits for Potassium and/or Sodium. These are flagged accordingly. The associated CCVs were within control limits for these analytes. No further corrective actions were taken.

ANIONS ANALYSIS

CASE NARRATIVE

For Anions analysis performed on 5/15/19 (batch 90908) the matrix spike and matrix spike duplicate recoveries (1905167-02 MS/MSD) were out of control limits for Chloride and Sulfate. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was from this work order. The LCS was within control limits for these analytes. No further corrective actions were taken.

LUMINANT

DHL Analytical, Inc.

Date: *30-May-19*

CLIENT: Golder
Project: Luminant-MLSES Ash Ponds
Lab Order: 1905167

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
1905167-01	Lake Sample		05/14/19 10:05 AM	5/15/2019
1905167-02	Pond Sample		05/14/19 10:20 AM	5/15/2019

LUMINANT

DHL Analytical, Inc.

30-May-19

Lab Order: 1905167
Client: Golder
Project: Luminant-MLSES Ash Ponds

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
1905167-01A	Lake Sample	05/14/19 10:05 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905167-01B	Lake Sample	05/14/19 10:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:34 AM	90990
	Lake Sample	05/14/19 10:05 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:34 AM	90990
	Lake Sample	05/14/19 10:05 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905167-01C	Lake Sample	05/14/19 10:05 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	Lake Sample	05/14/19 10:05 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	Lake Sample	05/14/19 10:05 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	Lake Sample	05/14/19 10:05 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	Lake Sample	05/14/19 10:05 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953
1905167-02A	Pond Sample	05/14/19 10:20 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/20/19 02:56 PM	91002
1905167-02B	Pond Sample	05/14/19 10:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:34 AM	90990
	Pond Sample	05/14/19 10:20 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/20/19 09:34 AM	90990
	Pond Sample	05/14/19 10:20 AM	Aqueous	SW7470A	Mercury Aq Prep	05/21/19 09:56 AM	91017
1905167-02C	Pond Sample	05/14/19 10:20 AM	Aqueous	M2320 B	Alkalinity Preparation	05/16/19 10:12 AM	90940
	Pond Sample	05/14/19 10:20 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	Pond Sample	05/14/19 10:20 AM	Aqueous	E300	Anion Preparation	05/15/19 09:07 AM	90908
	Pond Sample	05/14/19 10:20 AM	Aqueous	E300	Anion Preparation	05/16/19 09:16 AM	90935
	Pond Sample	05/14/19 10:20 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/15/19 12:12 PM	90921
	Pond Sample	05/14/19 10:20 AM	Aqueous	M2540C	TDS Preparation	05/16/19 03:23 PM	90953

LUMINANT

DHL Analytical, Inc.

30-May-19

Lab Order: 1905167
Client: Golder
Project: Luminant-MLSES Ash Ponds

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
1905167-01A	Lake Sample	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	Lake Sample	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:54 PM	UV/VIS_2_190520A
1905167-01B	Lake Sample	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:11 AM	CETAC2_HG_190522A
	Lake Sample	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90990	1	05/22/19 12:01 PM	ICP-MS4_190522B
	Lake Sample	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90990	1	05/21/19 03:24 PM	ICP-MS5_190521A
1905167-01C	Lake Sample	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:05 PM	TITRATOR_190516A
	Lake Sample	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 12:51 PM	IC2_190515A
	Lake Sample	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 05:23 PM	IC2_190515A
	Lake Sample	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 02:47 PM	UV/VIS_2_190515B
	Lake Sample	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D
1905167-02A	Pond Sample	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	91002	1	05/24/19	UV/VIS_2_190524A
	Pond Sample	Aqueous	M3500-Fe D	Ferrous Iron	91002	1	05/20/19 03:54 PM	UV/VIS_2_190520A
1905167-02B	Pond Sample	Aqueous	SW7470A	Mercury Total: Aqueous	91017	1	05/22/19 10:13 AM	CETAC2_HG_190522A
	Pond Sample	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90990	100	05/22/19 12:03 PM	ICP-MS4_190522B
	Pond Sample	Aqueous	SW6020A	Trace Metals: ICP-MS - Water	90990	1	05/21/19 03:26 PM	ICP-MS5_190521A
1905167-02C	Pond Sample	Aqueous	M2320 B	Alkalinity	90940	1	05/16/19 04:08 PM	TITRATOR_190516A
	Pond Sample	Aqueous	E300	Anions by IC method - Water	90908	10	05/15/19 01:39 PM	IC2_190515A
	Pond Sample	Aqueous	E300	Anions by IC method - Water	90908	1	05/15/19 05:39 PM	IC2_190515A
	Pond Sample	Aqueous	E300	Anions by IC method - Water	90935	100	05/16/19 04:54 PM	IC4_190516A
	Pond Sample	Aqueous	M4500-P E	Orthophosphate	90921	1	05/15/19 02:47 PM	UV/VIS_2_190515B
	Pond Sample	Aqueous	M2540C	Total Dissolved Solids	90953	1	05/17/19 11:40 AM	WC_190517D

LUMINANT

DHL Analytical, Inc.

Date: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	Lake Sample
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905167-01
Project No:	19122262-C	**Collection Date:**	05/14/19 10:05 AM
Lab Order:	1905167	**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	05/21/19 03:24 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 03:24 PM
Barium	0.0535	0.00300	0.0100		mg/L	1	05/21/19 03:24 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:24 PM
Boron	0.0632	0.0100	0.0300		mg/L	1	05/22/19 12:01 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:24 PM
Calcium	12.5	0.100	0.300		mg/L	1	05/21/19 03:24 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 03:24 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/21/19 03:24 PM
Iron	0.365	0.0300	0.100		mg/L	1	05/21/19 03:24 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:24 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	05/21/19 03:24 PM
Magnesium	6.09	0.100	0.300		mg/L	1	05/21/19 03:24 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 03:24 PM
Potassium	2.56	0.100	0.300		mg/L	1	05/21/19 03:24 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/21/19 03:24 PM
Sodium	11.9	0.100	0.300		mg/L	1	05/21/19 03:24 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/21/19 03:24 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/22/19 10:11 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	12.2	0.300	1.00		mg/L	1	05/15/19 05:23 PM
Fluoride	0.140	0.100	0.400	J	mg/L	1	05/15/19 05:23 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/15/19 05:23 PM
Sulfate	37.3	1.00	3.00		mg/L	1	05/15/19 05:23 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	55.4	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:05 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:05 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:05 PM
Alkalinity, Total (As CaCO3)	55.4	20.0	20.0		mg/L @ pH 4.5	1	05/16/19 04:05 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.365	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:54 PM

LUMINANT

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: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	Lake Sample
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905167-01
Project No:	19122262-C	**Collection Date:**	05/14/19 10:05 AM
Lab Order:	1905167	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/15/19 02:47 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	119	10.0	10.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	Pond Sample
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905167-02
Project No:	19122262-C	**Collection Date:**	05/14/19 10:20 AM
Lab Order:	1905167	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020A**					Analyst: **RO**
Antimony	0.00199	0.000800	0.00250	J	mg/L	1	05/21/19 03:26 PM
Arsenic	0.00305	0.00200	0.00500	J	mg/L	1	05/21/19 03:26 PM
Barium	0.0589	0.00300	0.0100		mg/L	1	05/21/19 03:26 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:26 PM
Boron	28.2	1.00	3.00		mg/L	100	05/22/19 12:03 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:26 PM
Calcium	319	10.0	30.0		mg/L	100	05/22/19 12:03 PM
Chromium	0.00336	0.00200	0.00500	J	mg/L	1	05/21/19 03:26 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/21/19 03:26 PM
Iron	<0.0300	0.0300	0.100		mg/L	1	05/21/19 03:26 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/21/19 03:26 PM
Lithium	0.119	0.00500	0.0100		mg/L	1	05/21/19 03:26 PM
Magnesium	553	10.0	30.0		mg/L	100	05/22/19 12:03 PM
Molybdenum	0.0550	0.00200	0.00500		mg/L	1	05/21/19 03:26 PM
Potassium	34.6	10.0	30.0		mg/L	100	05/22/19 12:03 PM
Selenium	2.96	0.200	0.500		mg/L	100	05/22/19 12:03 PM
Sodium	240	10.0	30.0		mg/L	100	05/22/19 12:03 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/21/19 03:26 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	0.000119	0.0000800	0.000200	J	mg/L	1	05/22/19 10:13 AM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **JL**
Chloride	513	30.0	100		mg/L	100	05/16/19 04:54 PM
Fluoride	24.3	1.00	4.00		mg/L	10	05/15/19 01:39 PM
Nitrate-N	11.1	0.100	0.500		mg/L	1	05/15/19 05:39 PM
Sulfate	2900	100	300		mg/L	100	05/16/19 04:54 PM
ALKALINITY		**M2320 B**					Analyst: **CC**
Alkalinity, Bicarbonate (As CaCO3)	79.1	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:08 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:08 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:08 PM
Alkalinity, Total (As CaCO3)	79.1	20.0	20.0		mg/L @ pH 4.52	1	05/16/19 04:08 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	05/24/19
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/20/19 03:54 PM

LUMINANT

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: *30-May-19*

CLIENT:	Golder	**Client Sample ID:**	Pond Sample
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	1905167-02
Project No:	19122262-C	**Collection Date:**	05/14/19 10:20 AM
Lab Order:	1905167	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **CC**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/15/19 02:47 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	5380	50.0	50.0		mg/L	1	05/17/19 11:40 AM

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_190522A

The QC data in batch 91017 applies to the following samples: 1905167-01B, 1905167-02B

Sample ID	**MB-91017**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 10:02:31 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.0000800	0.000200								

Sample ID	**LCS-91017**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 10:04:46 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00187	0.000200	0.00200	0	93.5	85	115			

Sample ID	**LCSD-91017**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 10:07:02 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00186	0.000200	0.00200	0	93.0	85	115	0.536	15	

Sample ID	**1905168-01B MS**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:23:23 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.00100	0.00200	0	97.8	80	120			

Sample ID	**1905168-01B MSD**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:25:39 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00194	0.00100	0.00200	0	97.0	80	120	0.770	15	

Sample ID	**1905168-01B SD**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:27:56 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.00200	0.00500	0	0				0	10	

Sample ID	**1905168-01B PDS**	Batch ID:	**91017**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:30:13 AM**	Prep Date:	**5/21/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0122	0.00100	0.0125	0	97.6	85	115			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **CETAC2_HG_190522A**

Sample ID	**ICV-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 9:57:56 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00383	0.000200	0.00400	0	95.8	90	110			

Sample ID	**CCV1-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 10:41:04 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00202	0.000200	0.00200	0	101	90	110			

Sample ID	**CCV2-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 11:08:23 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	90	110			

Sample ID	**CCV3-190522**	Batch ID:	**R104223**	TestNo:	**SW7470A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**CETAC2_HG_190522A**	Analysis Date:	**5/22/2019 2:51:11 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	90	110			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190522B**

The QC data in batch 90990 applies to the following samples: 1905167-01B, 1905167-02B

Sample ID	**MB-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:49:00 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	<0.0100	0.0300								

Sample ID	**LCS-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:51:00 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.203	0.0300	0.200	0	102	80	120			

Sample ID	**LCSD-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:53:00 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.202	0.0300	0.200	0	101	80	120	0.579	15	

Sample ID	**1905218-06A SD**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:59:00 AM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.103	0.150	0	0.0953				7.85	10	

Sample ID	**1905218-06A PDS**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 12:23:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.277	0.0300	0.200	0.0953	91.1	80	120			

Sample ID	**1905218-06A MS**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 12:25:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.288	0.0300	0.200	0.0953	96.1	80	120			

Sample ID	**1905218-06A MSD**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 12:27:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.282	0.0300	0.200	0.0953	93.3	80	120	2.01	15	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS4_190522B**

Sample ID	**ICV-190522**	Batch ID:	**R104220**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:38:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.104	0.0300	0.100	0	104	90	110			
Calcium	2.35	0.300	2.50	0	94.2	90	110			
Magnesium	2.45	0.300	2.50	0	98.2	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			

Sample ID	**LCVL-190522**	Batch ID:	**R104220**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 11:43:00 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0197	0.0300	0.0200	0	98.5	70	130			
Calcium	0.0981	0.300	0.100	0	98.1	70	130			
Magnesium	0.0967	0.300	0.100	0	96.7	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			

Sample ID	**CCV1-190522**	Batch ID:	**R104220**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 12:33:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.210	0.0300	0.200	0	105	90	110			
Calcium	4.65	0.300	5.00	0	92.9	90	110			
Magnesium	5.05	0.300	5.00	0	101	90	110			
Potassium	5.15	0.300	5.00	0	103	90	110			
Selenium	0.215	0.00500	0.200	0	107	90	110			
Sodium	5.08	0.300	5.00	0	102	90	110			

Sample ID	**LCVL1-190522**	Batch ID:	**R104220**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCVL**	Run ID:	**ICP-MS4_190522B**	Analysis Date:	**5/22/2019 12:38:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0203	0.0300	0.0200	0	102	70	130			
Calcium	0.0876	0.300	0.100	0	87.6	70	130			
Magnesium	0.0970	0.300	0.100	0	97.0	70	130			
Potassium	0.0932	0.300	0.100	0	93.2	70	130			
Selenium	0.00547	0.00500	0.00500	0	109	70	130			
Sodium	0.102	0.300	0.100	0	102	70	130			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

The QC data in batch 90990 applies to the following samples: 1905167-01B, 1905167-02B

Sample ID	**MB-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:11:00 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								
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-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:13:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.209	0.00250	0.200	0	104	80	120			
Arsenic	0.208	0.00500	0.200	0	104	80	120			
Barium	0.208	0.0100	0.200	0	104	80	120			
Beryllium	0.200	0.00100	0.200	0	99.8	80	120			
Cadmium	0.211	0.00100	0.200	0	105	80	120			
Calcium	5.18	0.300	5.00	0	104	80	120			
Chromium	0.209	0.00500	0.200	0	105	80	120			
Cobalt	0.216	0.00500	0.200	0	108	80	120			
Iron	5.40	0.100	5.00	0	108	80	120			
Lead	0.203	0.00100	0.200	0	101	80	120			
Lithium	0.214	0.0100	0.200	0	107	80	120			
Magnesium	5.35	0.300	5.00	0	107	80	120			
Molybdenum	0.204	0.00500	0.200	0	102	80	120			
Potassium	4.99	0.300	5.00	0	99.9	80	120			
Selenium	0.208	0.00500	0.200	0	104	80	120			
Sodium	5.38	0.300	5.00	0	108	80	120			
Thallium	0.200	0.00150	0.200	0	100	80	120			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**LCSD-90990**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:15:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.209	0.00250	0.200	0	105	80	120	0.307	15	
Arsenic	0.207	0.00500	0.200	0	104	80	120	0.318	15	
Barium	0.207	0.0100	0.200	0	103	80	120	0.392	15	
Beryllium	0.198	0.00100	0.200	0	99.0	80	120	0.810	15	
Cadmium	0.211	0.00100	0.200	0	105	80	120	0.119	15	
Calcium	5.16	0.300	5.00	0	103	80	120	0.293	15	
Chromium	0.209	0.00500	0.200	0	105	80	120	0.129	15	
Cobalt	0.215	0.00500	0.200	0	108	80	120	0.352	15	
Iron	5.41	0.100	5.00	0	108	80	120	0.077	15	
Lead	0.204	0.00100	0.200	0	102	80	120	0.722	15	
Lithium	0.211	0.0100	0.200	0	105	80	120	1.44	15	
Magnesium	5.37	0.300	5.00	0	107	80	120	0.251	15	
Molybdenum	0.202	0.00500	0.200	0	101	80	120	0.822	15	
Potassium	5.00	0.300	5.00	0	100	80	120	0.175	15	
Selenium	0.208	0.00500	0.200	0	104	80	120	0.274	15	
Sodium	5.38	0.300	5.00	0	108	80	120	0.080	15	
Thallium	0.202	0.00150	0.200	0	101	80	120	0.737	15	

Sample ID	**1905218-06A SD**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**SD**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:22:00 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	0.0519	0.0500	0	0.0510				1.62	10	
Beryllium	<0.00150	0.00500	0	0				0	10	
Cadmium	<0.00150	0.00500	0	0				0	10	
Calcium	23.9	1.50	0	23.8				0.464	10	
Chromium	<0.0100	0.0250	0	0				0	10	
Cobalt	<0.0150	0.0250	0	0				0	10	
Iron	0.185	0.500	0	0.186				0.629	10	
Lead	<0.00150	0.00500	0	0				0	10	
Lithium	0.0477	0.0500	0	0.0462				3.27	10	
Magnesium	12.2	1.50	0	12.2				0.282	10	
Molybdenum	<0.0100	0.0250	0	0				0	10	
Potassium	1.83	1.50	0	2.08				12.6	10	R
Selenium	<0.0100	0.0250	0	0				0	10	
Sodium	53.2	1.50	0	51.9				2.54	10	
Thallium	<0.00250	0.00750	0	0				0	10	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**1905218-06A PDS**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**PDS**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:44:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.192	0.00250	0.200	0	96.2	80	120			
Arsenic	0.183	0.00500	0.200	0	91.7	80	120			
Barium	0.237	0.0100	0.200	0.0510	92.9	80	120			
Beryllium	0.179	0.00100	0.200	0	89.3	80	120			
Cadmium	0.194	0.00100	0.200	0	97.0	80	120			
Calcium	26.2	0.300	5.00	23.8	48.1	80	120			S
Chromium	0.198	0.00500	0.200	0	98.8	80	120			
Cobalt	0.191	0.00500	0.200	0	95.6	80	120			
Iron	5.16	0.100	5.00	0.186	99.5	80	120			
Lead	0.190	0.00100	0.200	0	94.8	80	120			
Lithium	0.238	0.0100	0.200	0.0462	96.1	80	120			
Magnesium	15.8	0.300	5.00	12.2	72.5	80	120			S
Molybdenum	0.179	0.00500	0.200	0	89.4	80	120			
Potassium	6.49	0.300	5.00	2.08	88.3	80	120			
Selenium	0.178	0.00500	0.200	0	89.1	80	120			
Sodium	51.5	0.300	5.00	51.9	-7.46	80	120			S
Thallium	0.189	0.00150	0.200	0	94.5	80	120			

Sample ID	**1905218-06A MS**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:46:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.196	0.00250	0.200	0	98.1	80	120			
Arsenic	0.189	0.00500	0.200	0	94.4	80	120			
Barium	0.244	0.0100	0.200	0.0510	96.3	80	120			
Beryllium	0.183	0.00100	0.200	0	91.6	80	120			
Cadmium	0.196	0.00100	0.200	0	98.0	80	120			
Calcium	27.3	0.300	5.00	23.8	69.1	80	120			S
Chromium	0.197	0.00500	0.200	0	98.5	80	120			
Cobalt	0.194	0.00500	0.200	0	96.9	80	120			
Iron	5.24	0.100	5.00	0.186	101	80	120			
Lead	0.193	0.00100	0.200	0	96.5	80	120			
Lithium	0.241	0.0100	0.200	0.0462	97.6	80	120			
Magnesium	16.6	0.300	5.00	12.2	89.7	80	120			
Molybdenum	0.189	0.00500	0.200	0	94.4	80	120			
Potassium	6.74	0.300	5.00	2.08	93.2	80	120			
Selenium	0.183	0.00500	0.200	0	91.3	80	120			
Sodium	53.9	0.300	5.00	51.9	39.6	80	120			S
Thallium	0.192	0.00150	0.200	0	95.8	80	120			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID	**1905218-06A MSD**	Batch ID:	**90990**	TestNo:	**SW6020A**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**ICP-MS5_190521A**	Analysis Date:	**5/21/2019 3:49:00 PM**	Prep Date:	**5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.3	80	120	1.17	15	
Arsenic	0.189	0.00500	0.200	0	94.3	80	120	0.111	15	
Barium	0.246	0.0100	0.200	0.0510	97.3	80	120	0.778	15	
Beryllium	0.181	0.00100	0.200	0	90.4	80	120	1.36	15	
Cadmium	0.197	0.00100	0.200	0	98.7	80	120	0.775	15	
Calcium	27.4	0.300	5.00	23.8	72.7	80	120	0.665	15	S
Chromium	0.198	0.00500	0.200	0	99.1	80	120	0.607	15	
Cobalt	0.196	0.00500	0.200	0	97.8	80	120	0.893	15	
Iron	5.30	0.100	5.00	0.186	102	80	120	1.09	15	
Lead	0.192	0.00100	0.200	0	96.1	80	120	0.414	15	
Lithium	0.238	0.0100	0.200	0.0462	96.0	80	120	1.33	15	
Magnesium	16.8	0.300	5.00	12.2	92.6	80	120	0.883	15	
Molybdenum	0.191	0.00500	0.200	0	95.7	80	120	1.34	15	
Potassium	6.80	0.300	5.00	2.08	94.5	80	120	0.968	15	
Selenium	0.183	0.00500	0.200	0	91.7	80	120	0.351	15	
Sodium	54.6	0.300	5.00	51.9	54.2	80	120	1.35	15	S
Thallium	0.192	0.00150	0.200	0	96.0	80	120	0.248	15	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID **ICV-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:10:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.102	0.00250	0.100	0	102	90	110			
Arsenic	0.103	0.00500	0.100	0	103	90	110			
Barium	0.0990	0.0100	0.100	0	99.0	90	110			
Beryllium	0.0972	0.00100	0.100	0	97.2	90	110			
Cadmium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.52	0.300	2.50	0	101	90	110			
Chromium	0.103	0.00500	0.100	0	103	90	110			
Cobalt	0.108	0.00500	0.100	0	108	90	110			
Iron	2.60	0.100	2.50	0	104	90	110			
Lead	0.0982	0.00100	0.100	0	98.2	90	110			
Lithium	0.103	0.0100	0.100	0	103	90	110			
Magnesium	2.49	0.300	2.50	0	99.7	90	110			
Molybdenum	0.0930	0.00500	0.100	0	93.0	90	110			
Potassium	2.38	0.300	2.50	0	95.3	90	110			
Selenium	0.104	0.00500	0.100	0	104	90	110			
Sodium	2.56	0.300	2.50	0	103	90	110			
Thallium	0.0977	0.00150	0.100	0	97.7	90	110			

Sample ID **LCVL-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 12:15:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00183	0.00250	0.00200	0	91.4	70	130			
Arsenic	0.00504	0.00500	0.00500	0	101	70	130			
Barium	0.00459	0.0100	0.00500	0	91.8	70	130			
Beryllium	0.000968	0.00100	0.00100	0	96.8	70	130			
Cadmium	0.00106	0.00100	0.00100	0	106	70	130			
Calcium	0.104	0.300	0.100	0	104	70	130			
Chromium	0.00482	0.00500	0.00500	0	96.4	70	130			
Cobalt	0.00494	0.00500	0.00500	0	98.7	70	130			
Iron	0.0979	0.100	0.100	0	97.9	70	130			
Lead	0.000882	0.00100	0.00100	0	88.2	70	130			
Lithium	0.00996	0.0100	0.0100	0	99.6	70	130			
Magnesium	0.0983	0.300	0.100	0	98.3	70	130			
Molybdenum	0.00464	0.00500	0.00500	0	92.8	70	130			
Potassium	0.0691	0.300	0.100	0	69.1	70	130			S
Selenium	0.00633	0.00500	0.00500	0	127	70	130			
Sodium	0.0960	0.300	0.100	0	96.0	70	130			
Thallium	0.000944	0.00150	0.00100	0	94.4	70	130			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID **CCV4-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 3:00:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.203	0.00250	0.200	0	101	90	110			
Arsenic	0.203	0.00500	0.200	0	102	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.192	0.00100	0.200	0	95.9	90	110			
Cadmium	0.204	0.00100	0.200	0	102	90	110			
Calcium	4.96	0.300	5.00	0	99.3	90	110			
Chromium	0.203	0.00500	0.200	0	101	90	110			
Cobalt	0.213	0.00500	0.200	0	106	90	110			
Iron	5.15	0.100	5.00	0	103	90	110			
Lead	0.198	0.00100	0.200	0	98.8	90	110			
Lithium	0.205	0.0100	0.200	0	103	90	110			
Magnesium	5.15	0.300	5.00	0	103	90	110			
Molybdenum	0.199	0.00500	0.200	0	99.7	90	110			
Potassium	4.83	0.300	5.00	0	96.6	90	110			
Selenium	0.200	0.00500	0.200	0	100	90	110			
Sodium	5.26	0.300	5.00	0	105	90	110			
Thallium	0.197	0.00150	0.200	0	98.4	90	110			

Sample ID **LCVL4-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 3:05:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00207	0.00250	0.00200	0	104	70	130			
Arsenic	0.00491	0.00500	0.00500	0	98.1	70	130			
Barium	0.00487	0.0100	0.00500	0	97.5	70	130			
Beryllium	0.000934	0.00100	0.00100	0	93.4	70	130			
Cadmium	0.00104	0.00100	0.00100	0	104	70	130			
Calcium	0.0913	0.300	0.100	0	91.3	70	130			
Chromium	0.00486	0.00500	0.00500	0	97.1	70	130			
Cobalt	0.00525	0.00500	0.00500	0	105	70	130			
Iron	0.101	0.100	0.100	0	101	70	130			
Lead	0.000868	0.00100	0.00100	0	86.8	70	130			
Lithium	0.0102	0.0100	0.0100	0	102	70	130			
Magnesium	0.104	0.300	0.100	0	104	70	130			
Molybdenum	0.00483	0.00500	0.00500	0	96.6	70	130			
Potassium	0.0524	0.300	0.100	0	52.4	70	130			S
Selenium	0.00506	0.00500	0.00500	0	101	70	130			
Sodium	0.144	0.300	0.100	0	144	70	130			S
Thallium	0.000962	0.00150	0.00100	0	96.2	70	130			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_190521A**

Sample ID **CCV5-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 3:51:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.5	90	110			
Arsenic	0.199	0.00500	0.200	0	99.7	90	110			
Barium	0.194	0.0100	0.200	0	96.8	90	110			
Beryllium	0.181	0.00100	0.200	0	90.6	90	110			
Cadmium	0.197	0.00100	0.200	0	98.4	90	110			
Calcium	4.83	0.300	5.00	0	96.7	90	110			
Chromium	0.199	0.00500	0.200	0	99.4	90	110			
Cobalt	0.207	0.00500	0.200	0	104	90	110			
Iron	5.09	0.100	5.00	0	102	90	110			
Lead	0.192	0.00100	0.200	0	96.2	90	110			
Lithium	0.198	0.0100	0.200	0	99.0	90	110			
Magnesium	5.01	0.300	5.00	0	100	90	110			
Molybdenum	0.192	0.00500	0.200	0	95.8	90	110			
Potassium	4.71	0.300	5.00	0	94.2	90	110			
Selenium	0.200	0.00500	0.200	0	99.8	90	110			
Sodium	5.09	0.300	5.00	0	102	90	110			
Thallium	0.192	0.00150	0.200	0	95.8	90	110			

Sample ID **LCVL5-190521** Batch ID: **R104204** TestNo: **SW6020A** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_190521A** Analysis Date: **5/21/2019 3:55:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00208	0.00250	0.00200	0	104	70	130			
Arsenic	0.00481	0.00500	0.00500	0	96.1	70	130			
Barium	0.00469	0.0100	0.00500	0	93.8	70	130			
Beryllium	0.000861	0.00100	0.00100	0	86.1	70	130			
Cadmium	0.000998	0.00100	0.00100	0	99.8	70	130			
Calcium	0.102	0.300	0.100	0	102	70	130			
Chromium	0.00463	0.00500	0.00500	0	92.5	70	130			
Cobalt	0.00508	0.00500	0.00500	0	102	70	130			
Iron	0.0987	0.100	0.100	0	98.7	70	130			
Lead	0.000837	0.00100	0.00100	0	83.7	70	130			
Lithium	0.00978	0.0100	0.0100	0	97.8	70	130			
Magnesium	0.0989	0.300	0.100	0	98.9	70	130			
Molybdenum	0.00479	0.00500	0.00500	0	95.8	70	130			
Potassium	0.0352	0.300	0.100	0	35.2	70	130			S
Selenium	0.00485	0.00500	0.00500	0	97.0	70	130			
Sodium	0.135	0.300	0.100	0	135	70	130			S
Thallium	0.000929	0.00150	0.00100	0	92.9	70	130			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC2_190515A**

The QC data in batch 90908 applies to the following samples: 1905167-01C, 1905167-02C

Sample ID	**MB-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:10:50 AM**	Prep Date:	**5/15/2019**

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-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:26:50 AM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.1	1.00	10.00	0	101	90	110			
Fluoride	4.00	0.400	4.000	0	99.9	90	110			
Nitrate-N	5.09	0.500	5.000	0	102	90	110			
Sulfate	30.4	3.00	30.00	0	101	90	110			

Sample ID	**LCSD-90908**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 10:42:50 AM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.674	20	
Fluoride	4.05	0.400	4.000	0	101	90	110	1.26	20	
Nitrate-N	5.08	0.500	5.000	0	102	90	110	0.146	20	
Sulfate	30.9	3.00	30.00	0	103	90	110	1.55	20	

Sample ID	**1905167-01CMS**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:07:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	222	10.0	200.0	12.69	105	90	110			
Fluoride	211	4.00	200.0	0	106	90	110			
Nitrate-N	45.6	5.00	45.16	0	101	90	110			
Sulfate	239	30.0	200.0	41.32	98.7	90	110			

Sample ID	**1905167-01CMSD**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:23:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	221	10.0	200.0	12.69	104	90	110	0.308	20	
Fluoride	210	4.00	200.0	0	105	90	110	0.286	20	
Nitrate-N	45.8	5.00	45.16	0	101	90	110	0.495	20	
Sulfate	237	30.0	200.0	41.32	97.7	90	110	0.821	20	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC2_190515A**

Sample ID	**1905167-02CMS**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 1:55:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	686	10.0	200.0	528.8	78.8	90	110			S
Fluoride	229	4.00	200.0	24.26	102	90	110			
Nitrate-N	56.2	5.00	45.16	10.55	101	90	110			
Sulfate	2520	30.0	200.0	0	1260	90	110			S

Sample ID	**1905167-02CMSD**	Batch ID:	**90908**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 2:11:36 PM**	Prep Date:	**5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	688	10.0	200.0	528.8	79.8	90	110	0.292	20	S
Fluoride	229	4.00	200.0	24.26	102	90	110	0.251	20	
Nitrate-N	57.3	5.00	45.16	10.55	103	90	110	1.85	20	
Sulfate	<10.0	30.0	200.0	0	0	90	110	0	20	S

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC2_190515A**

Sample ID	**ICV-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 9:38:50 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	25.8	1.00	25.00	0	103	90	110			
Fluoride	10.3	0.400	10.00	0	103	90	110			
Nitrate-N	13.0	0.500	12.50	0	104	90	110			
Sulfate	77.8	3.00	75.00	0	104	90	110			

Sample ID	**CCV1-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 4:51:36 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.4	1.00	10.00	0	104	90	110			
Fluoride	4.15	0.400	4.000	0	104	90	110			
Nitrate-N	5.13	0.500	5.000	0	103	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

Sample ID	**CCV2-190515**	Batch ID:	**R104097**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC2_190515A**	Analysis Date:	**5/15/2019 8:35:35 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.6	1.00	10.00	0	106	90	110			
Fluoride	4.20	0.400	4.000	0	105	90	110			
Nitrate-N	5.20	0.500	5.000	0	104	90	110			
Sulfate	31.5	3.00	30.00	0	105	90	110			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC4_190516A**

The QC data in batch 90935 applies to the following samples: 1905167-02C

Sample ID	**MB-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MBLK**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:26:21 AM**	Prep Date:	**5/16/2019**

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-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:42:21 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.61	1.00	10.00	0	96.1	90	110			
Sulfate	29.5	3.00	30.00	0	98.3	90	110			

Sample ID	**LCSD-90935**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**LCSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 10:58:21 AM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.68	1.00	10.00	0	96.8	90	110	0.745	20	
Sulfate	29.8	3.00	30.00	0	99.2	90	110	0.935	20	

Sample ID	**1905167-02CMS**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:10:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2490	100	2000	512.8	98.6	90	110			
Sulfate	4830	300	2000	2897	96.9	90	110			

Sample ID	**1905167-02CMSD**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:26:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2500	100	2000	512.8	99.4	90	110	0.622	20	
Sulfate	4880	300	2000	2897	99.1	90	110	0.920	20	

Sample ID	**1905168-01CMS**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MS**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 5:58:26 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2170	100	2000	212.8	98.1	90	110			
Sulfate	4380	300	2000	2468	95.6	90	110			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC4_190516A**

Sample ID	**1905168-01CMSD**	Batch ID:	**90935**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**MSD**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 6:14:27 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2170	100	2000	212.8	97.8	90	110	0.235	20	
Sulfate	4390	300	2000	2468	96.2	90	110	0.273	20	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **IC4_190516A**

Sample ID	**ICV-190516**	Batch ID:	**R104119**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 9:54:21 AM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.7	1.00	25.00	0	99.0	90	110			
Sulfate	74.5	3.00	75.00	0	99.4	90	110			

Sample ID	**CCV1-190516**	Batch ID:	**R104119**	TestNo:	**E300**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**IC4_190516A**	Analysis Date:	**5/16/2019 9:10:26 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			
Sulfate	30.2	3.00	30.00	0	101	90	110			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_190516A**

The QC data in batch 90940 applies to the following samples: 1905167-01C, 1905167-02C

Sample ID **MB-90940** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.47**
SampType: **MBLK** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:00:00 PM** Prep Date: **5/16/2019**

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-90940** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.08**
SampType: **LCS** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:04:00 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	52.3	20.0	50.00	0	105	74	129			

Sample ID **1905134-01C DUP** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.52**
SampType: **DUP** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 2:15:00 PM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	205	20.0	0	205.8				0.536	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)	205	20.0	0	205.8				0.536	20	

Sample ID **1905168-05C DUP** Batch ID: **90940** TestNo: **M2320 B** Units: **mg/L @ pH 4.51**
SampType: **DUP** Run ID: **TITRATOR_190516A** Analysis Date: **5/16/2019 4:30:00 PM** Prep Date: **5/16/2019**

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

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_190516A**

Sample ID	**ICV-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.34**
SampType:	**ICV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 1:58:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	8.64	20.0	0							
Alkalinity, Carbonate (As CaCO3)	89.3	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	97.9	20.0	100.0	0	97.9	98	102			

Sample ID	**CCV1-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.25**
SampType:	**CCV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 3:39:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	21.7	20.0	0							
Alkalinity, Carbonate (As CaCO3)	76.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	98.5	20.0	100.0	0	98.5	90	110			

Sample ID	**CCV2-190516**	Batch ID:	**R104124**	TestNo:	**M2320 B**	Units:	**mg/L @ pH 4.21**
SampType:	**CCV**	Run ID:	**TITRATOR_190516A**	Analysis Date:	**5/16/2019 4:35:00 PM**	Prep Date:	**5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	17.7	20.0	0							
Alkalinity, Carbonate (As CaCO3)	81.3	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			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190515B**

The QC data in batch 90921 applies to the following samples: 1905167-01C, 1905167-02C

Sample ID **MB-90921** Batch ID: **90921** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_190515B** Analysis Date: **5/15/2019 12:42:00 PM** Prep Date: **5/15/2019**

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

Sample ID **LCS-90921** Batch ID: **90921** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_190515B** Analysis Date: **5/15/2019 12:43:00 PM** Prep Date: **5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.513	0.100	0.5000	0	103	80	120			

Sample ID **LCSD-90921** Batch ID: **90921** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_190515B** Analysis Date: **5/15/2019 12:43:00 PM** Prep Date: **5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.504	0.100	0.5000	0	101	80	120	1.77	15	

Sample ID **1905168-01CMS** Batch ID: **90921** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_190515B** Analysis Date: **5/15/2019 12:45:00 PM** Prep Date: **5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.587	0.100	0.5000	0.07700	102	80	120			

Sample ID **1905168-01CMSD** Batch ID: **90921** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_190515B** Analysis Date: **5/15/2019 12:45:00 PM** Prep Date: **5/15/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.525	0.100	0.5000	0.07700	89.6	80	120	11.2	15	

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190515B**

Sample ID	**ICV-190515**	Batch ID:	**R104071**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:41:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.204	0.100	0.2000	0	102	85	115			

Sample ID	**CCV1-190515**	Batch ID:	**R104071**	TestNo:	**M4500-P E**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190515B**	Analysis Date:	**5/15/2019 12:51:00 PM**	Prep Date:	

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	85	115			

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190520A**

The QC data in batch 91002 applies to the following samples: 1905167-01A, 1905167-02A

Sample ID **MB-91002** Batch ID: **91002** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_190520A** Analysis Date: **5/20/2019 3:53:00 PM** Prep Date: **5/20/2019**

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

Sample ID **LCS-91002** Batch ID: **91002** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_190520A** Analysis Date: **5/20/2019 3:53:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0888	0.100	0.1000	0	88.8	85	115			N

Sample ID **LCSD-91002** Batch ID: **91002** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_190520A** Analysis Date: **5/20/2019 3:53:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0879	0.100	0.1000	0	87.9	85	115	1.05	15	N

Sample ID **1905185-11AMS** Batch ID: **91002** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_190520A** Analysis Date: **5/20/2019 4:03:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0860	0.100	0.1000	0	86.0	85	115			N

Sample ID **1905185-11AMSD** Batch ID: **91002** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_190520A** Analysis Date: **5/20/2019 4:03:00 PM** Prep Date: **5/20/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0861	0.100	0.1000	0	86.1	85	115	0.116	15	N

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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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_190520A**

Sample ID	**ICV-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**ICV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:52:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0875	0.100	0.1000	0	87.5	85	115			N

Sample ID	**CCV1-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 3:59:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.197	0.100	0.2000	0	98.4	85	115			N

Sample ID	**CCV2-190520**	Batch ID:	**R104177**	TestNo:	**M3500-Fe D**	Units:	**mg/L**
SampType:	**CCV**	Run ID:	**UV/VIS_2_190520A**	Analysis Date:	**5/20/2019 4:12:00 PM**	Prep Date:	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.183	0.100	0.2000	0	91.7	85	115			N

LUMINANT

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: 1905167
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: **WC_190517D**

The QC data in batch 90953 applies to the following samples: 1905167-01C, 1905167-02C

Sample ID **MB-90953** Batch ID: **90953** TestNo: **M2540C** Units: **mg/L**
SampType: **MBLK** Run ID: **WC_190517D** Analysis Date: **5/17/2019 11:40:00 AM** Prep Date: **5/16/2019**

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-90953** Batch ID: **90953** TestNo: **M2540C** Units: **mg/L**
SampType: **LCS** Run ID: **WC_190517D** Analysis Date: **5/17/2019 11:40:00 AM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	745	10.0	745.6	0	99.9	90	113			

Sample ID **1905167-02C-DUP** Batch ID: **90953** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_190517D** Analysis Date: **5/17/2019 11:40:00 AM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	5340	50.0	0	5375				0.747	5	

Sample ID **1905168-02C-DUP** Batch ID: **90953** TestNo: **M2540C** Units: **mg/L**
SampType: **DUP** Run ID: **WC_190517D** Analysis Date: **5/17/2019 11:40:00 AM** Prep Date: **5/16/2019**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	940	50.0	0	910.0				3.24	5	

LUMINANT

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

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National Center for Testing & Innovation

ANALYTICAL REPORT

May 29, 2019

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

DHL Analytical, Inc.

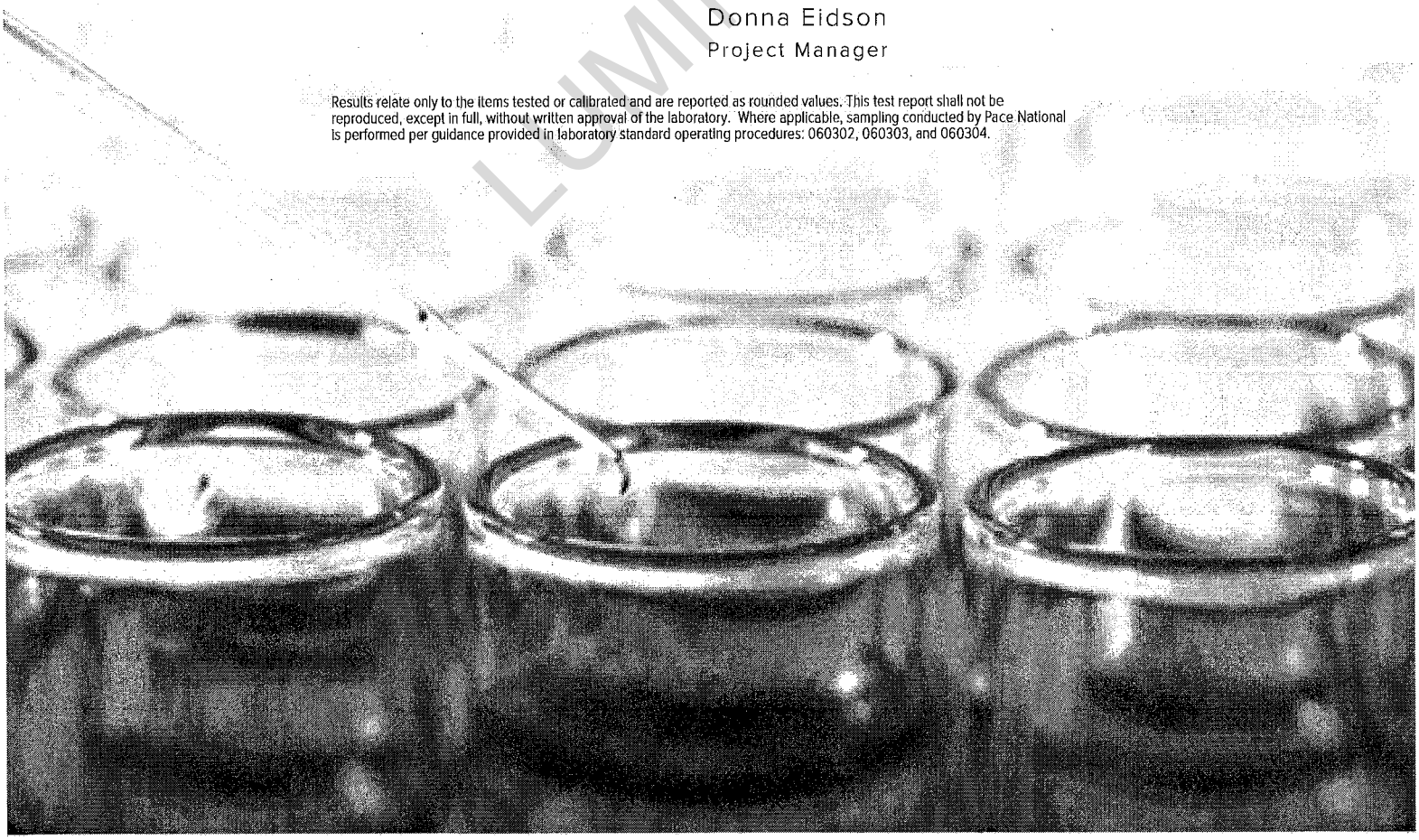
Sample Delivery Group:	L1100947
Samples Received:	05/21/2019
Project Number:	1905167
Description:	
Report To:	John DuPont 2300 Double Creek Drive Round Rock, TX 78664

LUMINANT

Entire Report Reviewed By: DEidson

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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LAKE SAMPLE L1100947-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 10:05	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

LAKE SAMPLE L1100947-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/14/19 10:20	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

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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

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.369		0.449	0.769	05/28/2019 10:55	WG1284744
(T) Barium	*102*			*62.0-143*	*05/28/2019 10:55*	WG1284744
(T) Yttrium	*118*			*79.0-136*	*05/28/2019 10:55*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.772		0.734	1.08	05/28/2019 10:55	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.403		0.285	0.311	05/24/2019 17:05	WG1284773
(T) Barium-133	*92.1*			*30.0-143*	*05/24/2019 17:05*	WG1284773

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Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.0402		0.349	0.599	05/28/2019 10:55	WG1284744
(T) Barium	*113*			*62.0-143*	*05/28/2019 10:55*	WG1284744
(T) Yttrium	*114*			*79.0-136*	*05/28/2019 10:55*	WG1284744

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.853		0.752	0.895	05/28/2019 10:55	WG1284773

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.853		0.403	0.296	05/24/2019 17:05	WG1284773
(T) Barium-133	*83.8*			*30.0-143*	*05/24/2019 17:05*	WG1284773

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QUALITY CONTROL SUMMARY

L1100947-01,02

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*							

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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*							

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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.

FINAL

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	LAO00356
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

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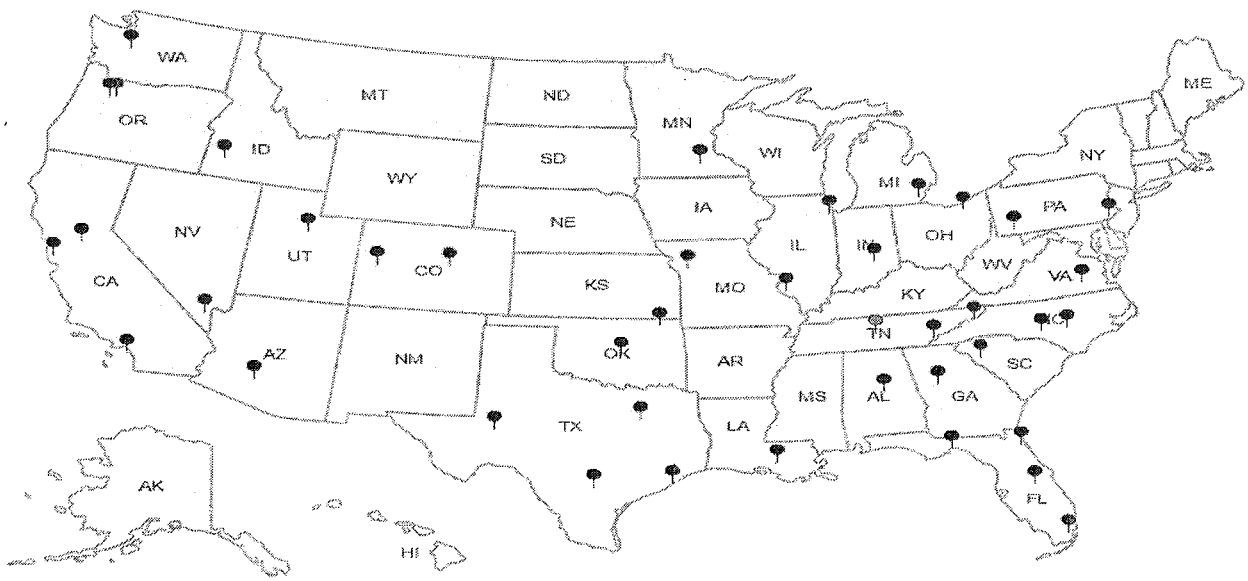
Our Locations

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: DHLRRTX	SDG#:	1100947	
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?		✓	

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1100947

CHAIN-OF-CUSTODY RECORD

H004

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

Work Order: 1905167

Subcontractor:
Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

15-May-19

Sample Id	Matrix	DHL#	Date Collected	Bottle Type	Ra-228 E904.0	Ra-226 M7500 Ra B M	Requested Tests			
					<2	<2				
Lake Sample	Aqueous	-01D	05/14/19 10:05 AM	1LHDPEHNO3		1				-01
Lake Sample	Aqueous	-01E	05/14/19 10:05 AM	1LHDPEHNO3	1					01
Pond Sample	Aqueous	-02D	05/14/19 10:20 AM	1LHDPEHNO3		1				02
Pond Sample	Aqueous	-02E	05/14/19 10:20 AM	1LHDPEHNO3	1					02

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

	Date/Time		Date/Time
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LUMINANT

Quantitative X-Ray Diffraction by Rietveld Refinement

Report Prepared for:	*Golder Associates - Will Vienne*
Project Number/ LIMS No.	*17431-01 / MI7012-JUN19*
Batch:	*Martin Lake Ash Ponds*
Sample Receipt:	*June 13, 2019*
Sample Analysis:	*June 28, 2019*
Reporting Date:	*July 19, 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.

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Contents:

1) Method Summary
2) Summary of Mineral Assemblages
3) Quantitative XRD Results
4) XRD Pattern(s)

Ben Eaton
Junior Mineralogist

Lain Glossop H.B.Sc
Senior Mineralogist

Method Summary

Mineral Identification and Interpretation:

Mineral identification and interpretation involve matching the diffraction pattern of a test sample material to patterns of single-phase reference materials. The reference patterns from the Crystallography Open Database (COD) and the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD).

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

Quantitative Rietveld Analysis:

Panalytical HighScore Plus software was used to perform the quantitative Rietveld Analysis. This software uses a graphics based profile analysis program built around a non-linear least squares fitting system, to quantitatively determine the amount of different phases present in a multicomponent sample. Whole pattern analyses are predicated by the fact that the X-ray diffraction pattern is a total sum of both instrumental and specimen factors. Unlike other peak intensity-based methods, the Rietveld method uses a least squares approach to refine a theoretical line profile (shown as a blue pattern in the analyses plots) until it matches the obtained experimental patterns (shown as the coloured pattern in the analyses plots).

Rietveld refinement is completed with a set of minerals specifically identified for the sample. Zero values indicate that the mineral was included in the refinement calculations, but the calculated concentration was less than 0.5 wt%. Minerals not identified by the analyst are not included in refinement calculations for specific samples and are indicated with a dash.

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WARNING: The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

Mineral/Compound	1 AP-2019-1 (30-31")	2 AP-2019-2 (35-36")	3 AP-2019-3 (18-19")
	(wt %)	(wt %)	(wt %)
Quartz	60.8	66.0	99.2
Albite	22.3	16.2	0.8
K-Feldspar	1.3	1.4	--
Chlorite	1.3	2.7	--
Muscovite	1.4	3.2	--
*Vermiculite	0.9	0.7	--
*Kaolinite	3.0	3.4	--
Illite	8.3	6.1	--
*Montmorillonite	0.7	0.4	--
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.

** Tentative identification of clays only, further clay XRD analysis will be required for positive identification*

Mineral/Compound	Formula
Quartz	SiO_2
Albite	$NaAlSi_3O_8$
K-Feldspar	$KAlSi_3O_8$
Chlorite	$(Mg_3,Fe_2)Al(AlSi_3)O_{10}(OH)_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Vermiculite	$(Mg,Fe,Al)_2(Al,Si)_4O_{10}(OH)_2 \cdot 4(H_2O)$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$
Montmorillonite	$Na_{0.2}Ca_{0.1}Al_{1.5}Mg_{0.5}Si_4O_{10}(OH)_2 \cdot 4(H_2O)$

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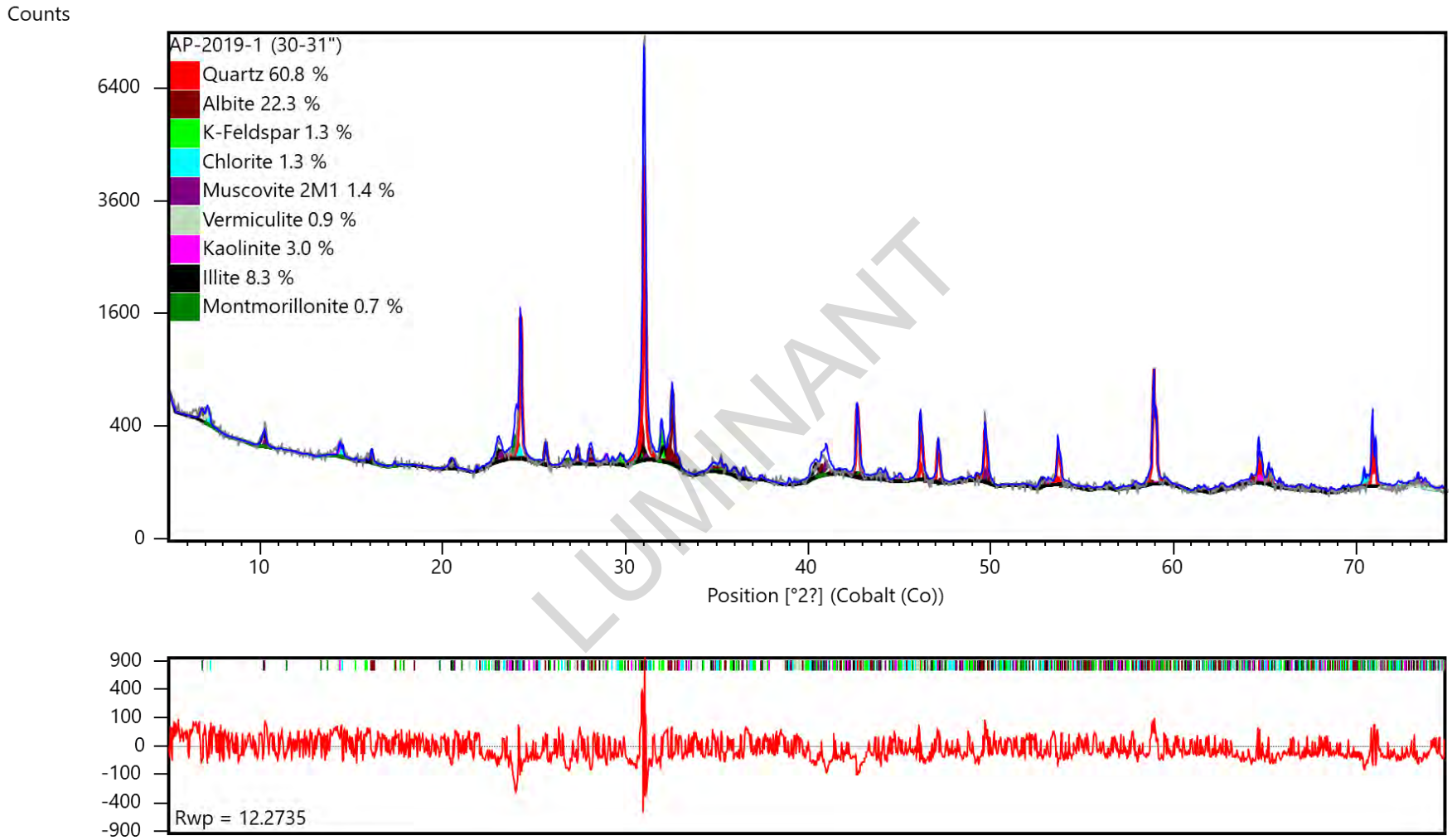

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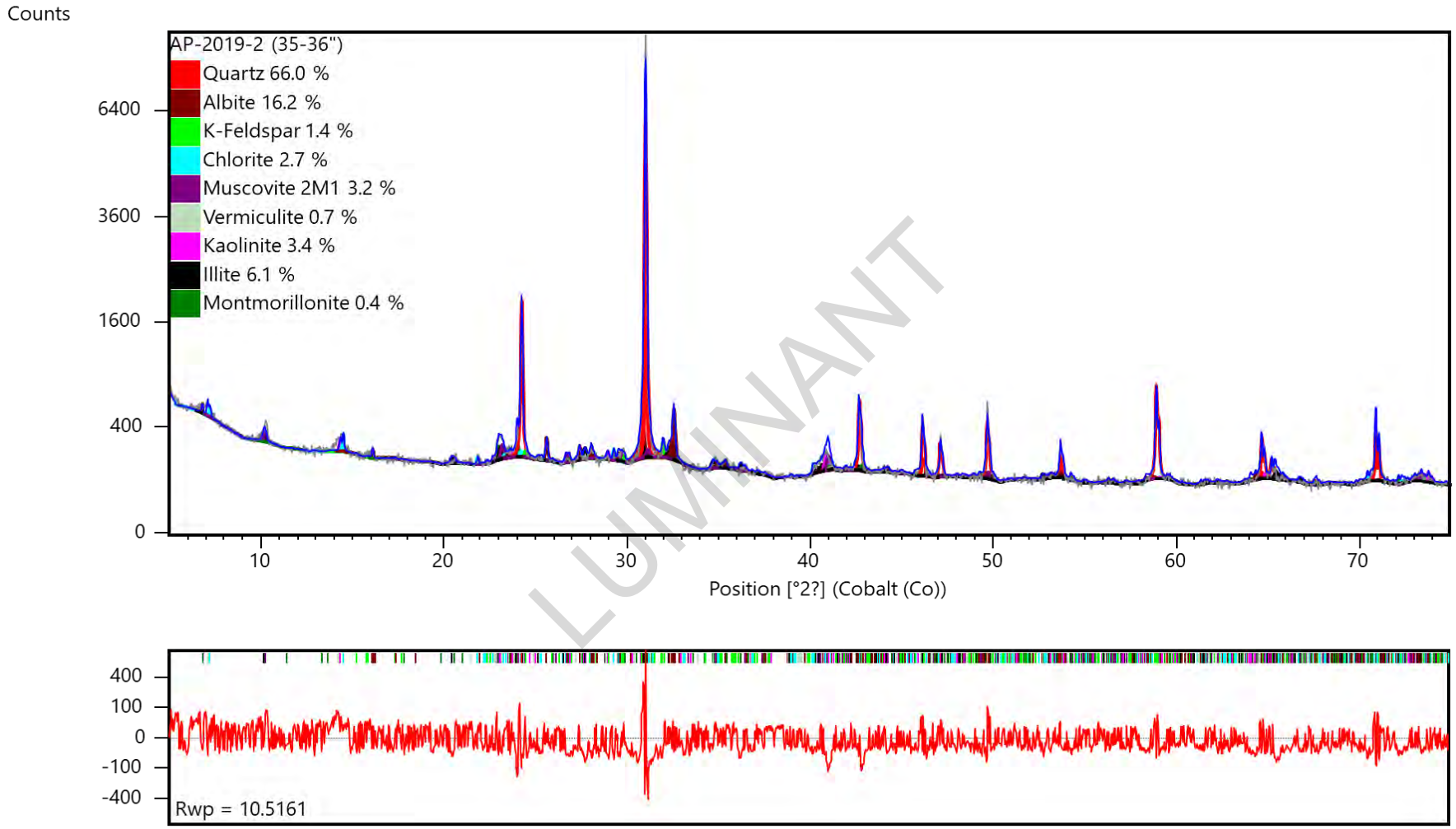
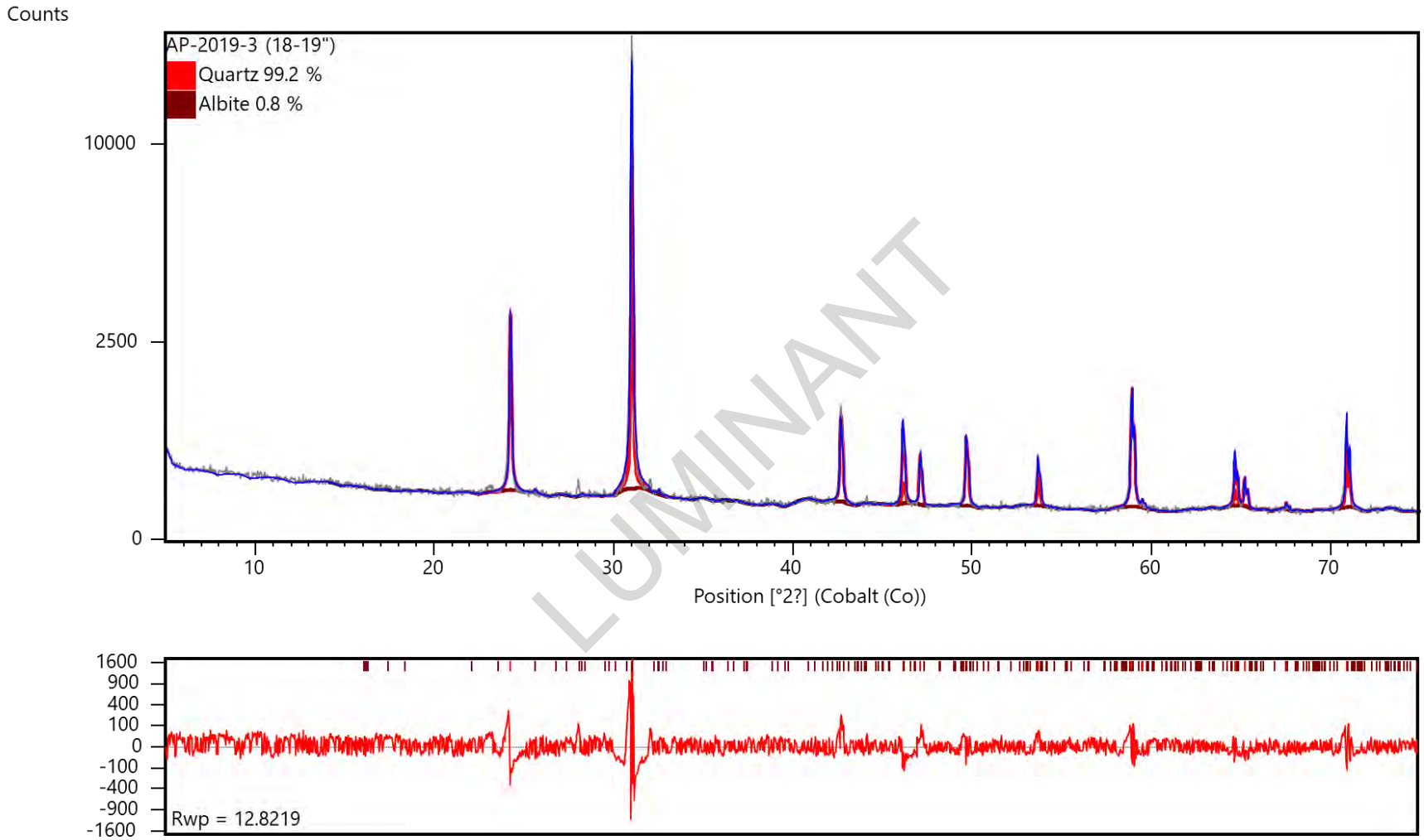
X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.



LUMINANT

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.



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X-ray diffractogram. The upper pattern is the measured diffractogram, the blue curve is the calculated pattern from the Rietveld Refinement and the lower red curve is the difference plot.

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ANALYTICAL REPORT

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

Laboratory Job ID: 140-15490-1
Client Project/Site: Martin Lake Ash Ponds - SEP + Totals

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

Attn: Will Vienne

Authorized for release by:
7/18/2019 5:51:37 PM

Terry Walker Wasmund, Project Manager II
(865)291-3000
terry.wasmund@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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LUMINANT

Definitions/Glossary

Client: Golder Associates Inc.
Job ID: 140-15490-1
Project/Site: Martin Lake Ash Ponds - SEP + Totals

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.
F1	MS and/or MSD Recovery is outside acceptance limits.
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)

LUMINANT

Job ID: 140-15490-1

Laboratory: Eurofins TestAmerica, Knoxville

Narrative

Job Narrative
140-15490-1

Receipt
The samples were received on 6/5/2019 at 9:20 AM. The samples arrived in good condition, properly preserved, and on ice. The temperature of the cooler at receipt was 1.2º 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

LUMINANT

Job ID: 140-15490-1 (Continued)

Laboratory: Eurofins TestAmerica, Knoxville (Continued)

interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

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

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

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

The 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 samples (140-15490-A-1-A SD ^5) and (140-15490-A-1-AD SD ^50) associated with batch 140-31713 was outside control limits.

Samples AP-2019-1 (30-31) (140-15490-1), AP-2019-2 (35-36) (140-15490-2), AP-2019-3 (18-19) (140-15490-3), (140-15490-A-1-AE DU) and (140-15490-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.

Samples AP-2019-1 (30-31) (140-15490-1), AP-2019-2 (35-36) (140-15490-2), AP-2019-3 (18-19) (140-15490-3), (140-15490-A-1-AE DU) and (140-15490-A-1-B DU) were diluted for Aluminum and Barium due to the nature of the sample matrix. Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry - % 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.

LUMINANT

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Lab Sample ID: 140-15490-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.88	J	13	0.63	mg/Kg	4	☼	6010B SEP	Step 1
Cobalt	0.54	J	13	0.24	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	3.1	J	3.9	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	9.7	J *	39	6.3	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.76	J *	9.9	0.47	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.76	J B	2.0	0.67	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	88		13	2.8	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	1.8		0.66	0.17	mg/Kg	1	☼	6010B SEP	Step 3
Barium	4.3	B	3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.067	J	0.33	0.020	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.34	J	3.3	0.059	mg/Kg	1	☼	6010B SEP	Step 3
Iron	580		6.6	3.8	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	2.4	B	0.99	0.036	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.22	J B	0.66	0.22	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1700		13	2.1	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	2.8	B	0.66	0.29	mg/Kg	1	☼	6010B SEP	Step 4
Barium	16		3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.13	J	0.33	0.021	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	1.5	J	3.3	0.070	mg/Kg	1	☼	6010B SEP	Step 4
Iron	3900		6.6	3.8	mg/Kg	1	☼	6010B SEP	Step 4
Li	3.0	J	3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	18		0.99	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	62	J *	200	31	mg/Kg	5	☼	6010B SEP	Step 5
Barium	7.0	J *	49	2.4	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	2300		13	2.1	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.94		0.66	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Barium	18		3.3	0.16	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.067	J	0.33	0.016	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.90	J	3.3	0.061	mg/Kg	1	☼	6010B SEP	Step 6
Iron	2500		6.6	3.8	mg/Kg	1	☼	6010B SEP	Step 6
Li	2.1	J	3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	16		0.99	0.33	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	29000		130	21	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	1.2		0.66	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Barium	390		33	1.6	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.56		0.33	0.0099	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.79	J	6.6	0.39	mg/Kg	2	☼	6010B SEP	Step 7
Iron	5200		6.6	5.4	mg/Kg	1	☼	6010B SEP	Step 7
Li	9.6		3.3	0.20	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	26		0.99	0.068	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.19	J	2.6	0.11	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.48	J	4.6	0.47	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	33000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	6.9		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	440		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.83		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	4.0		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

LUMINANT

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31) (Continued) — Lab Sample ID: 140-15490-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	12000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	15		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	66		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.19	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	0.98		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.48	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	13	F1	1.8	0.27	mg/Kg	1	☼	6010B	Total/NA
Lead	6.4		1.8	0.34	mg/Kg	1	☼	6010B	Total/NA
Aluminum	60000		130	21	mg/Kg	10	☼	6010B	Total/NA
Arsenic	6.8		0.66	0.17	mg/Kg	1	☼	6010B	Total/NA
Barium	680		33	1.6	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.89		0.33	0.0099	mg/Kg	1	☼	6010B	Total/NA
Cobalt	3.8	J	6.6	0.39	mg/Kg	2	☼	6010B	Total/NA
Iron	11000		6.6	5.4	mg/Kg	1	☼	6010B	Total/NA
Lithium	18		3.3	0.20	mg/Kg	1	☼	6010B	Total/NA
Manganese	66		0.99	0.068	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.40	J	2.6	0.11	mg/Kg	1	☼	6010B	Total/NA
Hg	0.081	J	0.13	0.053	mg/Kg	1	☼	7470A	Total/NA

Client Sample ID: AP-2019-2 (35-36) — Lab Sample ID: 140-15490-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	19	J	51	8.2	mg/Kg	4	☼	6010B SEP	Step 1
Barium	0.88	J	13	0.61	mg/Kg	4	☼	6010B SEP	Step 1
Cobalt	1.6	J	13	0.23	mg/Kg	4	☼	6010B SEP	Step 1
Iron	23	J	25	15	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	33		3.8	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	18	J *	38	6.1	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.67	J *	9.6	0.46	mg/Kg	3	☼	6010B SEP	Step 2
Cobalt	0.27	J	9.6	0.24	mg/Kg	3	☼	6010B SEP	Step 2
Iron	110	*	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	4.2		2.9	1.1	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.90	J B	1.9	0.65	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	97		13	2.7	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.97		0.64	0.17	mg/Kg	1	☼	6010B SEP	Step 3
Barium	4.1	B	3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.028	J	0.32	0.019	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.17	J	3.2	0.057	mg/Kg	1	☼	6010B SEP	Step 3
Iron	1100		6.4	3.7	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	1.5	B	0.96	0.034	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	1800		13	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.78	B	0.64	0.28	mg/Kg	1	☼	6010B SEP	Step 4
Barium	23		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.078	J	0.32	0.020	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	1.5	J	3.2	0.068	mg/Kg	1	☼	6010B SEP	Step 4
Iron	3800		6.4	3.7	mg/Kg	1	☼	6010B SEP	Step 4
Li	4.2		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

LUMINANT

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-2 (35-36) (Continued)

Lab Sample ID: 140-15490-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	31		0.96	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	55	J *	190	30	mg/Kg	5	☼	6010B SEP	Step 5
Barium	11	J *	48	2.3	mg/Kg	5	☼	6010B SEP	Step 5
Cobalt	0.85	J *	48	0.76	mg/Kg	5	☼	6010B SEP	Step 5
Manganese	3.9	J *	14	2.4	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	2000		13	2.0	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.74		0.64	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Barium	16		3.2	0.15	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.061	J	0.32	0.015	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.80	J	3.2	0.059	mg/Kg	1	☼	6010B SEP	Step 6
Iron	3300		6.4	3.7	mg/Kg	1	☼	6010B SEP	Step 6
Li	2.1	J	3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	19		0.96	0.32	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	26000		130	20	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.71		0.64	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Barium	330		32	1.5	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.51		0.32	0.0096	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	1.1	J	6.4	0.38	mg/Kg	2	☼	6010B SEP	Step 7
Iron	5600		6.4	5.2	mg/Kg	1	☼	6010B SEP	Step 7
Li	11		3.2	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	34		0.96	0.066	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.17	J	2.5	0.10	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.70	J	4.5	0.46	mg/Kg	2	☼	6010B SEP	Step 7
Aluminum	30000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	3.2		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	390		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.68		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	6.3		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	14000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	18		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	130		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.17	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	0.90		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.70	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	12		1.8	0.27	mg/Kg	1	☼	6010B	Total/NA
Lead	6.2		1.8	0.34	mg/Kg	1	☼	6010B	Total/NA
Aluminum	62000		130	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	3.0		0.64	0.17	mg/Kg	1	☼	6010B	Total/NA
Barium	560		32	1.5	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.72		0.32	0.0096	mg/Kg	1	☼	6010B	Total/NA
Cobalt	6.2	J	16	0.96	mg/Kg	5	☼	6010B	Total/NA
Iron	13000		6.4	5.2	mg/Kg	1	☼	6010B	Total/NA
Lithium	26		3.2	0.19	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

LUMINANT

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-2 (35-36) (Continued) — Lab Sample ID: 140-15490-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	150		0.96	0.066	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.41	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA
Hg	0.12	J	0.13	0.051	mg/Kg	1	☼	7470A	Total/NA

Client Sample ID: AP-2019-3 (18-19) — Lab Sample ID: 140-15490-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	14	J	50	8.0	mg/Kg	4	☼	6010B SEP	Step 1
Cobalt	0.87	J	13	0.23	mg/Kg	4	☼	6010B SEP	Step 1
Iron	15	J	25	15	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	1.2	J	3.8	0.16	mg/Kg	4	☼	6010B SEP	Step 1
Selenium	0.68	J B	1.9	0.64	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	30		13	2.6	mg/Kg	1	☼	6010B SEP	Step 3
Barium	2.3	J B	3.1	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.025	J	0.31	0.019	mg/Kg	1	☼	6010B SEP	Step 3
Iron	57		6.3	3.6	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	0.11	J B	0.94	0.034	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.23	J B	0.63	0.21	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	880		13	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	0.63	B	0.63	0.28	mg/Kg	1	☼	6010B SEP	Step 4
Barium	6.9		3.1	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.069	J	0.31	0.020	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	0.53	J	3.1	0.066	mg/Kg	1	☼	6010B SEP	Step 4
Iron	2300		6.3	3.6	mg/Kg	1	☼	6010B SEP	Step 4
Li	0.53	J	3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	4.2		0.94	0.16	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	0.65	B *	0.63	0.59	mg/Kg	1	☼	6010B SEP	Step 4
Aluminum	120	J *	190	29	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	1200		13	2.0	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	0.24	J	0.63	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Barium	2.1	J	3.1	0.15	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.026	J	0.31	0.015	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	0.28	J	3.1	0.058	mg/Kg	1	☼	6010B SEP	Step 6
Iron	820		6.3	3.6	mg/Kg	1	☼	6010B SEP	Step 6
Li	0.62	J	3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	2.9		0.94	0.31	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	12000		130	20	mg/Kg	10	☼	6010B SEP	Step 7
Arsenic	0.79	J	1.3	0.33	mg/Kg	2	☼	6010B SEP	Step 7
Barium	180		31	1.5	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.11	J	0.31	0.0094	mg/Kg	1	☼	6010B SEP	Step 7
Iron	2000		6.3	5.1	mg/Kg	1	☼	6010B SEP	Step 7
Li	6.0		3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	26		0.94	0.065	mg/Kg	1	☼	6010B SEP	Step 7
Mo	0.12	J	2.5	0.10	mg/Kg	1	☼	6010B SEP	Step 7
Aluminum	14000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	1.7		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	190		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.23	J	0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

LUMINANT

Detection Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-3 (18-19) (Continued)

Lab Sample ID: 140-15490-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	1.7	J	2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	5200		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	7.2		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	35		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.12	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	1.6		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	4.4		1.8	0.26	mg/Kg	1	☼	6010B	Total/NA
Lead	3.9		1.8	0.33	mg/Kg	1	☼	6010B	Total/NA
Aluminum	20000		130	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	2.9	J	3.1	0.81	mg/Kg	5	☼	6010B	Total/NA
Barium	240		31	1.5	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.42		0.31	0.0094	mg/Kg	1	☼	6010B	Total/NA
Cobalt	3.3	J	16	0.94	mg/Kg	5	☼	6010B	Total/NA
Iron	8000		6.3	5.1	mg/Kg	1	☼	6010B	Total/NA
Lithium	9.6		3.1	0.19	mg/Kg	1	☼	6010B	Total/NA
Manganese	47		0.94	0.065	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.28	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA

LUMINAIT

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1

Matrix: Solid
Percent Solids: 76.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		53	8.4	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Antimony	ND		16	1.5	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Arsenic	ND		2.6	0.68	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Barium	**0.88**	**J**	13	0.63	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Beryllium	ND		1.3	0.41	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Cobalt	**0.54**	**J**	13	0.24	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Iron	ND		26	15	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Li	ND		13	0.79	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Manganese	**3.1**	**J**	3.9	0.16	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Mo	ND		11	0.43	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Selenium	ND		2.6	0.89	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4
Thallium	ND		9.2	1.1	mg/Kg	☼	06/29/19 08:00	07/11/19 12:49	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9.7**	**J ***	39	6.3	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Antimony	ND		12	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Arsenic	ND		2.0	0.51	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Barium	**0.76**	**J ***	9.9	0.47	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Beryllium	ND	*	0.99	0.063	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Cobalt	ND		9.9	0.25	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Iron	ND	*	20	11	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Li	ND		9.9	0.59	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Manganese	ND		3.0	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Mo	ND		7.9	0.32	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Selenium	**0.76**	**J B**	2.0	0.67	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3
Thallium	ND		6.9	0.83	mg/Kg	☼	06/30/19 08:00	07/11/19 14:21	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**88**		13	2.8	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Antimony	ND		3.9	0.37	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Arsenic	**1.8**		0.66	0.17	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Barium	**4.3**	**B**	3.3	0.16	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Beryllium	**0.067**	**J**	0.33	0.020	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Cobalt	**0.34**	**J**	3.3	0.059	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Iron	**580**		6.6	3.8	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Li	ND		3.3	0.20	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Manganese	**2.4**	**B**	0.99	0.036	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Mo	ND		2.6	0.11	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Selenium	**0.22**	**J B**	0.66	0.22	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1
Thallium	ND		2.3	0.28	mg/Kg	☼	07/02/19 08:00	07/11/19 16:06	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1700**		13	2.1	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Antimony	ND		3.9	0.59	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Arsenic	**2.8**	**B**	0.66	0.29	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Barium	**16**		3.3	0.16	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Beryllium	**0.13**	**J**	0.33	0.021	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1

Matrix: Solid
Percent Solids: 76.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.5	J	3.3	0.070	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Iron	3900		6.6	3.8	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Li	3.0	J	3.3	0.20	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Manganese	18		0.99	0.17	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Mo	ND		2.6	0.11	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Selenium	ND	*	0.66	0.62	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1
Thallium	ND		2.3	0.38	mg/Kg	☼	07/03/19 08:00	07/11/19 17:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	62	J *	200	31	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Antimony	ND		59	5.5	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Arsenic	ND		9.9	2.5	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Barium	7.0	J *	49	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Beryllium	ND	*	4.9	0.41	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Cobalt	ND	*	49	0.79	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Iron	ND	*	99	58	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Li	ND		49	2.9	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Manganese	ND	*	15	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Mo	ND		39	1.6	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Selenium	ND		9.9	3.4	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5
Thallium	ND	*	35	4.6	mg/Kg	☼	07/10/19 08:00	07/12/19 11:54	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2300		13	2.1	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Antimony	ND		3.9	0.37	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Arsenic	0.94		0.66	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Barium	18		3.3	0.16	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Beryllium	0.067	J	0.33	0.016	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Cobalt	0.90	J	3.3	0.061	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Iron	2500		6.6	3.8	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Li	2.1	J	3.3	0.20	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Manganese	16		0.99	0.33	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Mo	ND		2.6	0.13	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Selenium	ND		0.66	0.22	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1
Thallium	ND		2.3	0.28	mg/Kg	☼	07/10/19 08:00	07/12/19 13:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		130	21	mg/Kg	☼	07/12/19 09:08	07/15/19 13:08	10
Antimony	ND		3.9	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Arsenic	1.2		0.66	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Barium	390		33	1.6	mg/Kg	☼	07/12/19 09:08	07/15/19 13:08	10
Beryllium	0.56		0.33	0.0099	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Cobalt	0.79	J	6.6	0.39	mg/Kg	☼	07/12/19 09:08	07/15/19 17:11	2
Iron	5200		6.6	5.4	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Li	9.6		3.3	0.20	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Manganese	26		0.99	0.068	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Mo	0.19	J	2.6	0.11	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1

Matrix: Solid
Percent Solids: 76.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.66	0.22	mg/Kg	☼	07/12/19 09:08	07/15/19 11:39	1
Thallium	**0.48**	**J**	4.6	0.47	mg/Kg	☼	07/12/19 09:08	07/15/19 17:11	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**33000**		10	1.6	mg/Kg			07/16/19 17:31	1
Antimony	ND		3.0	0.14	mg/Kg			07/16/19 17:31	1
Arsenic	**6.9**		0.50	0.13	mg/Kg			07/16/19 17:31	1
Barium	**440**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**0.83**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**4.0**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**12000**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**15**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**66**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	**0.19**	**J**	2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**0.98**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	**0.48**	**J**	1.8	0.18	mg/Kg			07/16/19 17:31	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		25	12	mg/Kg	☼	06/26/19 08:00	07/10/19 12:59	1
Chromium	**13**	**F1**	1.8	0.27	mg/Kg	☼	06/26/19 08:00	07/10/19 12:59	1
Lead	**6.4**		1.8	0.34	mg/Kg	☼	06/26/19 08:00	07/10/19 12:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**60000**		130	21	mg/Kg	☼	06/11/19 08:00	07/15/19 15:45	10
Antimony	ND		3.9	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Arsenic	**6.8**		0.66	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Barium	**680**		33	1.6	mg/Kg	☼	06/11/19 08:00	07/15/19 15:45	10
Beryllium	**0.89**		0.33	0.0099	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Cobalt	**3.8**	**J**	6.6	0.39	mg/Kg	☼	06/11/19 08:00	07/15/19 18:28	2
Iron	**11000**		6.6	5.4	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Lithium	**18**		3.3	0.20	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Manganese	**66**		0.99	0.068	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Molybdenum	**0.40**	**J**	2.6	0.11	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Selenium	ND		0.66	0.22	mg/Kg	☼	06/11/19 08:00	07/15/19 14:24	1
Thallium	ND		4.6	0.47	mg/Kg	☼	06/11/19 08:00	07/15/19 18:28	2

Method: 7470A - SEP Mercury (CVAA) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.081**	**J**	0.13	0.053	mg/Kg	☼	06/11/19 08:00	06/16/19 14:04	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-2 (35-36)

Date Collected: 06/03/19 13:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-2

Matrix: Solid
Percent Solids: 78.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**19**	**J**	51	8.2	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Antimony	ND		15	1.4	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Arsenic	ND		2.5	0.66	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Barium	**0.88**	**J**	13	0.61	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Beryllium	ND		1.3	0.39	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Cobalt	**1.6**	**J**	13	0.23	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Iron	**23**	**J**	25	15	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Li	ND		13	0.76	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Manganese	**33**		3.8	0.16	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Mo	ND		10	0.42	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Selenium	ND		2.5	0.87	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4
Thallium	ND		8.9	1.1	mg/Kg	☼	06/29/19 08:00	07/11/19 12:59	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**18**	**J ***	38	6.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Antimony	ND		11	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Arsenic	ND		1.9	0.50	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Barium	**0.67**	**J ***	9.6	0.46	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Beryllium	ND	*	0.96	0.061	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Cobalt	**0.27**	**J**	9.6	0.24	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Iron	**110**	*****	19	11	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Li	ND		9.6	0.57	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Manganese	**4.2**		2.9	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Mo	ND		7.6	0.31	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Selenium	**0.90**	**J B**	1.9	0.65	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3
Thallium	ND		6.7	0.80	mg/Kg	☼	06/30/19 08:00	07/11/19 14:42	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**97**		13	2.7	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Antimony	ND		3.8	0.36	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Arsenic	**0.97**		0.64	0.17	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Barium	**4.1**	**B**	3.2	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Beryllium	**0.028**	**J**	0.32	0.019	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Cobalt	**0.17**	**J**	3.2	0.057	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Iron	**1100**		6.4	3.7	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Li	ND		3.2	0.19	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Manganese	**1.5**	**B**	0.96	0.034	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Mo	ND		2.5	0.10	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Selenium	ND		0.64	0.22	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1
Thallium	ND		2.2	0.27	mg/Kg	☼	07/02/19 08:00	07/11/19 16:16	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1800**		13	2.0	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Antimony	ND		3.8	0.57	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Arsenic	**0.78**	**B**	0.64	0.28	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Barium	**23**		3.2	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Beryllium	**0.078**	**J**	0.32	0.020	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1

LUMINANT

Client Sample ID: AP-2019-2 (35-36)

Date Collected: 06/03/19 13:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-2

Matrix: Solid
Percent Solids: 78.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.5	J	3.2	0.068	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Iron	3800		6.4	3.7	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Li	4.2		3.2	0.19	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Manganese	31		0.96	0.17	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Mo	ND		2.5	0.10	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Selenium	ND	*	0.64	0.60	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1
Thallium	ND		2.2	0.37	mg/Kg	☼	07/03/19 08:00	07/11/19 17:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	55	J *	190	30	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Antimony	ND		57	5.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Arsenic	ND		9.6	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Barium	11	J *	48	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Beryllium	ND	*	4.8	0.40	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Cobalt	0.85	J *	48	0.76	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Iron	ND	*	96	56	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Li	ND		48	2.8	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Manganese	3.9	J *	14	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Mo	ND		38	1.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Selenium	ND		9.6	3.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5
Thallium	ND	*	33	4.5	mg/Kg	☼	07/10/19 08:00	07/12/19 12:05	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2000		13	2.0	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Antimony	ND		3.8	0.36	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Arsenic	0.74		0.64	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Barium	16		3.2	0.15	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Beryllium	0.061	J	0.32	0.015	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Cobalt	0.80	J	3.2	0.059	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Iron	3300		6.4	3.7	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Li	2.1	J	3.2	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Manganese	19		0.96	0.32	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Mo	ND		2.5	0.13	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Selenium	ND		0.64	0.22	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1
Thallium	ND		2.2	0.27	mg/Kg	☼	07/10/19 08:00	07/12/19 13:49	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26000		130	20	mg/Kg	☼	07/12/19 09:08	07/15/19 13:19	10
Antimony	ND		3.8	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Arsenic	0.71		0.64	0.17	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Barium	330		32	1.5	mg/Kg	☼	07/12/19 09:08	07/15/19 13:19	10
Beryllium	0.51		0.32	0.0096	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Cobalt	1.1	J	6.4	0.38	mg/Kg	☼	07/12/19 09:08	07/15/19 17:21	2
Iron	5600		6.4	5.2	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Li	11		3.2	0.19	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Manganese	34		0.96	0.066	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Mo	0.17	J	2.5	0.10	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-2 (35-36)

Date Collected: 06/03/19 13:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-2

Matrix: Solid
Percent Solids: 78.5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	ND		0.64	0.22	mg/Kg	☼	07/12/19 09:08	07/15/19 12:05	1
Thallium	**0.70**	**J**	4.5	0.46	mg/Kg	☼	07/12/19 09:08	07/15/19 17:21	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			07/16/19 17:31	1
Antimony	ND		3.0	0.14	mg/Kg			07/16/19 17:31	1
Arsenic	**3.2**		0.50	0.13	mg/Kg			07/16/19 17:31	1
Barium	**390**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**0.68**		0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**6.3**		2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**14000**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**18**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**130**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	**0.17**	**J**	2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**0.90**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	**0.70**	**J**	1.8	0.18	mg/Kg			07/16/19 17:31	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		24	12	mg/Kg	☼	06/26/19 08:00	07/10/19 13:13	1
Chromium	**12**		1.8	0.27	mg/Kg	☼	06/26/19 08:00	07/10/19 13:13	1
Lead	**6.2**		1.8	0.34	mg/Kg	☼	06/26/19 08:00	07/10/19 13:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**62000**		130	20	mg/Kg	☼	06/11/19 08:00	07/15/19 16:10	10
Antimony	ND		3.8	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Arsenic	**3.0**		0.64	0.17	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Barium	**560**		32	1.5	mg/Kg	☼	06/11/19 08:00	07/15/19 16:10	10
Beryllium	**0.72**		0.32	0.0096	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Cobalt	**6.2**	**J**	16	0.96	mg/Kg	☼	06/11/19 08:00	07/15/19 18:38	5
Iron	**13000**		6.4	5.2	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Lithium	**26**		3.2	0.19	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Manganese	**150**		0.96	0.066	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Molybdenum	**0.41**	**J**	2.5	0.10	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Selenium	ND		0.64	0.22	mg/Kg	☼	06/11/19 08:00	07/15/19 14:36	1
Thallium	ND		11	1.1	mg/Kg	☼	06/11/19 08:00	07/15/19 18:38	5

Method: 7470A - SEP Mercury (CVAA) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.12**	**J**	0.13	0.051	mg/Kg	☼	06/11/19 08:00	06/16/19 14:09	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-3 (18-19)

Date Collected: 06/03/19 15:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-3

Matrix: Solid
Percent Solids: 80.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14**	**J**	50	8.0	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Antimony	ND		15	1.4	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Barium	ND		13	0.60	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Beryllium	ND		1.3	0.39	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Cobalt	**0.87**	**J**	13	0.23	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Iron	**15**	**J**	25	15	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Li	ND		13	0.75	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Manganese	**1.2**	**J**	3.8	0.16	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Mo	ND		10	0.41	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Selenium	ND		2.5	0.85	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4
Thallium	ND		8.8	1.1	mg/Kg	☼	06/29/19 08:00	07/11/19 13:04	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	38	6.0	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Antimony	ND		11	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Arsenic	ND		1.9	0.49	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Barium	ND	*	9.4	0.45	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Beryllium	ND	*	0.94	0.060	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Cobalt	ND		9.4	0.24	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Iron	ND	*	19	11	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Li	ND		9.4	0.56	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Manganese	ND		2.8	1.1	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Mo	ND		7.5	0.31	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Selenium	**0.68**	**J B**	1.9	0.64	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3
Thallium	ND		6.6	0.79	mg/Kg	☼	06/30/19 08:00	07/11/19 14:47	3

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**30**		13	2.6	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Antimony	ND		3.8	0.35	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Arsenic	ND		0.63	0.16	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Barium	**2.3**	**J B**	3.1	0.15	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Beryllium	**0.025**	**J**	0.31	0.019	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Cobalt	ND		3.1	0.056	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Iron	**57**		6.3	3.6	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Li	ND		3.1	0.19	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Manganese	**0.11**	**J B**	0.94	0.034	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Mo	ND		2.5	0.10	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Selenium	**0.23**	**J B**	0.63	0.21	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/02/19 08:00	07/11/19 16:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**880**		13	2.0	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Antimony	ND		3.8	0.56	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Arsenic	**0.63**	**B**	0.63	0.28	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Barium	**6.9**		3.1	0.15	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Beryllium	**0.069**	**J**	0.31	0.020	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1

LUMINANT

Client Sample ID: AP-2019-3 (18-19)

Date Collected: 06/03/19 15:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-3

Matrix: Solid
Percent Solids: 80.0

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.53	J	3.1	0.066	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Iron	2300		6.3	3.6	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Li	0.53	J	3.1	0.19	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Manganese	4.2		0.94	0.16	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Mo	ND		2.5	0.10	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Selenium	0.65	B *	0.63	0.59	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1
Thallium	ND		2.2	0.36	mg/Kg	☼	07/03/19 08:00	07/11/19 18:04	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	120	J *	190	29	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Antimony	ND		56	5.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Arsenic	ND		9.4	2.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Barium	ND	*	47	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Beryllium	ND	*	4.7	0.39	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Cobalt	ND	*	47	0.75	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Iron	ND	*	94	55	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Li	ND		47	2.8	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Manganese	ND	*	14	2.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Mo	ND		38	1.6	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Selenium	ND		9.4	3.3	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5
Thallium	ND	*	33	4.4	mg/Kg	☼	07/10/19 08:00	07/12/19 12:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1200		13	2.0	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Antimony	ND		3.8	0.35	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Arsenic	0.24	J	0.63	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Barium	2.1	J	3.1	0.15	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Beryllium	0.026	J	0.31	0.015	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Cobalt	0.28	J	3.1	0.058	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Iron	820		6.3	3.6	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Li	0.62	J	3.1	0.19	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Manganese	2.9		0.94	0.31	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Mo	ND		2.5	0.12	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Selenium	ND		0.63	0.21	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/10/19 08:00	07/12/19 13:55	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		130	20	mg/Kg	☼	07/12/19 09:08	07/15/19 13:24	10
Antimony	ND		3.8	0.18	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1
Arsenic	0.79	J	1.3	0.33	mg/Kg	☼	07/12/19 09:08	07/15/19 17:27	2
Barium	180		31	1.5	mg/Kg	☼	07/12/19 09:08	07/15/19 13:24	10
Beryllium	0.11	J	0.31	0.0094	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1
Cobalt	ND		6.3	0.38	mg/Kg	☼	07/12/19 09:08	07/15/19 17:27	2
Iron	2000		6.3	5.1	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1
Li	6.0		3.1	0.19	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1
Manganese	26		0.94	0.065	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1
Mo	0.12	J	2.5	0.10	mg/Kg	☼	07/12/19 09:08	07/15/19 12:11	1

LUMINANT

Client Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-3 (18-19)

Date Collected: 06/03/19 15:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-3

Matrix: Solid
Percent Solids: 80.0

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	☼	07/12/19 09:08	07/15/19 17:27	2
Thallium	ND		4.4	0.45	mg/Kg	☼	07/12/19 09:08	07/15/19 17:27	2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**14000**		10	1.6	mg/Kg			07/16/19 17:31	1
Antimony	ND		3.0	0.14	mg/Kg			07/16/19 17:31	1
Arsenic	**1.7**		0.50	0.13	mg/Kg			07/16/19 17:31	1
Barium	**190**		2.5	0.12	mg/Kg			07/16/19 17:31	1
Beryllium	**0.23**	**J**	0.25	0.0075	mg/Kg			07/16/19 17:31	1
Cobalt	**1.7**	**J**	2.5	0.023	mg/Kg			07/16/19 17:31	1
Iron	**5200**		5.0	4.1	mg/Kg			07/16/19 17:31	1
Li	**7.2**		2.5	0.15	mg/Kg			07/16/19 17:31	1
Manganese	**35**		0.75	0.052	mg/Kg			07/16/19 17:31	1
Mo	**0.12**	**J**	2.0	0.082	mg/Kg			07/16/19 17:31	1
Selenium	**1.6**		0.50	0.17	mg/Kg			07/16/19 17:31	1
Thallium	ND		1.8	0.18	mg/Kg			07/16/19 17:31	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		24	12	mg/Kg	☼	06/26/19 08:00	07/10/19 13:18	1
Chromium	**4.4**		1.8	0.26	mg/Kg	☼	06/26/19 08:00	07/10/19 13:18	1
Lead	**3.9**		1.8	0.33	mg/Kg	☼	06/26/19 08:00	07/10/19 13:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**20000**		130	20	mg/Kg	☼	06/11/19 08:00	07/15/19 16:15	10
Antimony	ND		3.8	0.18	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Arsenic	**2.9**	**J**	3.1	0.81	mg/Kg	☼	06/11/19 08:00	07/15/19 18:43	5
Barium	**240**		31	1.5	mg/Kg	☼	06/11/19 08:00	07/15/19 16:15	10
Beryllium	**0.42**		0.31	0.0094	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Cobalt	**3.3**	**J**	16	0.94	mg/Kg	☼	06/11/19 08:00	07/15/19 18:43	5
Iron	**8000**		6.3	5.1	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Lithium	**9.6**		3.1	0.19	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Manganese	**47**		0.94	0.065	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Molybdenum	**0.28**	**J**	2.5	0.10	mg/Kg	☼	06/11/19 08:00	07/15/19 14:41	1
Selenium	ND		3.1	1.1	mg/Kg	☼	06/11/19 08:00	07/15/19 18:43	5
Thallium	ND		11	1.1	mg/Kg	☼	06/11/19 08:00	07/15/19 18:43	5

Method: 7470A - SEP Mercury (CVAA) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.13	0.050	mg/Kg	☼	06/11/19 08:00	06/16/19 14:17	1

LUMINANT

Default Detection Limits

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

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

Prep: 3010A
SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.077	mg/Kg
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

LUMINANT

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.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

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

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg
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

LUMINANT

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

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

Method: 7470A - SEP Mercury (CVAA) - Total

LUMINANT

Default Detection Limits

Client: Golder Associates Inc.
Job ID: 140-15490-1
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Method: 7470A - SEP Mercury (CVAA) - Total

Prep: Total

Analyte	RL	MDL	Units
Hg	0.10	0.040	mg/Kg

LUMINANT

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-31128/14-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 31553 — **Prep Batch: 31128**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		20	10	mg/Kg		06/26/19 08:00	07/10/19 11:42	1
Chromium	ND		1.5	0.22	mg/Kg		06/26/19 08:00	07/10/19 11:42	1
Lead	ND		1.5	0.28	mg/Kg		06/26/19 08:00	07/10/19 11:42	1

Lab Sample ID: LCS 140-31128/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 31553 — **Prep Batch: 31128**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	100	101		mg/Kg		101	80 - 120
Chromium	20.0	20.3		mg/Kg		101	90 - 110
Lead	10.0	10.1		mg/Kg		101	90 - 110

Lab Sample ID: 140-15490-1 MS — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 31553 — **Prep Batch: 31128**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	ND		124	124		mg/Kg	☼	100	75 - 125
Chromium	13	F1	24.8	45.6	F1	mg/Kg	☼	131	75 - 125
Lead	6.4		12.4	17.4		mg/Kg	☼	89	75 - 125

Lab Sample ID: 140-15490-1 MSD — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 31553 — **Prep Batch: 31128**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		122	123		mg/Kg	☼	101	75 - 125	0	20
Chromium	13	F1	24.4	45.6	F1	mg/Kg	☼	133	75 - 125	0	20
Lead	6.4		12.2	17.5		mg/Kg	☼	91	75 - 125	0	20

LUMINANT

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

Lab Sample ID: MB 140-30683/13-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 31713 — **Prep Batch: 30683**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Antimony	ND		3.0	0.14	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Arsenic	ND		0.50	0.13	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Barium	ND		2.5	0.12	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Beryllium	ND		0.25	0.0075	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Cobalt	ND		2.5	0.15	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Iron	ND		5.0	4.1	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Lithium	ND		2.5	0.15	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Manganese	ND		0.75	0.052	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Molybdenum	ND		2.0	0.082	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Selenium	ND		0.50	0.17	mg/Kg		06/11/19 08:00	07/15/19 11:13	1
Thallium	ND		1.8	0.18	mg/Kg		06/11/19 08:00	07/15/19 11:13	1

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

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

Lab Sample ID: LCS 140-30683/14-A
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30683

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	97.6		mg/Kg		98	75 - 125
Antimony	25.0	25.9		mg/Kg		103	75 - 125
Arsenic	5.00	5.29		mg/Kg		106	75 - 125
Barium	5.00	4.99		mg/Kg		100	75 - 125
Beryllium	2.50	2.51		mg/Kg		100	75 - 125
Cobalt	5.00	5.20		mg/Kg		104	75 - 125
Iron	50.0	51.1		mg/Kg		102	75 - 125
Lithium	5.00	5.12		mg/Kg		102	75 - 125
Manganese	5.00	5.21		mg/Kg		104	75 - 125
Molybdenum	25.0	26.6		mg/Kg		106	75 - 125
Selenium	7.50	7.55		mg/Kg		101	75 - 125
Thallium	20.0	21.2		mg/Kg		106	75 - 125

Lab Sample ID: LCSD 140-30683/15-A
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 30683

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	97.0		mg/Kg		97	75 - 125	1	30
Antimony	25.0	25.9		mg/Kg		104	75 - 125	0	30
Arsenic	5.00	5.24		mg/Kg		105	75 - 125	1	30
Barium	5.00	4.95		mg/Kg		99	75 - 125	1	30
Beryllium	2.50	2.48		mg/Kg		99	75 - 125	1	30
Cobalt	5.00	5.16		mg/Kg		103	75 - 125	1	30
Iron	50.0	50.4		mg/Kg		101	75 - 125	1	30
Lithium	5.00	5.04		mg/Kg		101	75 - 125	2	30
Manganese	5.00	5.16		mg/Kg		103	75 - 125	1	30
Molybdenum	25.0	26.5		mg/Kg		106	75 - 125	0	30
Selenium	7.50	7.47		mg/Kg		100	75 - 125	1	30
Thallium	20.0	21.2		mg/Kg		106	75 - 125	0	30

LUMINANT

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Total/NA
Prep Batch: 30683

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	6.8		7.11		mg/Kg	☼	5	30
Beryllium	0.89		0.959		mg/Kg	☼	7	30
Iron	11000		12200		mg/Kg	☼	7	30
Lithium	18		19.7		mg/Kg	☼	7	30
Manganese	66		71.7		mg/Kg	☼	8	30
Molybdenum	0.40	J	0.434	J	mg/Kg	☼	7	30
Selenium	ND		ND		mg/Kg	☼	NC	30

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

Lab Sample ID: 140-15490-1 DU **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 31713 **Prep Batch: 30683**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	60000		64600		mg/Kg	☼	7	30
Barium	680		733		mg/Kg	☼	7	30

Lab Sample ID: 140-15490-1 DU **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid **Prep Type: Total/NA**
Analysis Batch: 31713 **Prep Batch: 30683**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cobalt	3.8	J	4.35	J	mg/Kg	☼	13	30
Thallium	ND		0.657	J	mg/Kg	☼	NC	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-31148/13-B ^4 **Client Sample ID: Method Blank**
Matrix: Solid **Prep Type: Step 1**
Analysis Batch: 31604 **Prep Batch: 31252**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Antimony	ND		12	1.1	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Arsenic	ND		2.0	0.52	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Barium	ND		10	0.48	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Beryllium	ND		1.0	0.31	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Cobalt	ND		10	0.18	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Iron	ND		20	12	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Li	ND		10	0.60	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Manganese	ND		3.0	0.12	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Mo	ND		8.0	0.33	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Selenium	ND		2.0	0.68	mg/Kg		06/29/19 08:00	07/11/19 12:33	4
Thallium	ND		7.0	0.84	mg/Kg		06/29/19 08:00	07/11/19 12:33	4

Lab Sample ID: LCS 140-31148/14-B ^5 **Client Sample ID: Lab Control Sample**
Matrix: Solid **Prep Type: Step 1**
Analysis Batch: 31604 **Prep Batch: 31252**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	97.0		mg/Kg		97	75 - 125
Antimony	25.0	24.5		mg/Kg		98	75 - 125
Arsenic	5.00	4.89		mg/Kg		98	75 - 125
Barium	5.00	4.35	J	mg/Kg		87	75 - 125
Beryllium	2.50	2.58		mg/Kg		103	75 - 125
Cobalt	5.00	4.93	J	mg/Kg		99	75 - 125
Iron	50.0	49.6		mg/Kg		99	75 - 125
Li	5.00	4.72	J	mg/Kg		94	75 - 125
Manganese	5.00	5.09		mg/Kg		102	75 - 125
Mo	25.0	25.0		mg/Kg		100	75 - 125
Selenium	7.50	7.82		mg/Kg		104	75 - 125
Thallium	20.0	19.7		mg/Kg		98	75 - 125

LUMINANT

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

Lab Sample ID: LCSD 140-31148/15-B ^5
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 31252

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	99.5		mg/Kg		100	75 - 125	3	30
Antimony			25.0	24.7		mg/Kg		99	75 - 125	1	30
Arsenic			5.00	4.78		mg/Kg		96	75 - 125	2	30
Barium			5.00	4.30	J	mg/Kg		86	75 - 125	1	30
Beryllium			2.50	2.59		mg/Kg		104	75 - 125	0	30
Cobalt			5.00	4.89	J	mg/Kg		98	75 - 125	1	30
Iron			50.0	49.5		mg/Kg		99	75 - 125	0	30
Li			5.00	4.84	J	mg/Kg		97	75 - 125	3	30
Manganese			5.00	5.06		mg/Kg		101	75 - 125	1	30
Mo			25.0	25.1		mg/Kg		100	75 - 125	0	30
Selenium			7.50	8.06		mg/Kg		108	75 - 125	3	30
Thallium			20.0	20.1		mg/Kg		101	75 - 125	2	30

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 1
Prep Batch: 31252

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	0.88	J		0.934	J	mg/Kg	☼			5	30
Beryllium	ND			ND		mg/Kg	☼			NC	30
Cobalt	0.54	J		0.626	J	mg/Kg	☼			15	30
Iron	ND			ND		mg/Kg	☼			NC	30
Li	ND			ND		mg/Kg	☼			NC	30
Manganese	3.1	J		3.66	J	mg/Kg	☼			16	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 140-31253/13-B ^3
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 31256

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Antimony	ND		9.0	0.84	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Arsenic	ND		1.5	0.39	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Barium	ND		7.5	0.36	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Beryllium	ND		0.75	0.048	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Cobalt	ND		7.5	0.19	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Iron	ND		15	8.7	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Li	ND		7.5	0.45	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Manganese	ND		2.3	0.84	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Mo	ND		6.0	0.25	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Selenium	0.587	J	1.5	0.51	mg/Kg		06/30/19 08:00	07/11/19 14:06	3
Thallium	ND		5.3	0.63	mg/Kg		06/30/19 08:00	07/11/19 14:06	3

LUMINANT

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

Lab Sample ID: LCS 140-31253/14-B ^5 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 2**
Analysis Batch: 31604 — **Prep Batch: 31256**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	ND	*	mg/Kg		1	75 - 125
Antimony	25.0	21.1		mg/Kg		84	75 - 125
Arsenic	5.00	3.95		mg/Kg		79	75 - 125
Barium	5.00	2.28	J *	mg/Kg		46	75 - 125
Beryllium	2.50	1.35	*	mg/Kg		54	75 - 125
Cobalt	5.00	4.62	J	mg/Kg		92	75 - 125
Iron	50.0	ND	*	mg/Kg		2	75 - 125
Li	5.00	4.14	J	mg/Kg		83	75 - 125
Manganese	5.00	4.79		mg/Kg		96	75 - 125
Mo	25.0	20.7		mg/Kg		83	75 - 125
Selenium	7.50	7.34		mg/Kg		98	75 - 125
Thallium	20.0	18.4		mg/Kg		92	75 - 125

Lab Sample ID: LCSD 140-31253/15-B ^5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 2**
Analysis Batch: 31604 — **Prep Batch: 31256**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	ND	*	mg/Kg		-0.3	75 - 125	289	30
Antimony	25.0	21.4		mg/Kg		86	75 - 125	1	30
Arsenic	5.00	4.00		mg/Kg		80	75 - 125	1	30
Barium	5.00	2.28	J *	mg/Kg		46	75 - 125	0	30
Beryllium	2.50	1.32	*	mg/Kg		53	75 - 125	2	30
Cobalt	5.00	4.62	J	mg/Kg		92	75 - 125	0	30
Iron	50.0	ND	*	mg/Kg		3	75 - 125	28	30
Li	5.00	4.15	J	mg/Kg		83	75 - 125	0	30
Manganese	5.00	4.76		mg/Kg		95	75 - 125	1	30
Mo	25.0	20.9		mg/Kg		84	75 - 125	1	30
Selenium	7.50	6.68		mg/Kg		89	75 - 125	10	30
Thallium	20.0	18.6		mg/Kg		93	75 - 125	1	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 2**
Analysis Batch: 31604 — **Prep Batch: 31256**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	9.7	J *	11.8	J *	mg/Kg	☼	19	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Barium	0.76	J *	0.792	J *	mg/Kg	☼	4	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	0.76	J B	0.794	J	mg/Kg	☼	4	30
Thallium	ND		ND		mg/Kg	☼	NC	30

LUMINANT

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

Lab Sample ID: MB 140-31257/13-B
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 31338

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Antimony	ND		3.0	0.28	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Arsenic	ND		0.50	0.13	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Barium	0.151	J	2.5	0.12	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Beryllium	ND		0.25	0.015	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Cobalt	ND		2.5	0.045	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Iron	ND		5.0	2.9	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Li	ND		2.5	0.15	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Manganese	0.0515	J	0.75	0.027	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Mo	ND		2.0	0.082	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Selenium	0.197	J	0.50	0.17	mg/Kg		07/02/19 08:00	07/11/19 15:50	1
Thallium	ND		1.8	0.21	mg/Kg		07/02/19 08:00	07/11/19 15:50	1

Lab Sample ID: LCS 140-31257/14-B
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 31338

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	95.8		mg/Kg		96	75 - 125
Antimony	25.0	24.3		mg/Kg		97	75 - 125
Arsenic	5.00	4.90		mg/Kg		98	75 - 125
Barium	5.00	4.34		mg/Kg		87	75 - 125
Beryllium	2.50	2.56		mg/Kg		102	75 - 125
Cobalt	5.00	4.90		mg/Kg		98	75 - 125
Iron	50.0	54.0		mg/Kg		108	75 - 125
Li	5.00	4.87		mg/Kg		97	75 - 125
Manganese	5.00	5.03		mg/Kg		101	75 - 125
Mo	25.0	24.8		mg/Kg		99	75 - 125
Selenium	7.50	7.37		mg/Kg		98	75 - 125
Thallium	20.0	20.2		mg/Kg		101	75 - 125

Lab Sample ID: LCSD 140-31257/15-B
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 31338

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.1		mg/Kg		98	75 - 125	2	30
Antimony	25.0	24.6		mg/Kg		98	75 - 125	1	30
Arsenic	5.00	5.06		mg/Kg		101	75 - 125	3	30
Barium	5.00	4.49		mg/Kg		90	75 - 125	3	30
Beryllium	2.50	2.61		mg/Kg		104	75 - 125	2	30
Cobalt	5.00	4.97		mg/Kg		99	75 - 125	1	30
Iron	50.0	51.0		mg/Kg		102	75 - 125	6	30
Li	5.00	4.95		mg/Kg		99	75 - 125	2	30
Manganese	5.00	5.06		mg/Kg		101	75 - 125	1	30
Mo	25.0	24.9		mg/Kg		100	75 - 125	0	30
Selenium	7.50	7.63		mg/Kg		102	75 - 125	3	30
Thallium	20.0	20.5		mg/Kg		103	75 - 125	2	30

LUMINANT

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

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 3**
Analysis Batch: 31604 — **Prep Batch: 31338**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	88		90.2		mg/Kg	☼	3	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	1.8		1.75		mg/Kg	☼	5	30
Barium	4.3	B	4.58		mg/Kg	☼	7	30
Beryllium	0.067	J	0.0665	J	mg/Kg	☼	1	30
Cobalt	0.34	J	0.478	J F5	mg/Kg	☼	32	30
Iron	580		553		mg/Kg	☼	4	30
Li	ND		ND		mg/Kg	☼	NC	30
Manganese	2.4	B	2.99		mg/Kg	☼	20	30
Mo	ND		ND		mg/Kg	☼	NC	30
Selenium	0.22	J B	0.249	J	mg/Kg	☼	14	30
Thallium	ND		ND		mg/Kg	☼	NC	30

Lab Sample ID: MB 140-31341/13-B — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Step 4**
Analysis Batch: 31604 — **Prep Batch: 31360**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Antimony	ND		3.0	0.45	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Arsenic	0.260	J	0.50	0.22	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Barium	ND		2.5	0.12	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Beryllium	ND		0.25	0.016	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Cobalt	ND		2.5	0.053	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Iron	ND		5.0	2.9	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Li	ND		2.5	0.15	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Manganese	ND		0.75	0.13	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Mo	ND		2.0	0.082	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Selenium	0.561		0.50	0.47	mg/Kg		07/03/19 08:00	07/11/19 17:24	1
Thallium	ND		1.8	0.29	mg/Kg		07/03/19 08:00	07/11/19 17:24	1

Lab Sample ID: LCS 140-31341/14-B — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 4**
Analysis Batch: 31604 — **Prep Batch: 31360**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	98.4		mg/Kg		98	75 - 125
Antimony	25.0	25.6		mg/Kg		102	75 - 125
Arsenic	5.00	5.48		mg/Kg		110	75 - 125
Barium	5.00	4.90		mg/Kg		98	75 - 125
Beryllium	2.50	2.66		mg/Kg		106	75 - 125
Cobalt	5.00	4.92		mg/Kg		98	75 - 125
Iron	50.0	50.0		mg/Kg		100	75 - 125
Li	5.00	4.92		mg/Kg		98	75 - 125
Manganese	5.00	4.98		mg/Kg		100	75 - 125
Mo	25.0	25.7		mg/Kg		103	75 - 125
Selenium	7.50	0.762	*	mg/Kg		10	75 - 125
Thallium	20.0	17.2		mg/Kg		86	75 - 125

LUMINANT

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

Lab Sample ID: LCSD 140-31341/15-B — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 4**
Analysis Batch: 31604 — **Prep Batch: 31360**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	101		mg/Kg		101	75 - 125	3	30
Antimony			25.0	25.9		mg/Kg		103	75 - 125	1	30
Arsenic			5.00	5.55		mg/Kg		111	75 - 125	1	30
Barium			5.00	5.04		mg/Kg		101	75 - 125	3	30
Beryllium			2.50	2.74		mg/Kg		109	75 - 125	3	30
Cobalt			5.00	5.07		mg/Kg		101	75 - 125	3	30
Iron			50.0	51.5		mg/Kg		103	75 - 125	3	30
Li			5.00	5.09		mg/Kg		102	75 - 125	3	30
Manganese			5.00	5.13		mg/Kg		103	75 - 125	3	30
Mo			25.0	25.9		mg/Kg		104	75 - 125	1	30
Selenium			7.50	0.631	*	mg/Kg		8	75 - 125	19	30
Thallium			20.0	17.9		mg/Kg		89	75 - 125	4	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 4**
Analysis Batch: 31604 — **Prep Batch: 31360**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	1700			1740		mg/Kg	☼			0.1	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	2.8	B		2.56		mg/Kg	☼			10	30
Barium	16			18.8		mg/Kg	☼			15	30
Beryllium	0.13	J		0.135	J	mg/Kg	☼			1	30
Cobalt	1.5	J		1.59	J	mg/Kg	☼			8	30
Iron	3900			3860		mg/Kg	☼			2	30
Li	3.0	J		3.10	J	mg/Kg	☼			2	30
Manganese	18			18.2		mg/Kg	☼			0.4	30
Mo	ND			ND		mg/Kg	☼			NC	30
Selenium	ND	*		0.624	J *	mg/Kg	☼			NC	30
Thallium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: MB 140-31436/13-B ^5 — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 31651 — **Prep Batch: 31500**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Antimony	ND		45	4.2	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Arsenic	ND		7.5	1.9	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Barium	ND		38	1.8	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Beryllium	ND		3.8	0.32	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Cobalt	ND		38	0.60	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Iron	ND		75	44	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Li	ND		38	2.2	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Manganese	ND		11	1.9	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Mo	ND		30	1.3	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Selenium	ND		7.5	2.6	mg/Kg		07/10/19 08:00	07/12/19 11:39	5
Thallium	ND		26	3.5	mg/Kg		07/10/19 08:00	07/12/19 11:39	5

LUMINANT

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

Lab Sample ID: LCS 140-31436/14-B ^5 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 31651 — **Prep Batch: 31500**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	300	ND	*	mg/Kg		6	75 - 125
Antimony	75.0	81.2		mg/Kg		108	75 - 125
Arsenic	15.0	12.3		mg/Kg		82	75 - 125
Barium	15.0	7.80	J *	mg/Kg		52	75 - 125
Beryllium	7.50	4.23	*	mg/Kg		56	75 - 125
Cobalt	15.0	4.86	J *	mg/Kg		32	75 - 125
Iron	150	ND	*	mg/Kg		2	75 - 125
Li	15.0	16.4	J	mg/Kg		109	75 - 125
Manganese	15.0	4.82	J *	mg/Kg		32	75 - 125
Mo	75.0	64.7		mg/Kg		86	75 - 125
Selenium	22.5	24.8		mg/Kg		110	75 - 125
Thallium	60.0	ND	*	mg/Kg		2	75 - 125

Lab Sample ID: LCSD 140-31436/15-B ^5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 31651 — **Prep Batch: 31500**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	300	ND	*	mg/Kg		7	75 - 125	14	30
Antimony	75.0	82.5		mg/Kg		110	75 - 125	2	30
Arsenic	15.0	12.5		mg/Kg		83	75 - 125	2	30
Barium	15.0	7.73	J *	mg/Kg		52	75 - 125	1	30
Beryllium	7.50	4.34	*	mg/Kg		58	75 - 125	2	30
Cobalt	15.0	5.05	J *	mg/Kg		34	75 - 125	4	30
Iron	150	ND	*	mg/Kg		3	75 - 125	55	30
Li	15.0	16.1	J	mg/Kg		107	75 - 125	2	30
Manganese	15.0	4.97	J *	mg/Kg		33	75 - 125	3	30
Mo	75.0	64.0		mg/Kg		85	75 - 125	1	30
Selenium	22.5	26.2		mg/Kg		116	75 - 125	6	30
Thallium	60.0	ND	*	mg/Kg		0.9	75 - 125	60	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 5**
Analysis Batch: 31651 — **Prep Batch: 31500**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	62	J *	54.9	J *	mg/Kg	☼	12	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Barium	7.0	J *	8.10	J *	mg/Kg	☼	15	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

LUMINANT

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

Lab Sample ID: MB 140-31502/13-A
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 31502

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Antimony	ND		3.0	0.28	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Arsenic	ND		0.50	0.15	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Barium	ND		2.5	0.12	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Beryllium	ND		0.25	0.012	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Cobalt	ND		2.5	0.046	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Iron	ND		5.0	2.9	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Li	ND		2.5	0.15	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Manganese	ND		0.75	0.25	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Mo	ND		2.0	0.099	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Selenium	ND		0.50	0.17	mg/Kg		07/10/19 08:00	07/12/19 13:14	1
Thallium	ND		1.8	0.21	mg/Kg		07/10/19 08:00	07/12/19 13:14	1

Lab Sample ID: LCS 140-31502/14-A
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 31502

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	95.4		mg/Kg		95	75 - 125
Antimony	25.0	24.8		mg/Kg		99	75 - 125
Arsenic	5.00	4.94		mg/Kg		99	75 - 125
Barium	5.00	4.58		mg/Kg		92	75 - 125
Beryllium	2.50	2.57		mg/Kg		103	75 - 125
Cobalt	5.00	4.78		mg/Kg		96	75 - 125
Iron	50.0	47.4		mg/Kg		95	75 - 125
Li	5.00	4.71		mg/Kg		94	75 - 125
Manganese	5.00	4.83		mg/Kg		97	75 - 125
Mo	25.0	24.7		mg/Kg		99	75 - 125
Selenium	7.50	7.32		mg/Kg		98	75 - 125
Thallium	20.0	19.8		mg/Kg		99	75 - 125

Lab Sample ID: LCSD 140-31502/15-A
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 31502

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.8		mg/Kg		99	75 - 125	4	30
Antimony	25.0	25.5		mg/Kg		102	75 - 125	3	30
Arsenic	5.00	5.16		mg/Kg		103	75 - 125	4	30
Barium	5.00	4.77		mg/Kg		95	75 - 125	4	30
Beryllium	2.50	2.67		mg/Kg		107	75 - 125	4	30
Cobalt	5.00	4.97		mg/Kg		99	75 - 125	4	30
Iron	50.0	49.5		mg/Kg		99	75 - 125	4	30
Li	5.00	4.90		mg/Kg		98	75 - 125	4	30
Manganese	5.00	5.02		mg/Kg		100	75 - 125	4	30
Mo	25.0	25.2		mg/Kg		101	75 - 125	2	30
Selenium	7.50	7.50		mg/Kg		100	75 - 125	2	30
Thallium	20.0	20.6		mg/Kg		103	75 - 125	4	30

LUMINANT

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

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

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 6
Prep Batch: 31502

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	2300		2370		mg/Kg	☼	2	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	0.94		0.869		mg/Kg	☼	8	30
Barium	18		18.6		mg/Kg	☼	6	30
Beryllium	0.067	J	0.0691	J	mg/Kg	☼	3	30
Cobalt	0.90	J	0.940	J	mg/Kg	☼	5	30
Iron	2500		2510		mg/Kg	☼	0.4	30
Li	2.1	J	2.17	J	mg/Kg	☼	3	30
Manganese	16		16.1		mg/Kg	☼	0.6	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 140-31615/13-A
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 31615

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Antimony	ND		3.0	0.14	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Arsenic	ND		0.50	0.13	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Barium	ND		2.5	0.12	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Beryllium	ND		0.25	0.0075	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Cobalt	ND		2.5	0.15	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Iron	ND		5.0	4.1	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Li	ND		2.5	0.15	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Manganese	ND		0.75	0.052	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Mo	ND		2.0	0.082	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Selenium	ND		0.50	0.17	mg/Kg		07/12/19 09:08	07/15/19 10:58	1
Thallium	ND		1.8	0.18	mg/Kg		07/12/19 09:08	07/15/19 10:58	1

Lab Sample ID: LCS 140-31615/14-A
Matrix: Solid
Analysis Batch: 31713

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 31615

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.8		mg/Kg		97	75 - 125
Antimony	25.0	25.7		mg/Kg		103	75 - 125
Arsenic	5.00	5.23		mg/Kg		105	75 - 125
Barium	5.00	4.99		mg/Kg		100	75 - 125
Beryllium	2.50	2.52		mg/Kg		101	75 - 125
Cobalt	5.00	5.20		mg/Kg		104	75 - 125
Iron	50.0	51.7		mg/Kg		103	75 - 125
Li	5.00	5.15		mg/Kg		103	75 - 125
Manganese	5.00	5.21		mg/Kg		104	75 - 125
Mo	25.0	26.5		mg/Kg		106	75 - 125
Selenium	7.50	7.52		mg/Kg		100	75 - 125
Thallium	20.0	21.2		mg/Kg		106	75 - 125

LUMINANT

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

Lab Sample ID: LCSD 140-31615/15-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Step 7**
Analysis Batch: 31713 — **Prep Batch: 31615**

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			100	98.0		mg/Kg		98	75 - 125	1	30
Antimony			25.0	25.8		mg/Kg		103	75 - 125	0	30
Arsenic			5.00	5.30		mg/Kg		106	75 - 125	1	30
Barium			5.00	4.99		mg/Kg		100	75 - 125	0	30
Beryllium			2.50	2.50		mg/Kg		100	75 - 125	1	30
Cobalt			5.00	5.21		mg/Kg		104	75 - 125	0	30
Iron			50.0	51.5		mg/Kg		103	75 - 125	0	30
Li			5.00	5.18		mg/Kg		104	75 - 125	1	30
Manganese			5.00	5.21		mg/Kg		104	75 - 125	0	30
Mo			25.0	26.7		mg/Kg		107	75 - 125	1	30
Selenium			7.50	7.55		mg/Kg		101	75 - 125	0	30
Thallium			20.0	21.3		mg/Kg		107	75 - 125	1	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 7**
Analysis Batch: 31713 — **Prep Batch: 31615**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	1.2			1.16		mg/Kg	☼			6	30
Beryllium	0.56			0.602		mg/Kg	☼			7	30
Iron	5200			5740		mg/Kg	☼			11	30
Li	9.6			10.9		mg/Kg	☼			13	30
Manganese	26			29.0		mg/Kg	☼			9	30
Mo	0.19	J		0.209	J	mg/Kg	☼			10	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 7**
Analysis Batch: 31713 — **Prep Batch: 31615**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	29000			35900		mg/Kg	☼			23	30
Barium	390			447		mg/Kg	☼			14	30

Lab Sample ID: 140-15490-1 DU — **Client Sample ID: AP-2019-1 (30-31)**
Matrix: Solid — **Prep Type: Step 7**
Analysis Batch: 31713 — **Prep Batch: 31615**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Cobalt	0.79	J		0.899	J	mg/Kg	☼			12	30
Thallium	0.48	J		ND		mg/Kg	☼			NC	30

LUMINANT

QC Sample Results

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Method: 7470A - SEP Mercury (CVAA) - Total

Lab Sample ID: MB 140-30683/13-B
Matrix: Solid
Analysis Batch: 30868

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 30683

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.10	0.040	mg/Kg		06/11/19 08:00	06/16/19 13:56	1

Lab Sample ID: LCS 140-30683/14-B
Matrix: Solid
Analysis Batch: 30868

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 30683

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Hg			2.50	2.70		mg/Kg		108	75 - 125		

Lab Sample ID: LCSD 140-30683/15-B
Matrix: Solid
Analysis Batch: 30868

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 30683

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg			2.50	2.71		mg/Kg		108	75 - 125	0	30

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Analysis Batch: 30868

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Total/NA
Prep Batch: 30683

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Hg	0.081	J		0.102	J	mg/Kg	☼			23	30

LUMINANT

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Metals

Prep Batch: 30683

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	Total	
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	Total	
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	Total	
MB 140-30683/13-A	Method Blank	Total/NA	Solid	Total	
MB 140-30683/13-B	Method Blank	Total/NA	Solid	Total	
LCS 140-30683/14-A	Lab Control Sample	Total/NA	Solid	Total	
LCS 140-30683/14-B	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-30683/15-A	Lab Control Sample Dup	Total/NA	Solid	Total	
LCSD 140-30683/15-B	Lab Control Sample Dup	Total/NA	Solid	Total	
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	Total	

Prep Batch: 30859

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	7470A	30683
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	7470A	30683
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	7470A	30683
MB 140-30683/13-B	Method Blank	Total/NA	Solid	7470A	30683
LCS 140-30683/14-B	Lab Control Sample	Total/NA	Solid	7470A	30683
LCSD 140-30683/15-B	Lab Control Sample Dup	Total/NA	Solid	7470A	30683
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	7470A	30683

Analysis Batch: 30868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	7470A	30859
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	7470A	30859
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	7470A	30859
MB 140-30683/13-B	Method Blank	Total/NA	Solid	7470A	30859
LCS 140-30683/14-B	Lab Control Sample	Total/NA	Solid	7470A	30859
LCSD 140-30683/15-B	Lab Control Sample Dup	Total/NA	Solid	7470A	30859
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	7470A	30859

Prep Batch: 31128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	3050B	
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	3050B	
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	3050B	
MB 140-31128/14-A	Method Blank	Total/NA	Solid	3050B	
LCS 140-31128/15-A	Lab Control Sample	Total/NA	Solid	3050B	
140-15490-1 MS	AP-2019-1 (30-31)	Total/NA	Solid	3050B	
140-15490-1 MSD	AP-2019-1 (30-31)	Total/NA	Solid	3050B	

SEP Batch: 31148

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 1	Solid	Exchangeable	
140-15490-2	AP-2019-2 (35-36)	Step 1	Solid	Exchangeable	
140-15490-3	AP-2019-3 (18-19)	Step 1	Solid	Exchangeable	
MB 140-31148/13-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-31148/14-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-31148/15-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-15490-1 DU	AP-2019-1 (30-31)	Step 1	Solid	Exchangeable	

LUMINANT

QC Association Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Metals

Prep Batch: 31252

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 1	Solid	3010A	31148
140-15490-2	AP-2019-2 (35-36)	Step 1	Solid	3010A	31148
140-15490-3	AP-2019-3 (18-19)	Step 1	Solid	3010A	31148
MB 140-31148/13-B ^4	Method Blank	Step 1	Solid	3010A	31148
LCS 140-31148/14-B ^5	Lab Control Sample	Step 1	Solid	3010A	31148
LCSD 140-31148/15-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	31148
140-15490-1 DU	AP-2019-1 (30-31)	Step 1	Solid	3010A	31148

SEP Batch: 31253

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 2	Solid	Carbonate	
140-15490-2	AP-2019-2 (35-36)	Step 2	Solid	Carbonate	
140-15490-3	AP-2019-3 (18-19)	Step 2	Solid	Carbonate	
MB 140-31253/13-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-31253/14-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-31253/15-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-15490-1 DU	AP-2019-1 (30-31)	Step 2	Solid	Carbonate	

Prep Batch: 31256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 2	Solid	3010A	31253
140-15490-2	AP-2019-2 (35-36)	Step 2	Solid	3010A	31253
140-15490-3	AP-2019-3 (18-19)	Step 2	Solid	3010A	31253
MB 140-31253/13-B ^3	Method Blank	Step 2	Solid	3010A	31253
LCS 140-31253/14-B ^5	Lab Control Sample	Step 2	Solid	3010A	31253
LCSD 140-31253/15-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	31253
140-15490-1 DU	AP-2019-1 (30-31)	Step 2	Solid	3010A	31253

SEP Batch: 31257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 3	Solid	Non-Crystalline	
140-15490-2	AP-2019-2 (35-36)	Step 3	Solid	Non-Crystalline	
140-15490-3	AP-2019-3 (18-19)	Step 3	Solid	Non-Crystalline	
MB 140-31257/13-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-31257/14-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-31257/15-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-15490-1 DU	AP-2019-1 (30-31)	Step 3	Solid	Non-Crystalline	

Prep Batch: 31338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 3	Solid	3010A	31257
140-15490-2	AP-2019-2 (35-36)	Step 3	Solid	3010A	31257
140-15490-3	AP-2019-3 (18-19)	Step 3	Solid	3010A	31257
MB 140-31257/13-B	Method Blank	Step 3	Solid	3010A	31257
LCS 140-31257/14-B	Lab Control Sample	Step 3	Solid	3010A	31257
LCSD 140-31257/15-B	Lab Control Sample Dup	Step 3	Solid	3010A	31257
140-15490-1 DU	AP-2019-1 (30-31)	Step 3	Solid	3010A	31257

SEP Batch: 31341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 4	Solid	Metal Hydroxide	

LUMINANT

Metals (Continued)

SEP Batch: 31341 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-2	AP-2019-2 (35-36)	Step 4	Solid	Metal Hydroxide	
140-15490-3	AP-2019-3 (18-19)	Step 4	Solid	Metal Hydroxide	
MB 140-31341/13-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-31341/14-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-31341/15-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-15490-1 DU	AP-2019-1 (30-31)	Step 4	Solid	Metal Hydroxide	

Prep Batch: 31360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 4	Solid	3010A	31341
140-15490-2	AP-2019-2 (35-36)	Step 4	Solid	3010A	31341
140-15490-3	AP-2019-3 (18-19)	Step 4	Solid	3010A	31341
MB 140-31341/13-B	Method Blank	Step 4	Solid	3010A	31341
LCS 140-31341/14-B	Lab Control Sample	Step 4	Solid	3010A	31341
LCSD 140-31341/15-B	Lab Control Sample Dup	Step 4	Solid	3010A	31341
140-15490-1 DU	AP-2019-1 (30-31)	Step 4	Solid	3010A	31341

SEP Batch: 31436

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 5	Solid	Organic-Bound	
140-15490-2	AP-2019-2 (35-36)	Step 5	Solid	Organic-Bound	
140-15490-3	AP-2019-3 (18-19)	Step 5	Solid	Organic-Bound	
MB 140-31436/13-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-31436/14-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-31436/15-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-15490-1 DU	AP-2019-1 (30-31)	Step 5	Solid	Organic-Bound	

Prep Batch: 31500

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 5	Solid	3010A	31436
140-15490-2	AP-2019-2 (35-36)	Step 5	Solid	3010A	31436
140-15490-3	AP-2019-3 (18-19)	Step 5	Solid	3010A	31436
MB 140-31436/13-B ^5	Method Blank	Step 5	Solid	3010A	31436
LCS 140-31436/14-B ^5	Lab Control Sample	Step 5	Solid	3010A	31436
LCSD 140-31436/15-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	31436
140-15490-1 DU	AP-2019-1 (30-31)	Step 5	Solid	3010A	31436

SEP Batch: 31502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 6	Solid	Acid/Sulfide	
140-15490-2	AP-2019-2 (35-36)	Step 6	Solid	Acid/Sulfide	
140-15490-3	AP-2019-3 (18-19)	Step 6	Solid	Acid/Sulfide	
MB 140-31502/13-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-31502/14-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-31502/15-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-15490-1 DU	AP-2019-1 (30-31)	Step 6	Solid	Acid/Sulfide	

Analysis Batch: 31553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	6010B	31128
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	6010B	31128

LUMINANT

Metals (Continued)

Analysis Batch: 31553 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	6010B	31128
MB 140-31128/14-A	Method Blank	Total/NA	Solid	6010B	31128
LCS 140-31128/15-A	Lab Control Sample	Total/NA	Solid	6010B	31128
140-15490-1 MS	AP-2019-1 (30-31)	Total/NA	Solid	6010B	31128
140-15490-1 MSD	AP-2019-1 (30-31)	Total/NA	Solid	6010B	31128

Analysis Batch: 31604

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 1	Solid	6010B SEP	31252
140-15490-1	AP-2019-1 (30-31)	Step 2	Solid	6010B SEP	31256
140-15490-1	AP-2019-1 (30-31)	Step 3	Solid	6010B SEP	31338
140-15490-1	AP-2019-1 (30-31)	Step 4	Solid	6010B SEP	31360
140-15490-2	AP-2019-2 (35-36)	Step 1	Solid	6010B SEP	31252
140-15490-2	AP-2019-2 (35-36)	Step 2	Solid	6010B SEP	31256
140-15490-2	AP-2019-2 (35-36)	Step 3	Solid	6010B SEP	31338
140-15490-2	AP-2019-2 (35-36)	Step 4	Solid	6010B SEP	31360
140-15490-3	AP-2019-3 (18-19)	Step 1	Solid	6010B SEP	31252
140-15490-3	AP-2019-3 (18-19)	Step 2	Solid	6010B SEP	31256
140-15490-3	AP-2019-3 (18-19)	Step 3	Solid	6010B SEP	31338
140-15490-3	AP-2019-3 (18-19)	Step 4	Solid	6010B SEP	31360
MB 140-31148/13-B ^4	Method Blank	Step 1	Solid	6010B SEP	31252
MB 140-31253/13-B ^3	Method Blank	Step 2	Solid	6010B SEP	31256
MB 140-31257/13-B	Method Blank	Step 3	Solid	6010B SEP	31338
MB 140-31341/13-B	Method Blank	Step 4	Solid	6010B SEP	31360
LCS 140-31148/14-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	31252
LCS 140-31253/14-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	31256
LCS 140-31257/14-B	Lab Control Sample	Step 3	Solid	6010B SEP	31338
LCS 140-31341/14-B	Lab Control Sample	Step 4	Solid	6010B SEP	31360
LCSD 140-31148/15-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	31252
LCSD 140-31253/15-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	31256
LCSD 140-31257/15-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	31338
LCSD 140-31341/15-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	31360
140-15490-1 DU	AP-2019-1 (30-31)	Step 1	Solid	6010B SEP	31252
140-15490-1 DU	AP-2019-1 (30-31)	Step 2	Solid	6010B SEP	31256
140-15490-1 DU	AP-2019-1 (30-31)	Step 3	Solid	6010B SEP	31338
140-15490-1 DU	AP-2019-1 (30-31)	Step 4	Solid	6010B SEP	31360

Prep Batch: 31615

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 7	Solid	Residual	
140-15490-2	AP-2019-2 (35-36)	Step 7	Solid	Residual	
140-15490-3	AP-2019-3 (18-19)	Step 7	Solid	Residual	
MB 140-31615/13-A	Method Blank	Step 7	Solid	Residual	
LCS 140-31615/14-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-31615/15-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-15490-1 DU	AP-2019-1 (30-31)	Step 7	Solid	Residual	

Analysis Batch: 31651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 5	Solid	6010B SEP	31500
140-15490-1	AP-2019-1 (30-31)	Step 6	Solid	6010B SEP	31502

LUMINANT

Metals (Continued)

Analysis Batch: 31651 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-2	AP-2019-2 (35-36)	Step 5	Solid	6010B SEP	31500
140-15490-2	AP-2019-2 (35-36)	Step 6	Solid	6010B SEP	31502
140-15490-3	AP-2019-3 (18-19)	Step 5	Solid	6010B SEP	31500
140-15490-3	AP-2019-3 (18-19)	Step 6	Solid	6010B SEP	31502
MB 140-31436/13-B ^5	Method Blank	Step 5	Solid	6010B SEP	31500
MB 140-31502/13-A	Method Blank	Step 6	Solid	6010B SEP	31502
LCS 140-31436/14-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	31500
LCS 140-31502/14-A	Lab Control Sample	Step 6	Solid	6010B SEP	31502
LCSD 140-31436/15-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	31500
LCSD 140-31502/15-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	31502
140-15490-1 DU	AP-2019-1 (30-31)	Step 5	Solid	6010B SEP	31500
140-15490-1 DU	AP-2019-1 (30-31)	Step 6	Solid	6010B SEP	31502

Analysis Batch: 31713

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683
140-15490-2	AP-2019-2 (35-36)	Step 7	Solid	6010B SEP	31615
140-15490-2	AP-2019-2 (35-36)	Step 7	Solid	6010B SEP	31615
140-15490-2	AP-2019-2 (35-36)	Step 7	Solid	6010B SEP	31615
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	6010B	30683
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	6010B	30683
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	6010B	30683
140-15490-3	AP-2019-3 (18-19)	Step 7	Solid	6010B SEP	31615
140-15490-3	AP-2019-3 (18-19)	Step 7	Solid	6010B SEP	31615
140-15490-3	AP-2019-3 (18-19)	Step 7	Solid	6010B SEP	31615
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	6010B	30683
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	6010B	30683
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	6010B	30683
MB 140-30683/13-A	Method Blank	Total/NA	Solid	6010B	30683
MB 140-31615/13-A	Method Blank	Step 7	Solid	6010B SEP	31615
LCS 140-30683/14-A	Lab Control Sample	Total/NA	Solid	6010B	30683
LCS 140-31615/14-A	Lab Control Sample	Step 7	Solid	6010B SEP	31615
LCSD 140-30683/15-A	Lab Control Sample Dup	Total/NA	Solid	6010B	30683
LCSD 140-31615/15-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	31615
140-15490-1 DU	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1 DU	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1 DU	AP-2019-1 (30-31)	Step 7	Solid	6010B SEP	31615
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	6010B	30683

Analysis Batch: 31744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Sum of Steps 1-7	Solid	6010B SEP	
140-15490-2	AP-2019-2 (35-36)	Sum of Steps 1-7	Solid	6010B SEP	
140-15490-3	AP-2019-3 (18-19)	Sum of Steps 1-7	Solid	6010B SEP	

LUMINANT

QC Association Summary

Client: Golder Associates Inc.
Job ID: 140-15490-1
Project/Site: Martin Lake Ash Ponds - SEP + Totals

General Chemistry

Analysis Batch: 30602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-15490-1	AP-2019-1 (30-31)	Total/NA	Solid	Moisture	
140-15490-2	AP-2019-2 (35-36)	Total/NA	Solid	Moisture	
140-15490-3	AP-2019-3 (18-19)	Total/NA	Solid	Moisture	
140-15490-1 DU	AP-2019-1 (30-31)	Total/NA	Solid	Moisture	

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Lab Sample ID: 140-15490-1
Date Collected: 06/03/19 11:36
Matrix: Solid
Date Received: 06/05/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			31744	07/16/19 17:31	CLJ	TAL KNX
	Instrument ID:	NOEQUIP								
Total/NA	Analysis	Moisture		1			30602	06/06/19 14:52	BKD	TAL KNX
	Instrument ID:	W3								

Client Sample ID: AP-2019-1 (30-31)

Lab Sample ID: 140-15490-1
Date Collected: 06/03/19 11:36
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 76.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.536 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 12:59	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 14:24	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31713	07/15/19 15:45	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31713	07/15/19 18:28	KNC	TAL KNX
	Instrument ID:	DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			31604	07/11/19 12:49	KNC	TAL KNX
	Instrument ID:	DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			31604	07/11/19 14:21	KNC	TAL KNX
	Instrument ID:	DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 16:06	KNC	TAL KNX
	Instrument ID:	DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:49	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 11:54	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:29	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Lab Sample ID: 140-15490-1
Date Collected: 06/03/19 11:36
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 76.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 11:39	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31713	07/15/19 13:08	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31713	07/15/19 17:11	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 14:04	DKW	TAL KNX
	Instrument ID:	HG								

Client Sample ID: AP-2019-2 (35-36)

Lab Sample ID: 140-15490-2
Date Collected: 06/03/19 13:20
Matrix: Solid
Date Received: 06/05/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			31744	07/16/19 17:31	CLJ	TAL KNX
	Instrument ID:	NOEQUIP								
Total/NA	Analysis	Moisture		1			30602	06/06/19 14:52	BKD	TAL KNX
	Instrument ID:	W3								

Client Sample ID: AP-2019-2 (35-36)

Lab Sample ID: 140-15490-2
Date Collected: 06/03/19 13:20
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 78.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.527 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 13:13	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 14:36	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31713	07/15/19 16:10	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		5			31713	07/15/19 18:38	KNC	TAL KNX
	Instrument ID:	DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			31604	07/11/19 12:59	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-2 (35-36)

Date Collected: 06/03/19 13:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-2

Matrix: Solid
Percent Solids: 78.5

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	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			31604	07/11/19 14:42	KNC	TAL KNX
	Instrument ID:	DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 16:16	KNC	TAL KNX
	Instrument ID:	DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:59	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 12:05	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:49	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 12:05	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31713	07/15/19 13:19	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31713	07/15/19 17:21	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 14:09	DKW	TAL KNX
	Instrument ID:	HG								

Client Sample ID: AP-2019-3 (18-19)

Date Collected: 06/03/19 15:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			31744	07/16/19 17:31	CLJ	TAL KNX
	Instrument ID:	NOEQUIP								
Total/NA	Analysis	Moisture		1			30602	06/06/19 14:52	BKD	TAL KNX
	Instrument ID:	W3								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-3 (18-19)

Date Collected: 06/03/19 15:20
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-3

Matrix: Solid
Percent Solids: 80.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.527 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 13:18	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 14:41	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31713	07/15/19 16:15	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		5			31713	07/15/19 18:43	KNC	TAL KNX
	Instrument ID:	DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			31604	07/11/19 13:04	KNC	TAL KNX
	Instrument ID:	DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			31604	07/11/19 14:47	KNC	TAL KNX
	Instrument ID:	DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 16:21	KNC	TAL KNX
	Instrument ID:	DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 18:04	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 12:10	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:55	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 12:11	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31713	07/15/19 13:24	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31713	07/15/19 17:27	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-3 (18-19)

Lab Sample ID: 140-15490-3
Date Collected: 06/03/19 15:20
Matrix: Solid
Date Received: 06/05/19 09:20
Percent Solids: 80.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 14:17	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-30683/13-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	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 11:13	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-30683/13-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	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 13:56	DKW	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-31128/14-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 11:42	KNC	TAL KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-31148/13-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	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			31604	07/11/19 12:33	KNC	TAL KNX
	Instrument ID: DUO									

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31253/13-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	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			31604	07/11/19 14:06	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31257/13-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	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 15:50	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31341/13-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	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:24	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31436/13-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	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 11:39	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31502/13-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	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:14	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: Method Blank — Lab Sample ID: MB 140-31615/13-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	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 10:58	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30683/14-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 11:19	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-30683/14-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	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 13:59	DKW	TAL KNX
	Instrument ID:	HG								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31128/15-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.500 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 11:47	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31148/14-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	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			31604	07/11/19 12:38	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31253/14-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	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			31604	07/11/19 14:11	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31257/14-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	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 15:56	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31341/14-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	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:29	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31436/14-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	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 11:44	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31502/14-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:19	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: Lab Control Sample — Lab Sample ID: LCS 140-31615/14-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 11:03	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30683/15-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 11:24	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-30683/15-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 14:02	DKW	TAL KNX
	Instrument ID:	HG								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31148/15-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			31604	07/11/19 12:43	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31253/15-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			31604	07/11/19 14:16	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31257/15-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 16:01	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31341/15-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:44	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31436/15-B ^5

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 11:49	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31502/15-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:24	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: Lab Control Sample Dup — Lab Sample ID: LCSD 140-31615/15-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 11:08	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)
Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1 MS
Matrix: Solid
Percent Solids: 76.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.530 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 13:04	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: AP-2019-1 (30-31)
Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1 MSD
Matrix: Solid
Percent Solids: 76.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			0.539 g	50 mL	31128	06/26/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31553	07/10/19 13:08	KNC	TAL KNX
	Instrument ID:	DUO								

Client Sample ID: AP-2019-1 (30-31)
Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1 DU
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			30602	06/06/19 14:52	BKD	TAL KNX
	Instrument ID:	W3								

Client Sample ID: AP-2019-1 (30-31)
Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Percent Solids: 76.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			31713	07/15/19 14:30	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			31713	07/15/19 15:50	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		2			31713	07/15/19 18:33	KNC	TAL KNX
	Instrument ID:	DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	31148	06/26/19 09:47	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	31252	06/29/19 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			31604	07/11/19 12:54	KNC	TAL KNX
	Instrument ID:	DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	31253	06/29/19 08:00	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	31256	06/30/19 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			31604	07/11/19 14:37	KNC	TAL KNX
	Instrument ID:	DUO								

LUMINANT

Lab Chronicle

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Client Sample ID: AP-2019-1 (30-31)

Date Collected: 06/03/19 11:36
Date Received: 06/05/19 09:20

Lab Sample ID: 140-15490-1 DU

Matrix: Solid
Percent Solids: 76.0

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	31257	06/30/19 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	31338	07/02/19 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			31604	07/11/19 16:11	KNC	TAL KNX
	Instrument ID:	DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	31341	07/02/19 09:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	31360	07/03/19 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			31604	07/11/19 17:54	KNC	TAL KNX
	Instrument ID:	DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	31436	07/08/19 07:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	31500	07/10/19 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			31651	07/12/19 12:00	KNC	TAL KNX
	Instrument ID:	DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	31502	07/10/19 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			31651	07/12/19 13:44	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			31713	07/15/19 12:00	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			31713	07/15/19 13:14	KNC	TAL KNX
	Instrument ID:	DUO								
Step 7	Prep	Residual			1.000 g	50 mL	31615	07/12/19 09:08	KNC	TAL KNX
Step 7	Analysis	6010B SEP		2			31713	07/15/19 17:16	KNC	TAL KNX
	Instrument ID:	DUO								
Total/NA	Prep	Total			1.000 g	50 mL	30683	06/11/19 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	30859	06/16/19 08:00	DKW	TAL KNX
Total/NA	Analysis	7470A		1			30868	06/16/19 14:06	DKW	TAL KNX
	Instrument ID:	HG								

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Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Method Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
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

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Sample Summary

Client: Golder Associates Inc.
Project/Site: Martin Lake Ash Ponds - SEP + Totals

Job ID: 140-15490-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
140-15490-1	AP-2019-1 (30-31)	Solid	06/03/19 11:36	06/05/19 09:20	
140-15490-2	AP-2019-2 (35-36)	Solid	06/03/19 13:20	06/05/19 09:20	
140-15490-3	AP-2019-3 (18-19)	Solid	06/03/19 15:20	06/05/19 09:20	

LUMINANT

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: Kelsey Worley	Lab PM: Walker Wasmund, Terry	Carrier Tracking No(s):	COC No: 140-6683-2229.1
Client Contact: Will Vienne	Phone: 281-750-2734	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): Standard			
State, Zip: TX, 78664				
Phone: 512-671-3434(Tel)	PO #: 19122434-C			
Email: William_Vienne@golder.com	WO #: 1922434-C			
Project Name: Martin Lake Ash Ponds - SEP + Totals	Project #: 14005268			
Site:	SSOW#:			

Analysis Requested

140-15490 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	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	I		
AP-2019-1 (30-31)	06/03/19	1136	C	S			X	X		On Ice
AP-2019-2 (35-36)	06/03/19	1320	C	S			X	X		" "
AP-2019-3 (18-19)	06/03/19	1520	C	S			X	X		" "
BT: 1.2°C CT: 1.2°C, 1 Cooler										
FedEx No. Custody seal intact										
tr# 7876 7328 2042										
KW 6/5/19										

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
Kelsey Worley	06/04/19 1245	Golder	[illegible]	6/5/19 0820	TA-Knox

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

LUMMAMT

Loc: 140
15490

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	/			☐ **Containers, Broken**
2. Were ambient air containers received intact?			/	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : 5C68 Correction factor: +0.0	/			☐ **Cooler Out of Temp, Client Contacted, Proceed/Cancel** ☐ **Cooler Out of Temp, Same Day Receipt**
5. Were all of the sample containers received intact?	/			☐ **Containers, Broken**
6. Were samples received in appropriate containers?	/			☐ **Containers, Improper; Client Contacted; Proceed/Cancel**
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ **COC & Samples Do Not Match** ☐ **COC Incorrect/Incomplete** ☐ **COC Not Received**
8. Were all of the samples listed on the COC received?	/			☐ **Sample Received, Not on COC** ☐ **Sample on COC, Not Received**
9. Is the date/time of sample collection noted?	/			☐ **COC; No Date/Time; Client Contacted**
10. Was the sampler identified on the COC?	/			☐ **Sampler Not Listed on COC**
11. Is the client and project name/# identified?	/			☐ **COC Incorrect/Incomplete**
12. Are tests/parameters listed for each sample?	/			☐ **COC No tests on COC**
13. Is the matrix of the samples noted?	/			☐ **COC Incorrect/Incomplete**
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ **COC Incorrect/Incomplete**
15. Were samples received within holding time?	/			☐ **Holding Time - Receipt**
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ **pH Adjusted, pH Included (See box 16A)** ☐ **Incorrect Preservative**
17. Were VOA samples received without headspace?			/	☐ **Headspace (VOA only)**
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			/	☐ **Residual Chlorine**
19. For 1613B water samples is pH<9?			/	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

pH test strip lot number:

Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:	
Lot Number:	
Exp Date:	
Analyst:	
Date:	
Time:	

Project #: 1400526P PM Instructions:

Sample Receiving Associate: Date: 6/5/19

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FOUNDATION

APPENDIX C

GROUNDWATER SAMPLING RECORDS

LUMINANT

RECORD OF WATER LEVEL READINGS

GOLDER

Project Name: LUMINANT-MLSES-PONDS Location: TATUM, TX Project No.: 19122262-C

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
H-31	5-14-19	0704	SOLINST	TOC	22.73				JTB	
H-32	5-14-19	0759	SOLINST	TOC	23.16				JTB	
H-27	5-14-19	0903	SOLINST	TOC	22.02				JTB	
H-29	5-14-19	1050	SOLINST	TOC	22.61				JTB	
H-28	5-14-19	1155	SOLINST	TOC	7.12				JTB	
H-26	5-14-19	1350	SOLINST	TOC	13.21				JTB	
H-33	5-14-19	1449	SOLINST	TOC	13.42				JTB	

LUMINANT

Sheet 1 of 1

GROUNDWATER SAMPLING RECORD

Project Number: 19122262-C Project Name: LUMINAULT - MLSES Date: 5-14-19

Sample Number: H-26	Starting Water Level (ft. BMP): 13.21
Sampling Location (well ID, etc.): H-26	Casing Stickup (ft.): -
Sampled by: JTB	Starting Water Level (ft. BGL): 13.21
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: Dame

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

1352 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)
1401	—	.2	23.1	6.81	1730	0.86	-29	8.1	13.44
1406		1	22.7	6.82	1760	0.63	-31	7.1	13.46
1413		↓	22.8	6.83	1760	0.64	-31	7.7	13.47

Water Level (ft. BMP) at End of Purge: 13.47 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration	Preservation	Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)		(quality control sample, other)
1425	250mL	P	1	N	—	GEN CHEM
1425	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

LUMINANT

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINALIT- MLSES Date: 5-14-19

Sample Number: H-27	Starting Water Level (ft. BMP): 22.02
Sampling Location (well ID, etc.): H-27	Casing Stickup (ft.): –
Sampled by: JTB	Starting Water Level (ft. BGL): 22.02
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

0906 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)
0916	–	.2	22.1	6.74	1610	0.49	-79	7.7	22.23
0921		↓	22.4	6.77	1640	0.51	-81	7.9	22.24
0927		↓	22.4	6.78	1630	0.52	-82	7.9	22.23

Water Level (ft. BMP) at End of Purge: 22.23 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration	Preservation	Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)		(quality control sample, other)
0940	250mL	P	1	N	–	GEN CHEM
0940	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

LUMINANT

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINANT- MLSES Date: 5-14-19

Sample Number: H-28	Starting Water Level (ft. BMP): 7.12
Sampling Location (well ID, etc.): H-28	Casing Stickup (ft.): –
Sampled by: JTB	Starting Water Level (ft. BGL): 7.12
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

Time (1157)	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)
1201	–	.2	22.6	6.29	1580	0.39	-34	3.8	7.29
1211			22.9	6.31	1520	0.31	-39	4.6	7.31
1218			22.9	6.32	1510	0.32	-39	4.8	7.32

Water Level (ft. BMP) at End of Purge: 7.32 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1230	250mL	P	1	N	–	GEN CHEM
1230	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

LUMINANT

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINANT- MCSES Date: 5-14-19

Sample Number: H-29	Starting Water Level (ft. BMP): 22.61
Sampling Location (well ID, etc.): H-29	Casing Stickup (ft.): –
Sampled by: JTB	Starting Water Level (ft. BGL): 22.61
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: Dame

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 (1053)	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)
1102	–	.2	21.9	6.46	1710	0.71	-86	7.2	22.88
1107			22.6	6.51	1730	0.62	-87	6.2	22.89
1114			22.7	6.52	1730	0.63	-87	6.1	22.89

Water Level (ft. BMP) at End of Purge: 22.89 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1125	250mL	P	1	N	–	GEN CHEM
1125	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

LUMINANT

GROUNDWATER SAMPLING RECORD

Project Number: 19122262-C Project Name: LUMINANT - MLSES Date: 5-14-19

Sample Number:	H-31	Starting Water Level (ft. BMP):	22.73
Sampling Location (well ID, etc.):	H-31	Casing Stickup (ft.):	–
Sampled by:	JTB	Starting Water Level (ft. BGL):	22.73
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

0707 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)
0717	–	.2	22.6	6.49	1670	0.79	-76	4.6	22.92
0722		↓	22.5	6.41	1630	0.61	-77	5.8	22.93
0726			22.4	6.42	1620	0.60	-77	5.6	22.93

Water Level (ft. BMP) at End of Purge: 22.93 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration	Preservation	Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)		(quality control sample, other)
0740	250mL	P	1	N	–	GEN CHEM
0740	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

LUMINANT

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINANT- MLSES Date: 5-14-19

Sample Number: H-32	Starting Water Level (ft. BMP): 23.16
Sampling Location (well ID, etc.): H-32	Casing Stickup (ft.): –
Sampled by: JTB	Starting Water Level (ft. BGL): 23.16
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 juice

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

0757 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)
0807	–	.2	22.4	5.99	1510	0.41	-71	4.8	23.34
0812			22.7	6.01	1540	0.31	-76	9.2	23.35
0818			22.6	6.02	1540	0.32	-77	8.7	23.35

Water Level (ft. BMP) at End of Purge: 23.35 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
0825	250mL	P	1	N	–	GEN CHEM
0825	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

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINAULT- MLSES Date: 5-14-19

Sample Number: H-33	Starting Water Level (ft. BMP): 13.42
Sampling Location (well ID, etc.): H-33	Casing Stickup (ft.): –
Sampled by: JTB	Starting Water Level (ft. BGL): 13.42
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 juice

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

1451 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)
1501	–	.2	23.4	6.81	1620	0.77	-29	5.9	13.67
1506		↓	23.6	6.82	1640	0.63	-26	7.8	13.66
1512			23.6	6.81	1650	0.62	-26	7.4	13.66

Water Level (ft. BMP) at End of Purge: 13.66 Sample Intake Depth (ft. BMP):

SAMPLE INVENTORY

Bottles Collected				Filtration		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1530	250mL	P	1	N	–	GEN CHEM
1530	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

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