Remedy Selection Report

Martin Lake Steam Electric Station - Ash Pond Area

Rusk County, Texas

Submitted to:

Luminant Generation Company LLC

Submitted by:

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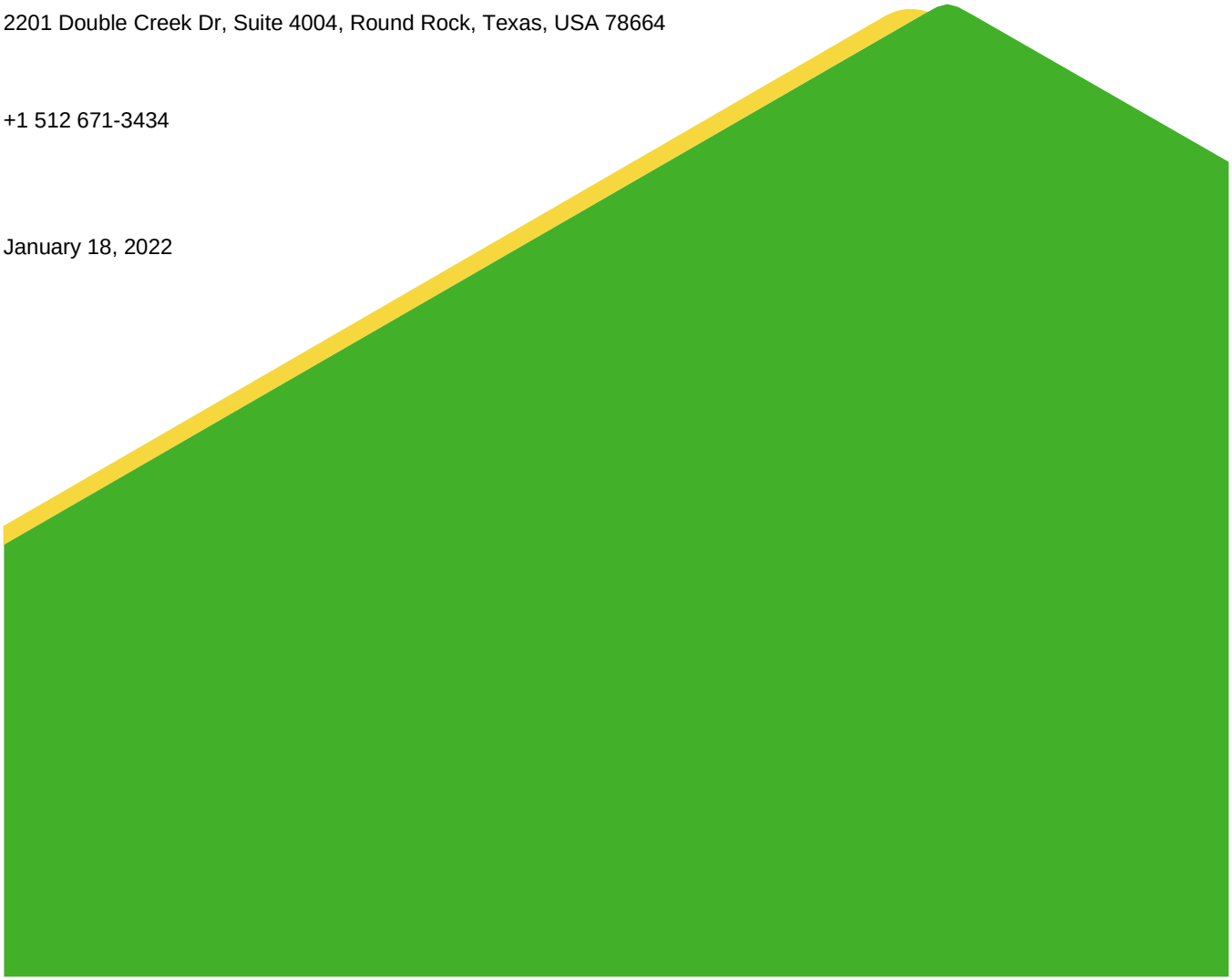
January 18, 2022



PROFESSIONAL CERTIFICATION

This document and all attachments were prepared by Golder Associates Inc. under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that this Remedy Selection Report meets the requirements of 40 C.F.R. § 257.97 and 30 TAC §352.971.

Patrick J. Behling, P.E.

Principal Engineer

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1.0 INTRODUCTION

On behalf of Luminant Generation Company LLC (Luminant), Golder Associates Inc. (Golder), Member of WSP, has prepared this Remedy Selection Report 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") (**Figure 1)**. Luminant manages coal combustion residuals (CCR) generated from the MLSES in the Ash Pond Area per the applicable requirements of 40 C.F.R. Part 257, Subpart D as amended (CCR Final Rule) and 30 TAC Chapter 352 (Texas CCR Rule). The United States Environmental Protection Agency (USEPA) published its final approval of the Texas CCR rule on June 28, 2021. *See* 86 Fed. Reg. 33,892 (June 28, 2021). The Texas CCR Rule became effective on July 28, 2021, and it adopts and incorporates by reference the requirements for remedy selection located at § 257.97.

Statistically significant levels (SSLs) of beryllium, cobalt, and lithium above groundwater protection standards (GWPSs) were detected in the uppermost groundwater-bearing unit (GWBU) hydraulically downgradient of the Ash Pond Area during 2018 assessment monitoring. SSLs of lithium were not observed in subsequent semi-annual assessment monitoring events completed from 2019 to 2021; therefore, lithium is not currently considered a constituent with SSLs. SSLs of beryllium and cobalt were observed in subsequent semi-annual assessment monitoring events completed from 2019 to 2021 and are currently considered constituents with SSLs.

In response to the SSLs identified in 2018, an Assessment of Corrective Measures (ACM) Report was completed for the Ash Pond Area in September 2019 as required by § 257.96 (Golder 2019a). The ACM demonstrated that groundwater concentrations of beryllium, cobalt, and lithium were stable or decreasing at all CCR monitoring wells and that the extent of beryllium, cobalt, and lithium SSLs was delineated on-site (i.e., no offsite migration was indicated). The ACM evaluated various source control and groundwater response technologies to address the beryllium, cobalt, and lithium SSLs.

The purpose of this remedy selection report is to describe the selected remedy, describe how the selected remedy meets the requirements of §257.97, and provide a schedule for implementing and completing remedial activities.

2.0 SITE SETTING

The MLSES is located approximately 5 miles southeast of Tatum, Rusk County, Texas. The Ash Pond Area is located immediately east of the MLSES power units and adjacent to the Martin Lake Reservoir (**Figure 1**).

2.1 Site Hydrogeology and CCR Monitoring Well Network

The Site lies 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 Wilcox Group is overlain by sands of the Carrizo Formation at higher elevations in the area; however, the Carrizo Formation is not present at the Site.

The CCR groundwater monitoring well network at the Ash Pond Area was established in 2015 using monitoring wells H-26, H-27, H-28, H-29, H-31, H-32, AND H-33 (**Figure 1**). Soil borings completed at the Site indicate 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 unit with minor clayey sand. The upper zone is underlain by an intermediate zone composed of poorly-graded fine sand and silty sand 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 (PBW 2017). The CCR monitoring wells are completed

in the intermediate zone. 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 Reservoir.

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 2019b) documenting the water well survey activities and findings was approved by the TCEQ in a letter dated August 12, 2019. No imminent threats to water wells or potentially affected drinking water wells were identified at the Site.

3.0 SOURCE CONTROL MEASURES

The EAP, WAP, and NSP are considered unlined surface impoundments under §257.71(a)(1)(ii) of the CCR Rule (BM 2016). As a result, the EAP, WAP, and NSP are being retrofitted with new composite liner systems that comply with the requirements of the CCR Rule to improve the level of source control in the impoundments. In accordance with §257.102(k)(5), a notification of intent to retrofit the Ash Pond Area liner systems was posted on June 29, 2020. Design of the Ash Pond Area liner system retrofit has been completed and construction is underway. The EAP and WAP were retrofitted in 2020 and 2021, respectively, with a new composite liner system meeting the requirements of § 257.70(b). The liner system in the NSP will be similarly retrofitted in 2022.

4.0 POTENTIAL GROUNDWATER CORRECTIVE MEASURES

The ACM Report (Golder 2019a), which assessed potential corrective measures, was prepared to comply with the requirements of § 257.96. Per the applicable screening criteria described in §257.96(c), potential corrective measures were evaluated based on their overall performance, reliability, ease of implementation, potential impacts of the remedy, time to begin and complete the remedy, and institutional requirements. The source control measures discussed in Section 3 are considered a component of each of the corrective measures that were evaluated. Possible corrective measures for groundwater included the following options to address groundwater impacts:

- Monitored Natural Attenuation (MNA);
- Groundwater Extraction and Treatment;
- Vertical Hydraulic Barrier;
- Permeable Reactive Barrier;
- In-Situ Chemical Treatment; and
- Phytoremediation.

MNA was identified as the most applicable groundwater remedy for further evaluation.

5.0 CCR RULE REMEDY OBJECTIVES

In accordance with §257.97(a), based on the results of the ACM, as soon as feasible a remedy should be selected for the CCR units. Specifically, under § 257.97(b) the remedy must (1) protect human health and the environment; (2) attain the groundwater protection standard as specified pursuant to § 257.95(h); (3) control the sources of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV into the environment; (4) remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate

disturbance of sensitive ecosystems; and (5) comply with any relevant standards for management of wastes as specified in § 257.98(d). The CCR Rule also specifies decision criteria to be considered by the owner or operator in selecting the most appropriate remedy. Under § 257.97(c), these criteria include: (1) Long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful; (2) effectiveness of remedy in controlling the source to reduce further releases; (3) ease or difficulty of implementation; and (4) community concerns.

6.0 REMEDY SELECTION

MNA with source control measures has been selected as the remedy to address the Appendix IV constituents observed at SSLs at the Site. This remedy was selected over the other potential corrective measure alternatives based on its overall high performance, high reliability, ease of implementation, low potential for negative impacts, and minimal institutional requirements.

MNA refers to the reliance on natural attenuation processes (within the context of a carefully controlled and monitored approach) to achieve site-specific groundwater remediation objectives. MNA relies on a range of natural processes, including sorption, (co)precipitation, radioactive decay, dispersion, dilution, and abiotic degradation/transformation to achieve remediation objectives. A Site-specific feasibility study to evaluate MNA as a potential groundwater remedy for the Appendix IV constituents observed at SSLs was performed in accordance with guidance and best practices promulgated by the USEPA (USEPA 2007a and 2007b) and Interstate Technology and Regulatory Council (ITRC 2010). The overall feasibility of MNA as a groundwater response technology was evaluated based on the following multi-tiered approach:

1) Demonstrate active constituent removal from groundwater and dissolved plume stability (Tier I);

2) Determine the mechanisms and rates of the operative attenuation processes (Tier II);

3) Determine the long-term capacity for attenuation and the stability of immobilized constituents (Tier III); and

4) Prepare a long-term MNA performance monitoring plan (Tier IV).

A Tier I MNA evaluation report was completed in December 2019 (Golder 2019c) and a Tier II/III MNA evaluation report was completed in June 2021 (Golder 2021b). Based on the results of these MNA evaluations, the following was concluded regarding the Appendix IV constituents identified at SSLs:

- Physical and chemical attenuation of beryllium, cobalt, and lithium is occurring at the Site. Concentrations of these constituents in groundwater are stable and the aquifer has adequate capacity to attenuate these constituents in a reasonable timeframe. Geochemical modeling indicates that attenuation will be efficient and stable in the long term. Therefore, MNA with source control measures is considered an effective corrective measure for the Ash Pond Area.

Copies of the Tier I and Tier II/III MNA evaluation reports are provided in **Appendix A and B**, respectively.

The selected remedy will attain the objectives stated in §257.97 as outlined below:

(1) Long and short term effectiveness, and degree of certainty of success:

The Tier I through Tier III MNA studies completed for the Site demonstrate that physical and chemical attenuation of Appendix IV constituents identified at SSLs is occurring, that concentrations are stable, and that the aquifer has adequate capacity to attenuate these constituents in a reasonable timeframe.

(i) *Magnitude of reduction of existing risks*:

Source control measures are likely effective at preventing future releases, and MNA feasibility data indicate that conditions are suitable for the ongoing reduction of constituents identified at SSLs in groundwater to concentrations below GWPSs.

(ii) *Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy*:

Source control measures reduce the risk of future impacts by preventing the transport of CCR constituents to groundwater at concentrations above GWPSs.

(iii) *The type and degree of long-term management required, including monitoring, operation, and maintenance*:

Long-term assessment of the condition of the monitoring network will be required. Maintenance of the monitoring network is anticipated to be low.

(iv) *Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and redisposal of contaminant*:

The remedy presents minimal risk of exposure. Results from the ACM nature and extent investigation indicate that Appendix IV constituents at SSLs are contained within the plant property boundary and are not affecting the adjacent Martin Lake Reservoir. The Drinking Water Survey Report (Golder, 2019b) completed at the Site indicated the CCR units pose no imminent threats to water wells or potentially affected drinking water wells.

(v) *Time until full protection is achieved*:

The selected remedy will require a substantial period of time to achieve GWPSs (estimated at 17 to 50 years); however, this is a reasonable timeframe when compared to other potential corrective measures that were evaluated, which would not significantly decrease the time until full protection would be achieved.

(vi) *Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment*:

The selected remedy presents a low risk of exposure. Access to the CCR units and surrounding land are controlled by Luminant. Potential exposure to CCR will be prevented through source control measures and Site access restrictions.

(vii) *Long-term reliability of the engineering and institutional controls*:

Restriction of access and exposure are currently implemented and will continue at the Site.

(viii) *Potential need for replacement of the remedy*:

Although unlikely, monitoring wells may need to be replaced over the remediation period. Monitoring well replacement will be documented in the Annual Groundwater Monitoring and Corrective Action Report following well replacement activities.

(2) Effectiveness of remedy in controlling the source to reduce further releases:

Source control measures are being implemented as discussed in Section 3. Source control will reduce infiltration of surface water from the CCR impoundments to the GWBU, preventing potential releases to the GWBU.

(i) *The extent to which containment practices will reduce further releases*:

Source control measures are likely effective at preventing future releases, and MNA feasibility data indicate that conditions are suitable for the ongoing reduction of Appendix IV constituents identified at SSLs in groundwater.

(ii) *The extent to which treatment technologies may be used*:

MNA feasibility data indicate that conditions are suitable for the ongoing reduction of Appendix IV constituents identified at SSLs in groundwater. Additional treatment technologies are not proposed.

(3) Ease or difficulty of implementation:

MNA is relatively easily implemented. The existing monitoring well network can be used for the monitoring component of the remedy. Source control measures described in Section 3 involve significant cost; however, these measures are being implemented to bring the CCR units into compliance with §257.71(a)(1)(ii). The source control measures will provide long-term stability to groundwater conditions and ensure long-term effectiveness of MNA.

(i) *Degree of difficulty associated with constructing the technology*:

The current monitoring well network will be used to evaluate the effectiveness of the remedy. If required, additional monitoring wells can be installed relatively easily.

(ii) *Expected operational reliability of the technologies*:

There are no anticipated problems with the monitoring network or source control measures.

(iii) *Need to coordinate with and obtain necessary approvals and permits from other agencies*:

The monitoring well network is already in place at the Site. There is no anticipated need to coordinate with and obtain approvals and permits from other agencies.

(iv) *Availability of necessary equipment and specialists*:

Consulting and engineering firms are established that can implement the remedy. Drilling companies and drilling equipment are available in the event that additional wells need to be installed.

(v) *Available capacity and location of needed treatment, storage, and disposal services*:

Adequate treatment, storage, and disposal services are available at the plant or at offsite waste management facilities.

(4) Community concerns:

A public meeting was held on November 13, 2019 at the Henderson Chamber of Commerce in Henderson, Texas to discuss the results of the ACM in accordance with § 257.96(e). No comments were received from the public. As indicated in Section 2.1, there are no nearby water supply wells completed within the GWBU below or downgradient of the CCR units. The ACM (Golder 2019a) demonstrated that groundwater concentrations of Appendix IV constituents identified at SSLs are stable or decreasing at all CCR monitoring wells and the extent of these constituents at SSLs was delineated on-site (i.e., no offsite migration was indicated).

7.0 SCHEDULE

A project schedule for the implementation of the remedy has been developed that considers the factors outlined in § 257.97(d), including the nature and extent of the release, the reasonable probability of the remedy achieving compliance, the availability of disposal capacity and treatment, potential risks, and the resource value of the aquifer. The remedy schedule is being implemented as soon as feasible and will not cause changes or impacts to the aquifer resource value. Below are key milestones in the implementation of the selected remedial activities:

Source Control Implementation	Anticipated Source Control Completion	MNA Sampling and Analysis Activities	Remedy Performance Review
June 2020	2022	Ongoing	Annual – Commencing 2023

The MNA monitoring well network and MNA sampling and analysis procedures will be the same as those used in the current assessment monitoring program. As such, groundwater monitoring activities to satisfy MNA monitoring requirements are ongoing. The MNA groundwater monitoring program and source control measures that constitute the selected remedy have therefore been initiated and the requirement of § 257.98(a) for initiating remedial activities within 90 days of selecting a remedy has been met.

As detailed in the Tier II/III MNA Evaluation Report (Golder 2021b), beryllium, cobalt, and lithium concentrations are stable and the aquifer has adequate capacity to attenuate these constituents. The results of a point decay analysis for groundwater at background and downgradient wells indicates that beryllium, cobalt, and lithium will take approximately 17 years, 2 years, and <1 year, respectively, to attenuate to concentrations below their respective GWPSs.

Predictive modeling in PHAST (Parkhurst et al. 2010) was used in the Tier II/III MNA Evaluation Report as a more conservative approach to estimating time to compliance by taking into account source control and increased source concentrations needed to achieve model calibration. Based on this approach, estimated times to attenuate to concentrations below GWPSs increased to approximately 30 years, 50 years, and 50 years for beryllium, cobalt, and lithium, respectively. This increase in the time to compliance estimate is due to the elevated source values used to achieve model calibration, which were significantly higher than actual measured porewater concentrations from the CCR units. PHAST modeling presents the most conservative approach to determining the rate of attenuation. The actual time to achieve compliance likely falls between the estimates calculated using the point decay method and the PHAST method.

Routine groundwater monitoring as part of an MNA program is required to verify that MNA is occurring. A Tier IV MNA Performance Monitoring Plan (Golder 2021c) has been prepared to describe the monitoring network, sampling and analysis methods, procedures for assessing MNA effectiveness, and reporting for an MNA program. A copy of the Tier IV MNA Performance Monitoring Plan is provided in **Appendix C**. An assessment of MNA effectiveness will be presented in the Annual Groundwater Monitoring and Corrective Action Report for the Site, anticipated to commence in 2023.

8.0 REFERENCES

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

FIGURES

LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

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	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19134019	0	1

APPENDIX A

Tier I Monitored Natural Attenuation Evaluation

GOLDER

DATE December 13, 2019 **Project No.** 19122434

TO Kim Mireles, Sr. Director - Environmental Services
Luminant Generation Company LLC

CC David Mitchell - Luminant Generation Company LLC

FROM Patrick Behling - Golder Associates, Inc. **EMAIL Patrick_Behling@Golder.com**

MARTIN LAKE ASH POND AREA MONITORED NATURAL ATTENUATION EVALUATION

1.0 OVERVIEW

Groundwater and solid materials were evaluated to determine the feasibility of Monitored Natural Attenuation (MNA) as part of the Assessment of Corrective Measures (ACM) 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 structure of this feasibility evaluation closely follows the United States Environmental Protection Agency (USEPA) guidance on using MNA as a remedial strategy (USEPA 2007a and 2007b) and considers best practices from the Interstate Technology Regulatory Council (ITRC) document: "A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater" (ITRC 2010).

Based on the evaluation presented in this document, beryllium, cobalt, and lithium are candidates for MNA at the MLSES Ash Pond Area site per 40 Code of Federal Regulations (CFR) Part 257 as amended (CCR Final Rule). All three constituents are subject to attenuation controls on their concentrations in downgradient groundwater and meet the initial screening criteria as part of this attenuation assessment. Further geochemical evaluation (i.e. Tier II) of MNA with institutional controls is, therefore, recommended.

2.0 APPROACH

To assess the feasibility of MNA at the MLSES Ash Pond Area at the Tier 1 MNA screening level, samples of overburden and groundwater, lake water (Martin Lake), and pond water were collected in June 2019 and analyzed to provide a geochemical dataset that was used for a supplemental assessment in addition to previously-reported groundwater data (Golder 2019). Golder performed the supplemental assessment activities in accordance with the MLSES Groundwater Monitoring Program. The supplemental assessment activities included:

- Groundwater characterization to identify temporal and geographical trends, where present.
- Geochemical modeling to identify the major chemical species and evaluate saturation indices of minerals relevant to attenuation of beryllium, cobalt, and lithium.

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- Mineralogical analysis of overburden to identify and quantify the major mineral components.
- Chemical analysis of overburden to quantify the total metal content and identify the environmentally-available fraction of metals.

Based on the results generated by this supplemental assessment, a screening-level attenuation evaluation was completed to determine the overall feasibility of MNA at the MLSES Ash Pond Area.

2.1 Groundwater, Pond Water, and Lake Water Sampling and Analysis

2.1.1 Sample Collection

Golder personnel collected water samples from the background wells, downgradient or "monitoring" wells, the EAP, and Martin Lake Reservoir as presented in Table 1. The nature and extent of the plume were delineated in accordance with 40 CFR §257.95(g) utilizing samples from Martin Lake Reservoir, which is located downgradient from the Ash Pond Area (Golder 2019).

2.1.2 Geochemical Analysis

Geochemical analysis of groundwater, lake water, and pond water samples included the evaluation of field parameters and the concentrations of total metals and major cations and anions. The rationale and methods used were as follows:

Field Parameters: Parameters measured in the field included pH, dissolved oxygen, oxidation reduction potential (ORP), conductivity, and temperature. These parameters were used to determine general geochemical conditions in the groundwater and support geochemical modeling.

Metals: Analysis of Appendix III and IV metals concentrations was conducted to understand the geochemical composition of groundwater, lake water, and pond water. Metals analysis allows for the delineation of a potential plume, evaluation of mineral saturation indices, development of partitioning coefficients (in conjunction with solid material analyses), and evaluation of background contributions from natural sources or anthropogenic sources.

Major Cations and Anions: Geochemical modeling of mineral solubility, metals attenuation, and background contributions requires analysis of major cations and anions because they affect and participate in sorption and mineral dissolution or precipitation reactions.

The groundwater and pond water samples were analyzed using the following methods:

- pH following SW846 9040C "pH Electrometric Measurement" (USEPA 2004)
- Total dissolved solids standard method (SM) 2540C "Total Dissolved Solids Dried at 180°C" (USEPA 1993a)
- Total hardness following SM 2340B (USEPA 1997)
- Chloride and fluoride following USEPA SW846 9056A "Determination of Inorganic Anions by Ion Chromatography", Revision 1 (USEPA 2007c)
- Nitrate and nitrite following EPA 353.2 "Determination of Nitrate-Nitrite Nitrogen by Automated Colorimetry, Revision 2.0" (USEPA 1993b)
- Alkalinity following SM 2320B "Alkalinity by Titration" (USEPA 2005a)

- Phosphorous following SM 4500-P E “Phosphorous by Ascorbic Acid Method” (USEPA 2005b)
- Total Target Analyte List (TAL) metals following USEPA SW846 6010C “Inductively Coupled Plasma-Atomic Emission Spectrometry”, Revision 3, SW846 6020B “Inductively Coupled Plasma-Mass Spectrometry”, Revision 2, and SW846 6020A “Inductively Coupled Plasma-Mass Spectrometry”, Revision 1 (USEPA 1998)

2.1.3 Geochemical Modeling Approach

Geochemical modeling was conducted to evaluate general groundwater, lake water, and pond water 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, cobalt, and lithium) and trilinear plots (also known as Piper plots) displaying the relative abundance of major ions. The Minteq.v4 database was used as the basis for the Pourbaix diagrams.

The potential for mineral precipitation was assessed in PHREEQC using a saturation index (SI) calculated according to Equation 1.

$$SI = \log (IAP/Ksp) \qquad \text{(Equation 1)}$$

The saturation index is the ratio of the ion activity product (IAP) of a mineral to the solubility product (Ksp). An SI value greater than zero indicates that the water is supersaturated with respect to a particular mineral phase and, therefore, precipitation of the mineral may occur. An evaluation of precipitation kinetics is then required to determine whether the supersaturated mineral will indeed form. An SI value less than zero indicates the water is undersaturated with respect to a particular mineral phase. An SI value close to zero indicates equilibrium conditions exist between the mineral and the solution. SI values between -0.5 and 0.5 are referred to as ‘at equilibrium’ in this report.

2.1.4 Data Handling and Geochemical Modeling Assumptions

Assumptions related to data handling and geochemical modeling assumptions were as follows:

- **Groundwater continuity:** Groundwater, lake water, and pond water quality data from a single sampling event conducted on May 14, 2019 were evaluated. This sampling event was selected because all wells related to the Site and lake water and pond water were sampled and analyzed for the full suite of parameters described in Section 2.1.2 and the resulting data are assumed to provide a comprehensive overview of Site conditions. Temporal trend analysis of pH, beryllium, cobalt, and lithium in groundwater made use of all available sampling events from a well (up to 11 samples from some wells), dating back to October 2015.

- **Pond and lake water chemistry:** The pond and lake water samples collected from the East CCR unit pond and adjacent lake were assumed to be representative of both ash ponds and lake water.
- **Redox values:** ORP values measured in the field were converted to reduction potential (Eh) by adding 200 millivolts (mV) to the field-measured values as per YSI (2015).
- **Non-detect values:** Constituents with concentrations less than their respective method detection limits were assumed to have a concentration equal to the reporting limit in model simulations.
- **Total recoverable concentrations:** Total recoverable fraction results were used for geochemical modeling.
- **Charge balance:** Groundwater compositions with charge balance errors less than 10% were considered valid. Compositions with charge balance errors greater than 10% were included in the assessment but would be considered less reliable.

2.2 Overburden Sampling and Analysis

2.2.1 Sample Collection

A drilling contractor collected continuous cores from three assessment locations downgradient of the monitoring well network. The assessment locations (AP-2019-1, AP-2019-2, and AP-2019-3) are between the CCR monitoring well network and Martin Lake (Golder 2019). Golder staff collected overburden samples from drill cores that are representative of the saturated uppermost aquifer downgradient of the ash ponds, which is underlain by a silty to sandy confining clay unit. These samples were submitted to the laboratory for analysis under chain-of-custody procedures. The unique descriptions used to identify the samples included the overburden boring name and depth of the sample below ground surface (bgs). Sample locations and depths are described in Table 2. Boring logs are provided in Appendix A.

2.2.2 Overburden Analysis

Multiple geochemical analytical methods were used to assess the mineralogical and chemical composition of the overburden material samples. The selected geochemical test methods included:

- **Mineralogical composition**: The purpose of the mineralogical analysis was to identify and quantify the crystalline mineral phases in each sample. This information is required for geochemical modeling as the release or attenuation of 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 mineralogical analysis using quantitative (Rietveld) X-ray diffraction (XRD) (ME-LR-MIN-MET-MN-DO5) and a Bruker AXS D8 Advance Diffractometer.
- **Total metals:** This test was used to quantify the chemical composition of overburden 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. The laboratory analyzed a target analyte list of metals following the methods USEPA SW846 6010C “Inductively Coupled Plasma-Atomic Emission Spectrometry”, Revision 3 (November 2000).
- **Sequential extraction (SEP):** This test consists of a seven-step metals extraction from solids as per Tessier et al. (1979) to identify the provenance of constituents of interest (i.e. the operationally-defined

fraction that contains the metal)[1] and determine their potential environmental mobility. For instance, metals bound in the carbonate fraction, or that are exchangeable, are much more likely to become mobile due to changes in groundwater conditions than metals bound within a sulfide or silicate fraction. The total concentration of a metal measured from all seven steps can be compared to the concentration determined from the total metal analysis for compositional accountability. The laboratory analyzed the metals content of the extracted samples using the method USEPA SW846 6020B "Inductively Coupled Plasma-Mass Spectrometry", Revision 2 (July 2014).

3.0 GROUNDWATER, POND WATER AND LAKE WATER CHARACTERIZATION

Groundwater quality data from background wells H-26, H-27, H-33, monitoring wells H-28, H-29, H-31, H-32, and pond and lake water samples were used for this evaluation. The water quality monitoring data are presented in Appendices B and C and can be summarized as follows:

General Chemistry Parameters

- pH: The pH of groundwater samples collected from CCR monitoring well network ranged from 6.0 to 6.8 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 3.6 and as high as 11.2 have been recorded in some wells; however, these conditions do not persist, and pH returns to circumneutral values by the next sampling round. The pH of Martin Lake was 6.8 and ash pond water had a pH of 6.5 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. The redox of the ash pond and lake water was not measured during sampling.
- Total Dissolved Solids (TDS): Groundwater TDS concentrations were variable in May 2019 in the CCR monitoring well network. The lowest TDS concentration in groundwater (453 mg/L) occurred in 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 was 119 mg/L and the TDS of the ash pond water was 5,380 mg/L.
- Major ion chemistry: A Piper plot was generated for groundwater, lake water, and ash pond water samples to facilitate the identification of water types and source contributions (Figure 1a). Three distinct groupings of samples are apparent based on their major ion proportions. Upgradient wells H-26 and H-33 show close

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

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

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

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

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

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

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

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

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. Ash pond water is geochemically distinct from any other sample. Based on the molar ratios of calcium, sodium, and sulfate (Figure 1b), all groundwater samples (background and downgradient) and the lake water sample generally plot as one group, while ash pond water again is geochemically distinct from the other samples, and dominated by sulfate and magnesium.

- 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. Ferric iron in water from Martin Lake was measured at 0.365 mg/L while ferrous iron was non-detect (<0.05 mg/L). Iron was not detected in either valence state in ash pond water.

- 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 lake water, but was measured at 11.1 mg/L in ash pond 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 lake or ash pond water in May 2019. No spatial trend was apparent in the nitrate or phosphate distribution in groundwater.

Constituents with 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 2a). 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 (0.0197 mg/l). Beryllium was not detected in the Martin Lake water sample nor in water of the ash pond (<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 3a).

- 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 2b). 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 reported cobalt concentrations in groundwater above the GWPS. Cobalt was not detected in water from Martin Lake or in ash pond water 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 3b).

- Lithium: Lithium concentrations in groundwater have exceeded the GWPS (0.177 mg/L) since October 2015 in four wells: H-27 (upgradient), H-28, H-31, and H-33 (Figure 2c). 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. Ash pond water contained lithium, measured at 0.119 mg/L in May 2019, which is both below the GWPS and lower than in groundwater at background/upgradient wells H-26 and H-33. Lithium is likely present in groundwater as the monovalent cation Li^+ based on the pH and Eh of groundwater (Figure 3c).

In summary, the groundwater data at the Ash Pond Area show that concentrations of parameters of interest in groundwater are decreasing or stable. The absence of beryllium and cobalt in ash pond water and low levels of lithium (below that of two background wells) demonstrates that the ash ponds are unlikely to be the source for any GWPS exceedances. As indicated by major ion compositions (Figures 1a and b), ash pond water is substantially different than downgradient groundwater, suggesting an absence of direct interaction between pond water and groundwater.

3.1 Geochemical Modeling Results

The results of speciation modeling of groundwater from background and CCR monitoring wells, and lake and ash pond water are provided in Table 3. Mineral saturation plays an important role in attenuation of metals, either directly by their removal through mineral precipitation, or indirectly by providing a sorptive surface. The results can be summarized as follows:

- **Iron-bearing minerals:** Ferrihydrite [$Fe(OH)_3$] was indicated to be at equilibrium or oversaturated in all groundwater, lake water, and ash pond water samples, indicating a strong potential for ongoing precipitation of solid phase iron oxides. Thus, throughout the Ash Pond Area, the prevalence of iron oxides is assumed.
- **Other minerals:** All groundwater samples were in equilibrium with respect to barite [$BaSO_4$]. Gypsum [$CaSO_4{:}2H_2O$] was in equilibrium with groundwater at well H-31 and pond water.

In summary, barite and ferrihydrite contribute to controlling groundwater composition at some or all of the monitoring wells. In the case of ferrihydrite, the dissolved concentrations of certain COIs can be reduced through the ability of this mineral to act as a substrate for adsorption in addition to precipitation/co-precipitation.

4.0 COMPOSITIONAL ANALYSIS OF OVERBURDEN

4.1 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 analyses identified two different materials at the different sampling depths. The shallow core (AP-2019-3 18’ to 19’ below ground surface) consisted almost exclusively of quartz (99.2%) with minor albite (0.8%). The two deeper core samples (AP-2019-1 and AP-2019-2) also predominately contained quartz (60.8 to 66.0 %) but the silicate minerals albite, chlorite, K-feldspar, muscovite and illite were reported as well. Although clay-specific XRD analysis was not conducted, the clay minerals vermiculite, kaolinite and montmorillonite were

tentatively identified in addition to the illite. Therefore, the presence of clays at the Ash Pond Area below the shallow quartz sand unit can be inferred. Analytical reports for the XRD samples are provided in Appendix B.

4.2 Chemical Composition and Sequential Extraction

Chemical analysis and sequential extractions were used to determine the chemical composition of the overburden and the distribution of constituents of interest over various operationally-defined fractions comprising the overburden. This testing was completed per Table 1 on overburden from three borehole locations, (reported in Table 4).

A description of the individual fractions determined by sequential extraction is presented in Footnote 1, Section 2.2.2. Metals extracted in steps 1 through 5 are considered environmentally available, whereas metals extracted in steps 6 and 7 are present in refractory fractions and are not expected to be released under conditions typically encountered in aquifers (Tessier et al. 1979). Total metal quantities from the sequential extraction are expressed as "SEP Total" in Table 5. The sum of the sequential extraction steps is also presented for comparison but does not represent an analytically-determined value.

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

General Chemistry Parameters

- Aluminum: 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; Figure 4). 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 minerals or clays intermixed in the silica sand matrix, in agreement with the mineralogical results presented in Section 4.1. Clays can represent an important sorptive reservoir for numerous trace metals and metalloids, including those of concern at this site (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 (Figure 5). 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 with an 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 (Figure 6). The non-environmentally available fraction of beryllium (25% to 84% of total) is considered 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, suggesting 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 (Figure 7). 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, also indicating potential attenuation of cobalt from groundwater and the presence of cobalt in primary soil phases.
- 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) was present in the environmentally-available fraction (Figure 8). 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 taking place.

Based on the above results, attenuation of all three COIs is likely occurring in various soil fractions. The most pronounced attenuation is associated with amorphous metals and metal hydroxides. Clays also present a viable attenuation fraction in the soil matrix.

5.0 ATTENUATION EVALUATION

The potential for natural attenuation of beryllium, cobalt, and lithium was evaluated at a screening level, in accordance with recommended practices and guidance promulgated by the US EPA and the ITRC (EPA 2007a; EPA 2007b; ITRC 2010). According to EPA (2007a), the purpose of the evaluation conducted during this screening phase is to “Demonstrate that the groundwater plume is not expanding and that sorption of the contaminant onto aquifer solids is occurring where immobilization is the predominant attenuation process.” Based on this definition, the following observations support MNA as a viable corrective measure for the MLSES Ash Pond Area:

- **Plume Stability:** Based on the water quality monitoring data presented in this assessment, groundwater concentrations of beryllium, cobalt, and lithium outside of the ash ponds appear to be relatively stable or decreasing (accounting for outliers). Beryllium and cobalt are unlikely to originate from the ash ponds due to their absence in pond water. It is also considered likely that lithium in groundwater does not originate from the ash ponds as its concentration was much lower in pond water than in groundwater from background monitoring wells at the Ash Pond Area.
- **Magnitude of Exceedances**: Occasional exceedances of the lithium GWPS in some wells do not amount to levels that would be considered an SSL per the CCR Rule (Cite ACM report). The highest level of beryllium in groundwater (since monitoring began) at the Ash Pond Area was observed at well H-31 (on December 11, 2016). During the previous sampling round, beryllium was measured in groundwater at 0.00167 mg/L, below the GWPS of 0.004 mg/L. Groundwater at well H-31 was also again below the GWPS for beryllium two events after the highest measured value, indicating variability in beryllium levels. The cobalt GWPS exceedances in H-28, H-29, H-31, and H-32 fluctuate substantially over time. For example, cobalt in groundwater at well H-31 during the most recent sampling event (May 14, 2019) was the second highest cobalt measured since October 2015 in any well at the MLSES Ash Pond Area. However, during the

previous sampling (September 7, 2018) cobalt in groundwater was reported at the detection limit (0.0035 mg/L). Thus, while cobalt exceedances occur periodically, the substantial variability in cobalt concentrations points to variability possibly related to flow conditions and/or natural geochemical variation rather than a continuous source of cobalt.

- **Ash Pond Water:** Historical records are not available for ash additions or pond water concentrations over the lifespan of the ash ponds. However, based on recent pond water data, beryllium and cobalt are not present in the ash ponds at levels above their respective detection limits. This indicates that the ash ponds are not likely to be a current source for these metals. Lithium in the ash ponds was measured at a concentration of 0.119 mg/L in May 2019, well below the level measured in background groundwater (0.177 mg/L). This indicates the ash ponds are likely not a source for the SSLs beryllium and cobalt in groundwater (lithium is currently not at an SSL in groundwater based on a 95% confidence interval).
- **Groundwater Chemistry:** The groundwater monitoring results and the findings of the geochemical modeling support the potential for natural attenuation of beryllium, cobalt, and lithium. Equilibrium of groundwater with the mineral phase ferrihydrite was indicated in all groundwater samples. Modeling results are consistent with the findings from the sequential extraction analysis, which demonstrate carbonate, amorphous, organic, and metal hydroxide phases sequester beryllium, cobalt, and lithium in overburden at the MLSES Ash Pond Area. Further, differences in relative abundance of the major ions in groundwater indicate that ash pond water is geochemically distinct from both groundwater at the Ash Pond Area and Martin Lake.
- **Confirmation of Attenuation/Immobilization:** Based on both mineralogical and chemical analysis, it is evident that attenuation of beryllium, cobalt, and lithium by aquifer materials is occurring. Iron, capable of forming (hydr)oxide or amorphous phases that facilitate metals attenuation (Dzombak and Morel 1990), was identified in all overburden samples (in agreement with modeling indicating ferrihydrite precipitation). The ubiquitous presence of aluminum, in the form of aluminum oxides and clay minerals, provides an additional well-studied attenuation reservoir (Karamalidis and Dzombak 2011; Prodromou 2016; Uddin 2017). Thus, overburden samples from the Ash Pond Area site demonstrate sequestration of COIs is occurring.

Based on these findings, beryllium, cobalt, and lithium appear to be candidates for an MNA remedy application and meet the criteria for Tier I MNA in accordance with USEPA guidance (USEPA 2007a and 2007b). As such, the feasibility of MNA at the Ash Pond Area should be further evaluated with a Tier II MNA evaluation.

6.0 CONCLUSION

The above serves as the Tier I evaluation of MNA feasibility at the MLSES Site for beryllium, cobalt, and lithium with respect to the Ash Pond Area. This document and evaluation have been completed in accordance with guidance and best practices promulgated by the USEPA (USEPA 2007a and 2007b) and the ITRC (ITRC 2010). Based on the findings of this evaluation, the Ash Pond Area at the MLSES is a viable candidate for MNA as a corrective measure.

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Tables

Table 1: Overview of the wells used in the MNA assessment.

Background Wells	Monitoring Wells	Lake Water	Pond Water
H-26, H-27, H-33	H-28, H-29, H-31, H-32	Lake-Sample	Pond-Water

Table 2: Summary of overburden samples collected

Sample Location	Sample Description
Assessment boring AP-2019-1 (30'-31')	Sand (SW), light brown to gray with orange staining, very-fine grained to fine grained, wet at 30 feet bgs, moist or dry above
Assessment boring AP-2019-2 (35'-36')	Sand (SW), gray, very fine-grained to fine-grained, wet at 35 feet bgs, moist or dry above
Assessment boring AP-2019-3 (18'-19')	Sand (SP), orange and gray, very fine-grained to fine-grained, wet at 18 feet bgs, moist or dry above

Table 3: Geochemical Modeling Results

MINERAL PHASES - Saturation Indices		H-26	H-27	H-28	H-29	H-31	H-32
Otavite	$CdCO_3$	-2.91	-3.63	-3.74	-3.49	-4.54	-4.72
Ferrihydrite	$Fe(OH)_3$	**4.27**	**2.10**	**1.67**	**1.72**	**1.56**	**2.30**
Siderite	$FeCO_3$	-2.15	-2.86	-3.85	-3.62	-0.79	-2.66
Melanterite	$FeSO_4\ 7H_2O$	-7.37	-6.87	-6.71	-6.75	-3.66	-5.62
Anglesite	$PbSO_4$	-4.66	-4.36	-3.79	-3.87	-4.04	-4.07
Gypsum	$CaSO_4{:}2H_2O$	-1.59	-1.22	-0.84	-0.90	**-0.35**	-1.48
Jarosite-H	$(H_3O)Fe_3(SO_4)_2(OH)_6$	**0.54**	-4.52	-3.40	-4.19	-3.55	-1.04
Jarosite-K	$KFe_3(SO_4)_2(OH)_6$	**6.63**	**0.93**	**1.38**	**0.80**	**1.81**	**3.56**
Jarosite-Na	$NaFe_3(SO_4)_2(OH)_6$	**4.01**	-0.85	**0.00**	-0.58	**0.45**	**1.93**
Calcite	$CaCO_3$	-0.51	-1.33	-2.10	-1.88	-1.61	-2.64
Magnesite	$MgCO_3$	-2.22	-2.18	-2.92	-2.70	-2.47	-3.76
Barite	$BaSO_4$	**0.66**	**0.28**	**0.35**	**0.28**	**0.60**	**0.01**
Witherite	$BaCO_3$	-3.55	-5.12	-6.20	-6.00	-5.96	-6.44
Fluorite	CaF_2	-2.78	-3.00	-3.37	-3.32	-1.31	-1.41
CoCO3	$CoCO_3$	-2.28	-4.35	-3.53	-3.31	-3.15	-3.70
Cerrusite	$PbCO_3$	-2.07	-2.96	-3.55	-3.36	-3.79	-3.74
Carbon Dioxide	pCO2(g) [(b)]	-1.59	-2.05	-2.00	-2.20	-1.91	-1.67

Notes:

[(a)] Saturation indices between -0.5 and 0.5 or >0.5 identified by bold type and grey shading

[(b)] pCO2(g) values presented at 10^{value} atm

Table 3: Geochemical Modeling Results

MINERAL PHASES - Saturation Indices		H-33	Pond Sample	Lake Sample
Otavite	$CdCO_3$	-2.88	-4.21	-3.25
Ferrihydrite	$Fe(OH)_3$	**4.22**	**1.68**	**2.86**
Siderite	$FeCO_3$	-2.11	-3.40	-2.51
Melanterite	$FeSO_4\ 7H_2O$	-7.31	-6.74	-7.49
Anglesite	$PbSO_4$	-4.73	-4.15	-5.08
Gypsum	$CaSO_4{:}2H_2O$	-1.62	**-0.26**	-2.56
Jarosite-H	$(H_3O)Fe_3(SO_4)_2(OH)_6$	**0.64**	-3.44	-3.99
Jarosite-K	$KFe_3(SO_4)_2(OH)_6$	**6.71**	**2.60**	**1.42**
Jarosite-Na	$NaFe_3(SO_4)_2(OH)_6$	**4.10**	**0.06**	-1.31
Calcite	$CaCO_3$	-0.56	-1.07	-1.71
Magnesite	$MgCO_3$	-2.14	-1.59	-2.78
Barite	$BaSO_4$	**0.64**	**1.07**	**-0.04**
Witherite	$BaCO_3$	-3.59	-5.03	-4.48
Fluorite	CaF_2	-2.74	**1.34**	-3.46
CoCO3	$CoCO_3$	-2.33	-4.90	-4.03
Cerrusite	$PbCO_3$	-2.18	-3.48	-2.73
Carbon Dioxide	pCO2(g) [(b)]	-1.50	-1.60	-1.97

Notes:

[(a)] Saturation indices between -0.5 and 0.5 or >0.5 identified by bold type and grey shading

[(b)] pCO2(g) values presented at 10^value atm

Table 4. Summary of Rietveld Quantitative Analysis 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	$Na_{0.2}Ca_{0.1}Al_{1.5}Mg_{0.5}Si_4O_{10}(OH)_2 \cdot 4(H_2O)$

Table 5. Sequential Extraction and Total Metals From Overburden

Sample Location		AP-2019-1	AP-2019-2	AP-2019-3
Sample Depth (feet bgs)		30'-31'	35'-36'	18'-19'
Sample Date		6/3/2019	6/3/2019	6/3/2019
Analyte	SEP Step	mg/kg	mg/kg	mg/kg
Aluminum	SEP Step 1	<53 U	19 J	14 J
Aluminum	SEP Step 2	9.7 J *	18 J *	<38 * U
Aluminum	SEP Step 3	88	97	30
Aluminum	SEP Step 4	1700	1800	880
Aluminum	SEP Step 5	62 J *	55 J *	120 J *
Aluminum	SEP Step 6	2300	2000	1200
Aluminum	SEP Step 7	29000	26000	12000
Aluminum	SEP Sum	33000	30000	14000
Aluminum	SEP Total	60000	62000	20000
Antimony	SEP Step 1	<16 U	<15 U	<15 U
Antimony	SEP Step 2	<12 U	<11 U	<11 U
Antimony	SEP Step 3	<3.9 U	<3.8 U	<3.8 U
Antimony	SEP Step 4	<3.9 U	<3.8 U	<3.8 U
Antimony	SEP Step 5	<59 U	<57 U	<56 U
Antimony	SEP Step 6	<3.9 U	<3.8 U	<3.8 U
Antimony	SEP Step 7	<3.9 U	<3.8 U	<3.8 U
Antimony	SEP Sum	<3.0 U	<3.0 U	<3.0 U
Antimony	SEP Total	<3.9 U	<3.8 U	<3.8 U
Arsenic	SEP Step 1	<2.6 U	<2.5 U	<2.5 U
Arsenic	SEP Step 2	<2.0 U	<1.9 U	<1.9 U
Arsenic	SEP Step 3	1.8	0.97	<0.63 U
Arsenic	SEP Step 4	2.8 B	0.78 B	0.63 B
Arsenic	SEP Step 5	<9.9 U	<9.6 U	<9.4 U
Arsenic	SEP Step 6	0.94	0.74	0.24 J
Arsenic	SEP Step 7	1.2	0.71	0.79 J
Arsenic	SEP Sum	6.9	3.2	1.7
Arsenic	SEP Total	6.8	3.0	2.9 J
Barium	SEP Step 1	0.88 J	0.88 J	<13 U
Barium	SEP Step 2	0.76 J *	0.67 J *	<9.4 * U
Barium	SEP Step 3	4.3 B	4.1 B	2.3 J B
Barium	SEP Step 4	16	23	6.9
Barium	SEP Step 5	7.0 J *	11 J *	<47 * U
Barium	SEP Step 6	18	16	2.1 J
Barium	SEP Step 7	390	330	180
Barium	SEP Sum	440	390	190
Barium	SEP Total	680	560	240
Beryllium	SEP Step 1	<1.3 U	<1.3 U	<1.3 U
Beryllium	SEP Step 2	<0.99 * U	<0.96 * U	<0.94 * U
Beryllium	SEP Step 3	0.067 J	0.028 J	0.025 J
Beryllium	SEP Step 4	0.13 J	0.078 J	0.069 J
Beryllium	SEP Step 5	<4.9 * U	<4.8 * U	<4.7 * U
Beryllium	SEP Step 6	0.067 J	0.061 J	0.026 J

Table 5. Sequential Extraction and Total Metals From Overburden

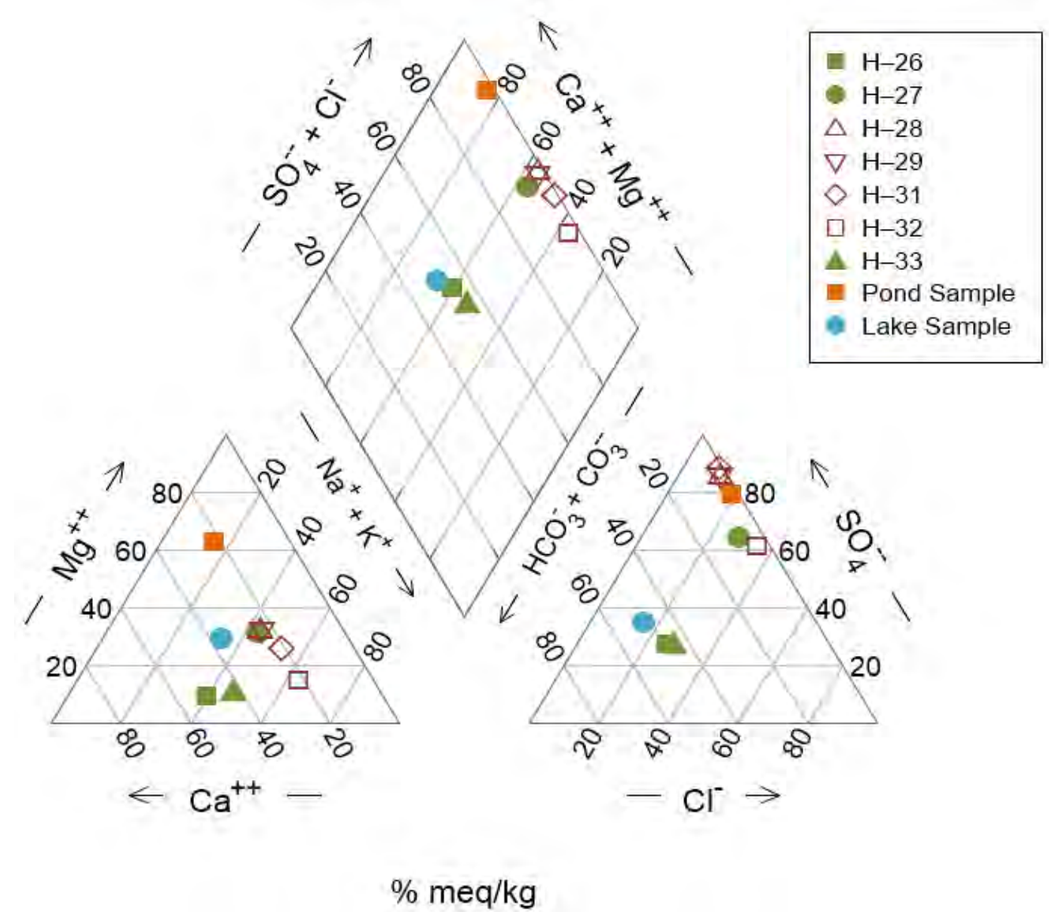
Sample Location		AP-2019-1	AP-2019-2	AP-2019-3
Sample Depth (feet bgs)		30'-31'	35'-36'	18'-19'
Sample Date		6/3/2019	6/3/2019	6/3/2019
Analyte	SEP Step	mg/kg	mg/kg	mg/kg
Beryllium	SEP Step 7	0.56	0.51	0.11 J
Beryllium	SEP Sum	0.83	0.68	0.23 J
Beryllium	SEP Total	0.89	0.72	0.42
Boron	Total 3050B	<25 U	<24 U	<24 U
Chromium	Total 3050B	13 F1	12	4.4
Cobalt	SEP Step 1	0.54 J	1.6 J	0.87 J
Cobalt	SEP Step 2	<9.9 U	0.27 J	<9.4 U
Cobalt	SEP Step 3	0.34 J	0.17 J	<3.1 U
Cobalt	SEP Step 4	1.5 J	1.5 J	0.53 J
Cobalt	SEP Step 5	<49 * U	0.85 J *	<47 * U
Cobalt	SEP Step 6	0.90 J	0.80 J	0.28 J
Cobalt	SEP Step 7	0.79 J	1.1 J	<6.3 U
Cobalt	SEP Sum	4.0	6.3	1.7 J
Cobalt	SEP Total	3.8 J	6.2 J	3.3 J
Hg	Total Hg	0.081 J	0.12 J	<0.13 U
Iron	SEP Step 1	<26 U	23 J	15 J
Iron	SEP Step 2	<20 * U	110 *	<19 * U
Iron	SEP Step 3	580	1100	57
Iron	SEP Step 4	3900	3800	2300
Iron	SEP Step 5	<99 * U	<96 * U	<94 * U
Iron	SEP Step 6	2500	3300	820
Iron	SEP Step 7	5200	5600	2000
Iron	SEP Sum	12000	14000	5200
Iron	SEP Total	11000	13000	8000
Lead	Total 3050B	6.4	6.2	3.9
Lithium	SEP Step 1	<13 U	<13 U	<13 U
Lithium	SEP Step 2	<9.9 U	<9.6 U	<9.4 U
Lithium	SEP Step 3	<3.3 U	<3.2 U	<3.1 U
Lithium	SEP Step 4	3.0 J	4.2	0.53 J
Lithium	SEP Step 5	<49 U	<48 U	<47 U
Lithium	SEP Step 6	2.1 J	2.1 J	0.62 J
Lithium	SEP Step 7	9.6	11	6.0
Lithium	SEP Sum	15	18	7.2
Lithium	SEP Total	18	26	9.6
Manganese	SEP Step 1	3.1 J	33	1.2 J
Manganese	SEP Step 2	<3.0 U	4.2	<2.8 U
Manganese	SEP Step 3	2.4 B	1.5 B	0.11 J B
Manganese	SEP Step 4	18	31	4.2
Manganese	SEP Step 5	<15 * U	3.9 J *	<14 * U
Manganese	SEP Step 6	16	19	2.9
Manganese	SEP Step 7	26	34	26
Manganese	SEP Sum	66	130	35
Manganese	SEP Total	66	150	47

Table 5. Sequential Extraction and Total Metals From Overburden

Sample Location		AP-2019-1	AP-2019-2	AP-2019-3
Sample Depth (feet bgs)		30'-31'	35'-36'	18'-19'
Sample Date		6/3/2019	6/3/2019	6/3/2019
Analyte	SEP Step	mg/kg	mg/kg	mg/kg
Molybdenum	SEP Step 1	<11 U	<10 U	<10 U
Molybdenum	SEP Step 2	<7.9 U	<7.6 U	<7.5 U
Molybdenum	SEP Step 3	<2.6 U	<2.5 U	<2.5 U
Molybdenum	SEP Step 4	<2.6 U	<2.5 U	<2.5 U
Molybdenum	SEP Step 5	<39 U	<38 U	<38 U
Molybdenum	SEP Step 6	<2.6 U	<2.5 U	<2.5 U
Molybdenum	SEP Step 7	0.19 J	0.17 J	0.12 J
Molybdenum	SEP Sum	0.19 J	0.17 J	0.12 J
Molybdenum	SEP Total	0.40 J	0.41 J	0.28 J
Selenium	SEP Step 1	<2.6 U	<2.5 U	<2.5 U
Selenium	SEP Step 2	0.76 J B	0.90 J B	0.68 J B
Selenium	SEP Step 3	0.22 J B	<0.64 U	0.23 J B
Selenium	SEP Step 4	<0.66 * U	<0.64 * U	0.65 B *
Selenium	SEP Step 5	<9.9 U	<9.6 U	<9.4 U
Selenium	SEP Step 6	<0.66 U	<0.64 U	<0.63 U
Selenium	SEP Step 7	<0.66 U	<0.64 U	<1.3 U
Selenium	SEP Sum	0.98	0.90	1.6
Selenium	SEP Total	<0.66 U	<0.64 U	<3.1 U
Thallium	SEP Step 1	<9.2 U	<8.9 U	<8.8 U
Thallium	SEP Step 2	<6.9 U	<6.7 U	<6.6 U
Thallium	SEP Step 3	<2.3 U	<2.2 U	<2.2 U
Thallium	SEP Step 4	<2.3 U	<2.2 U	<2.2 U
Thallium	SEP Step 5	<35 * U	<33 * U	<33 * U
Thallium	SEP Step 6	<2.3 U	<2.2 U	<2.2 U
Thallium	SEP Step 7	0.48 J	0.70 J	<4.4 U
Thallium	SEP Sum	0.48 J	0.70 J	<1.8 U
Thallium	SEP Total	<4.6 U	<11 U	<11 U

Figures

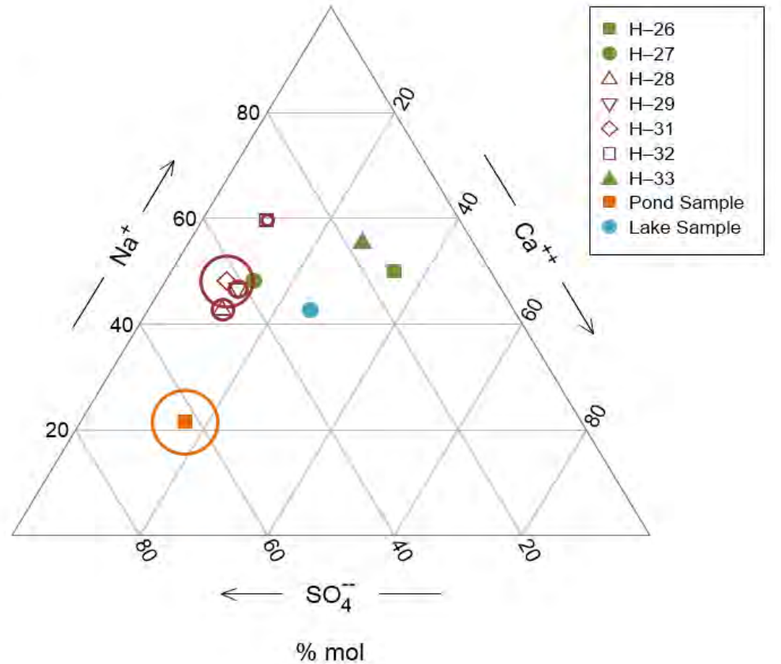
(a)



% meq/kg

TDS (mg/kg)

4500



% mol

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MARTIN LAKE SES
ASH POND AREA

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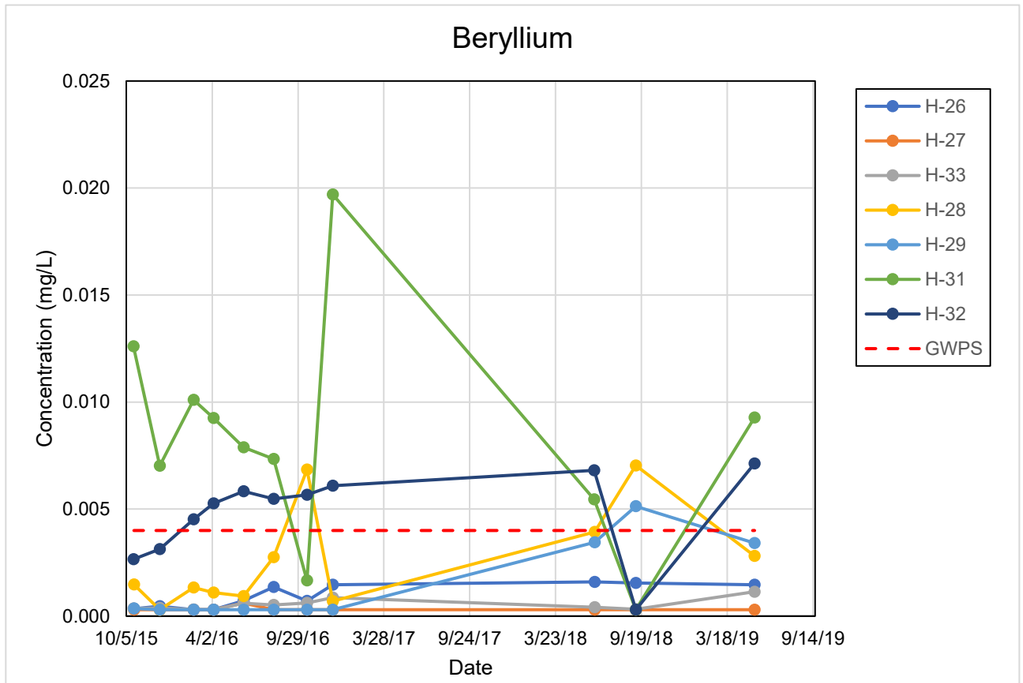
GOLDER

PROJECT
ASSESSMENT OF CORRECTIVE MEASURES
GEOCHEMICAL ASSESSMENT

TITLE
MAJOR GROUNDWATER CEHMISTRY (A) AND SELECT RELATIVE ION ABUNDANCE (B)

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	1a-b

(a)



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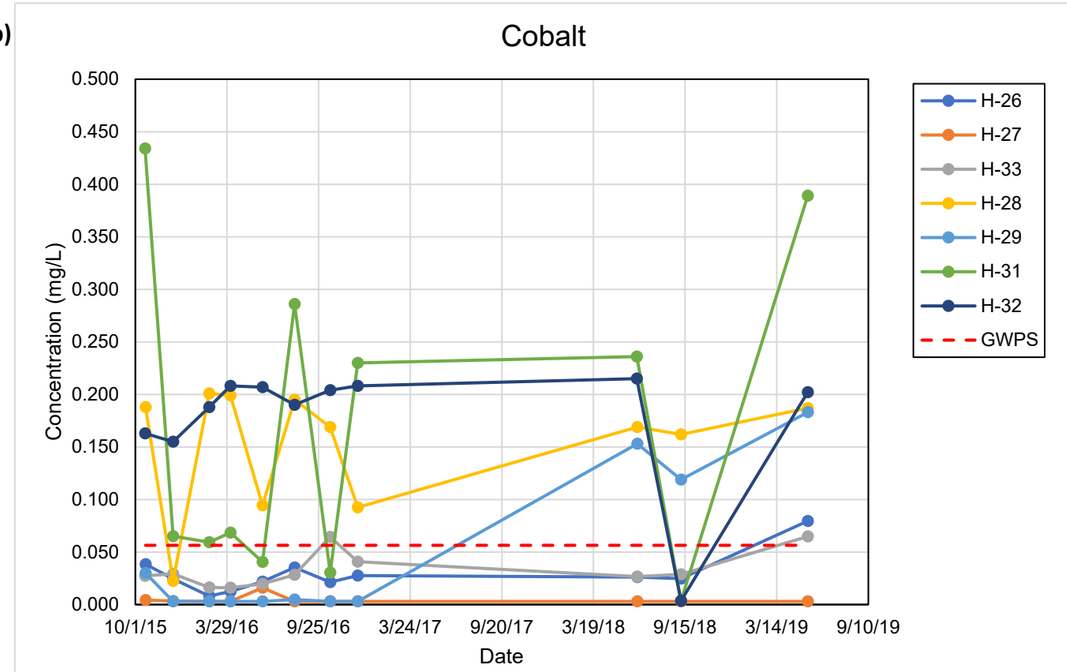

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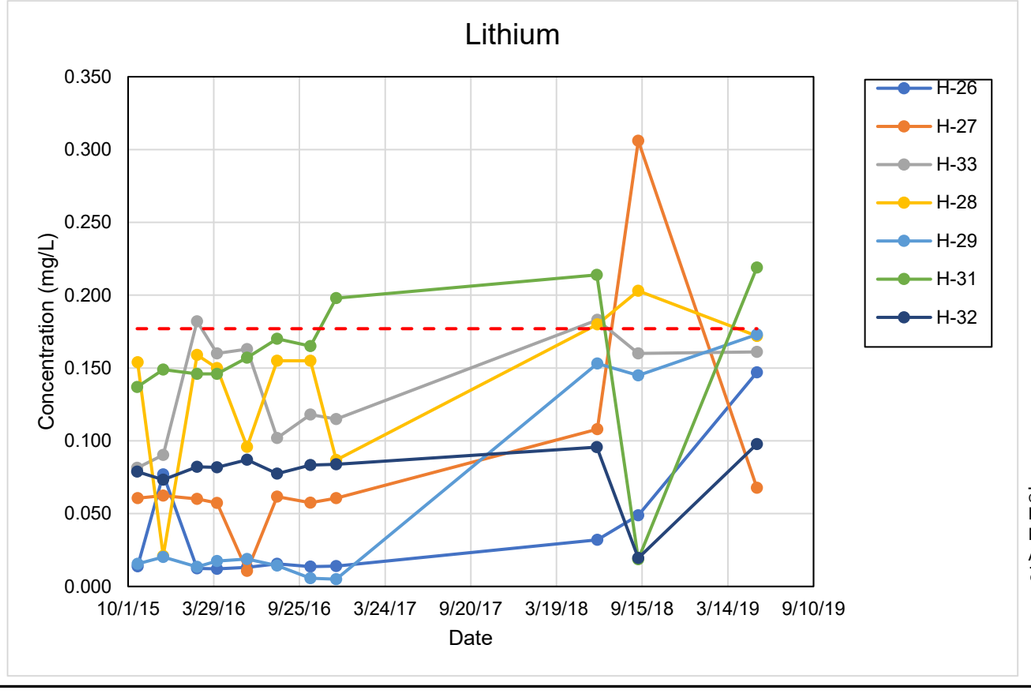

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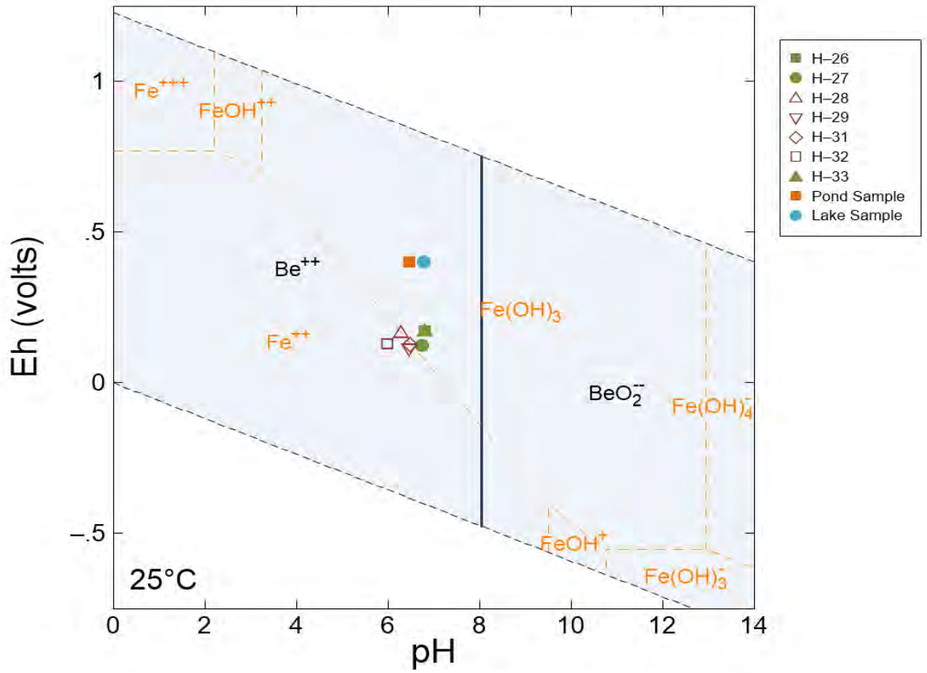
TITLE
HISTORICAL TRENDS OF BERYLLIUM (A), COBALT (B), AND LITHIUM (C), IN GROUNDWATER

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	2a-c

(a)



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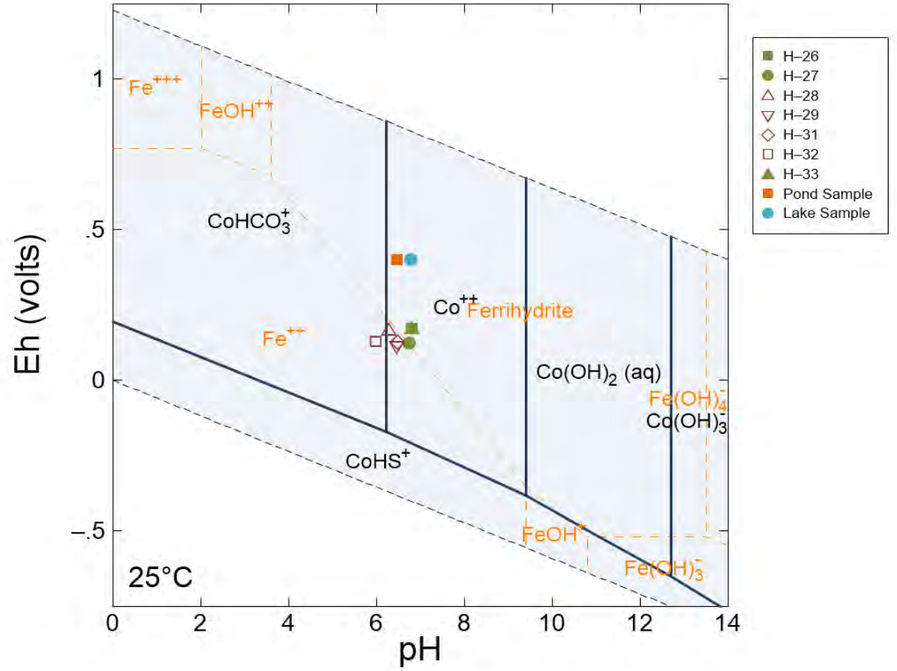

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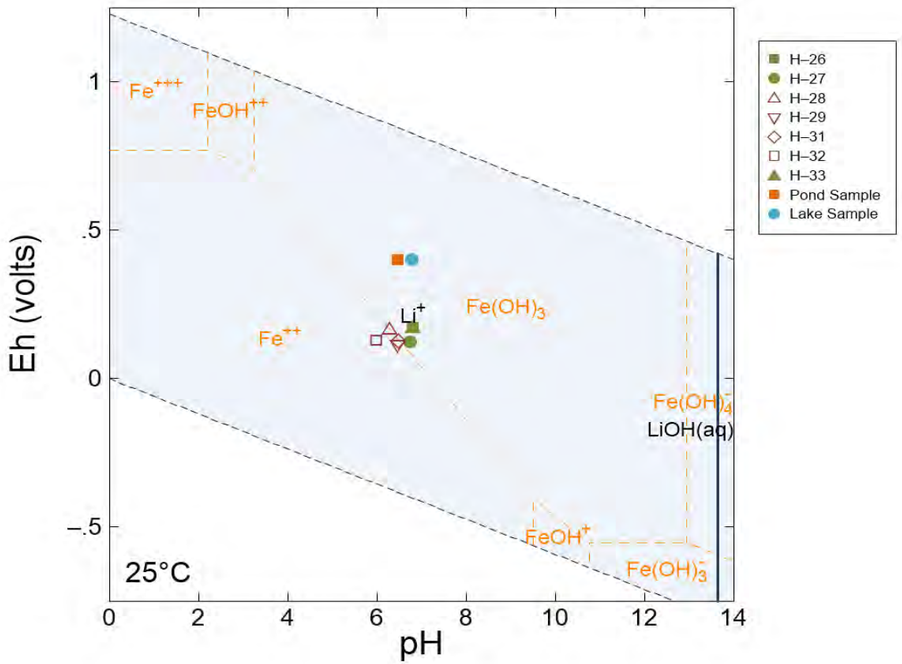

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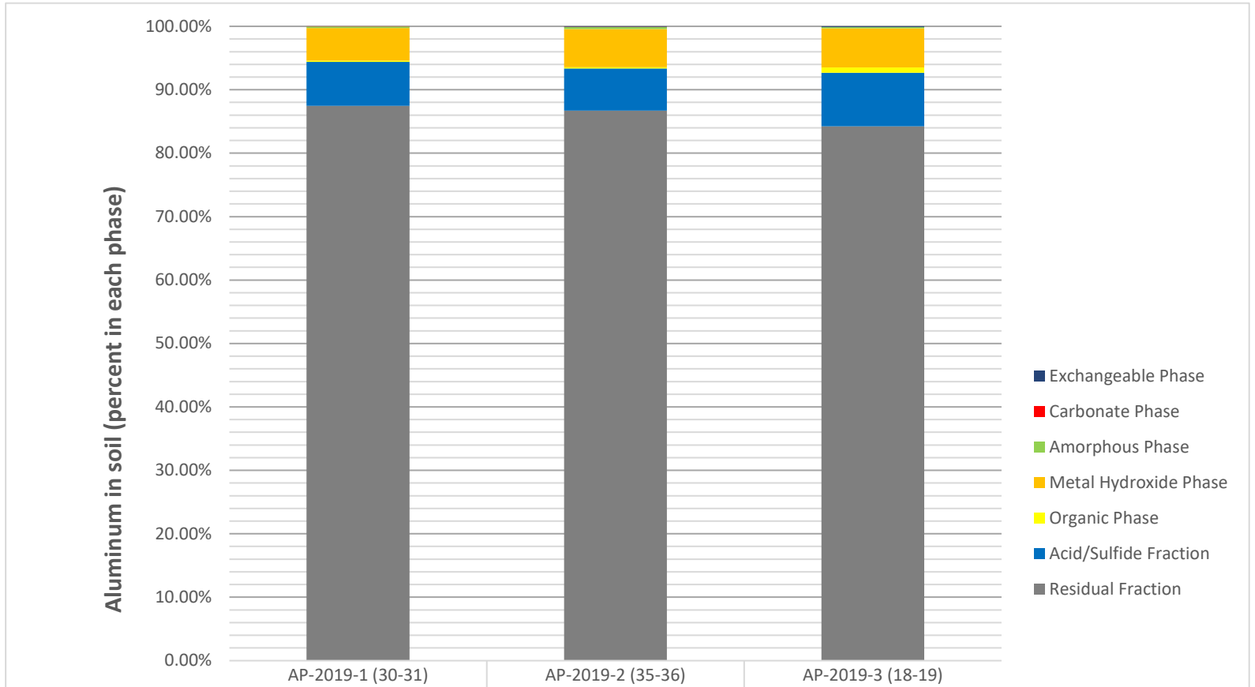
TITLE
SPECIATION OF BERYLLIUM (A), COBALT (B),
AND LITHIUM (C), IN GROUNDWATER

PROJECT NO.	PHASE	REV.	FIGURE
164817101	01	A	3a-c



	AP-2019-1 (30-31)	AP-2019-2 (35-36)	AP-2019-3 (18-19)
Exchangeable Phase	0.00%	0.06%	0.10%
Carbonate Phase	0.03%	0.06%	0.00%
Amorphous Phase	0.27%	0.32%	0.21%
Metal Hydroxide Phase	5.13%	6.00%	6.18%
Organic Phase	0.19%	0.18%	0.84%
Acid/Sulfide Fraction	6.94%	6.67%	8.42%
Residual Fraction	87.46%	86.70%	84.25%

Borehole and depth below ground surface (Aluminum in perecent of total)

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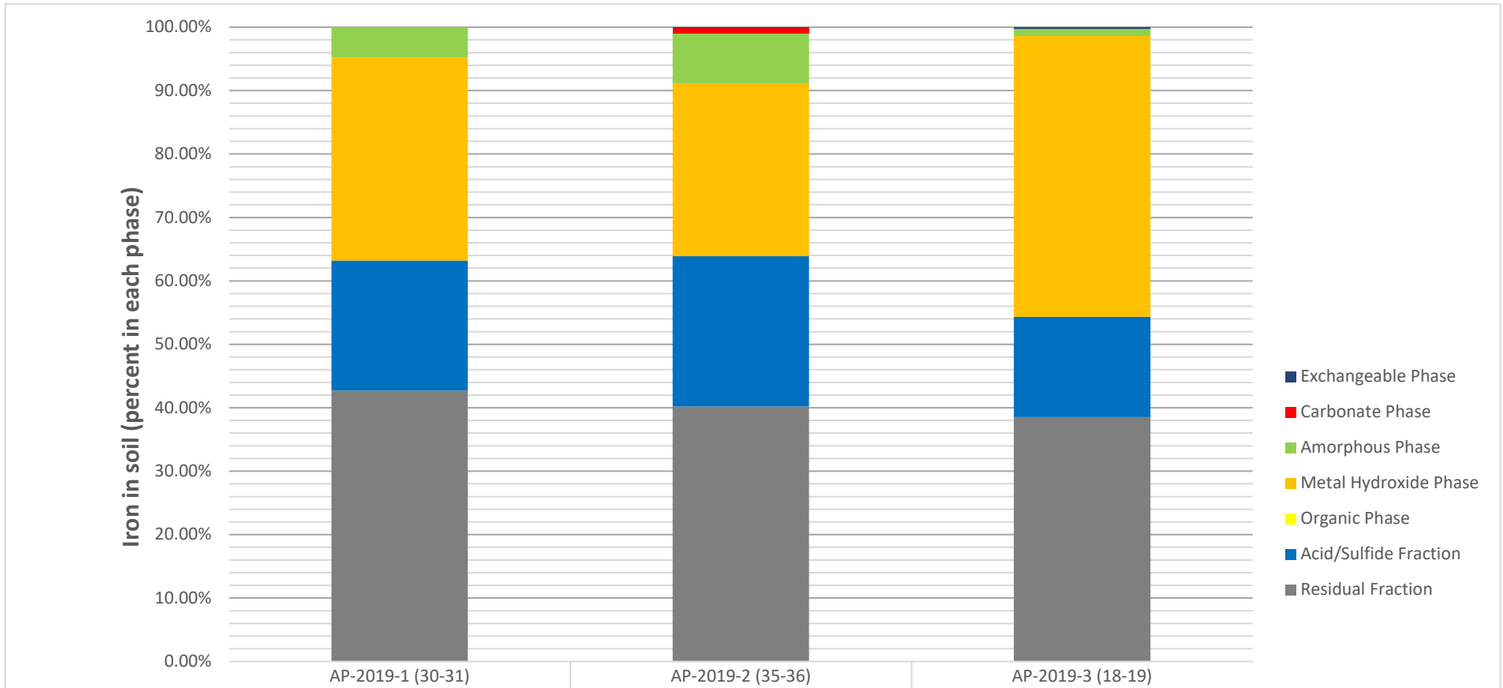
TITLE
SEQUENTIAL EXTRACTION OF ALUMINUM

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	4



	AP-2019-1 (30-31)	AP-2019-2 (35-36)	AP-2019-3 (18-19)
Exchangeable Phase	0.00%	0.17%	0.29%
Carbonate Phase	0.00%	0.79%	0.00%
Amorphous Phase	4.76%	7.89%	1.10%
Metal Hydroxide Phase	32.02%	27.27%	44.30%
Organic Phase	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	20.53%	23.68%	15.79%
Residual Fraction	42.69%	40.19%	38.52%

Borehole and depth below ground surface (Iron in perecent of total)

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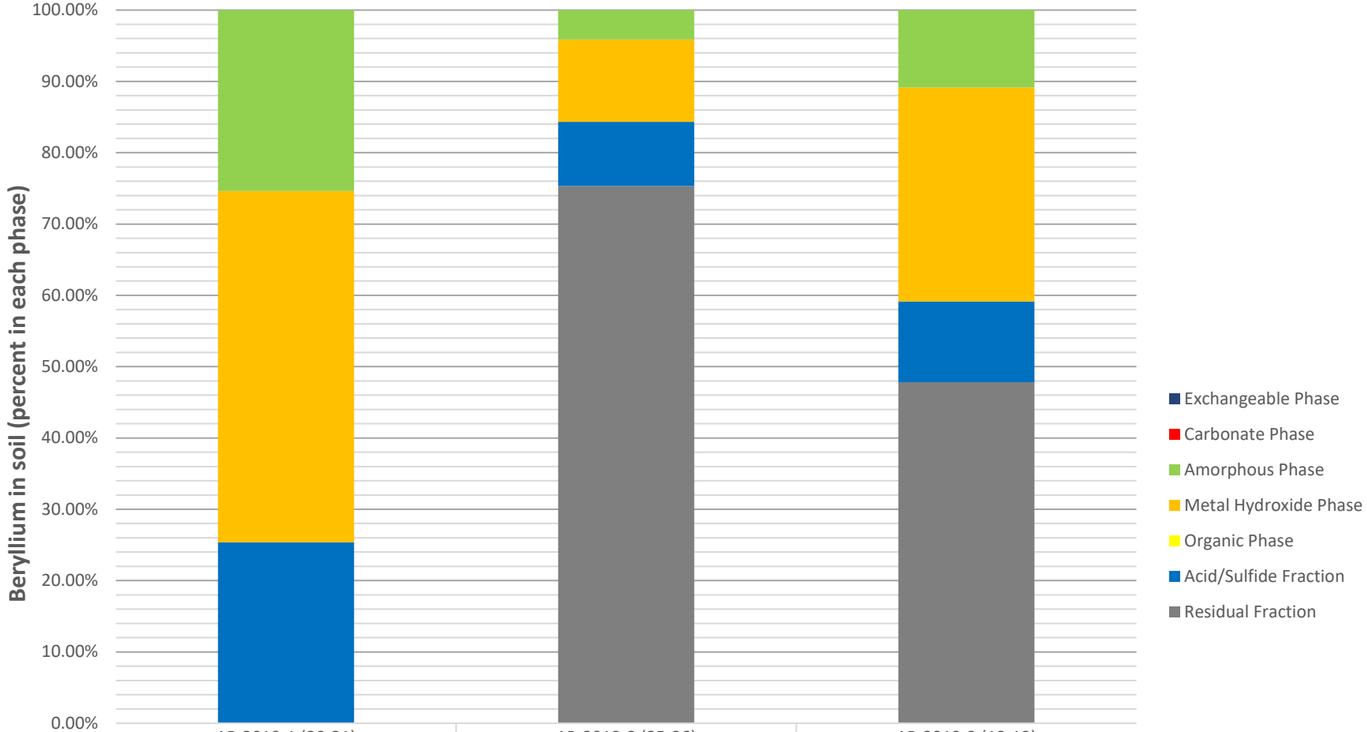
TITLE
SEQUENTIAL EXTRACTION

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	5



	AP-2019-1 (30-31)	AP-2019-2 (35-36)	AP-2019-3 (18-19)
Exchangeable Phase	0.00%	0.00%	0.00%
Carbonate Phase	0.00%	0.00%	0.00%
Amorphous Phase	25.38%	4.14%	10.87%
Metal Hydroxide Phase	49.24%	11.52%	30.00%
Organic Phase	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	25.38%	9.01%	11.30%
Residual Fraction	0.00%	75.33%	47.83%

Borehole and depth below ground surface (Beryllium in perecent of total)

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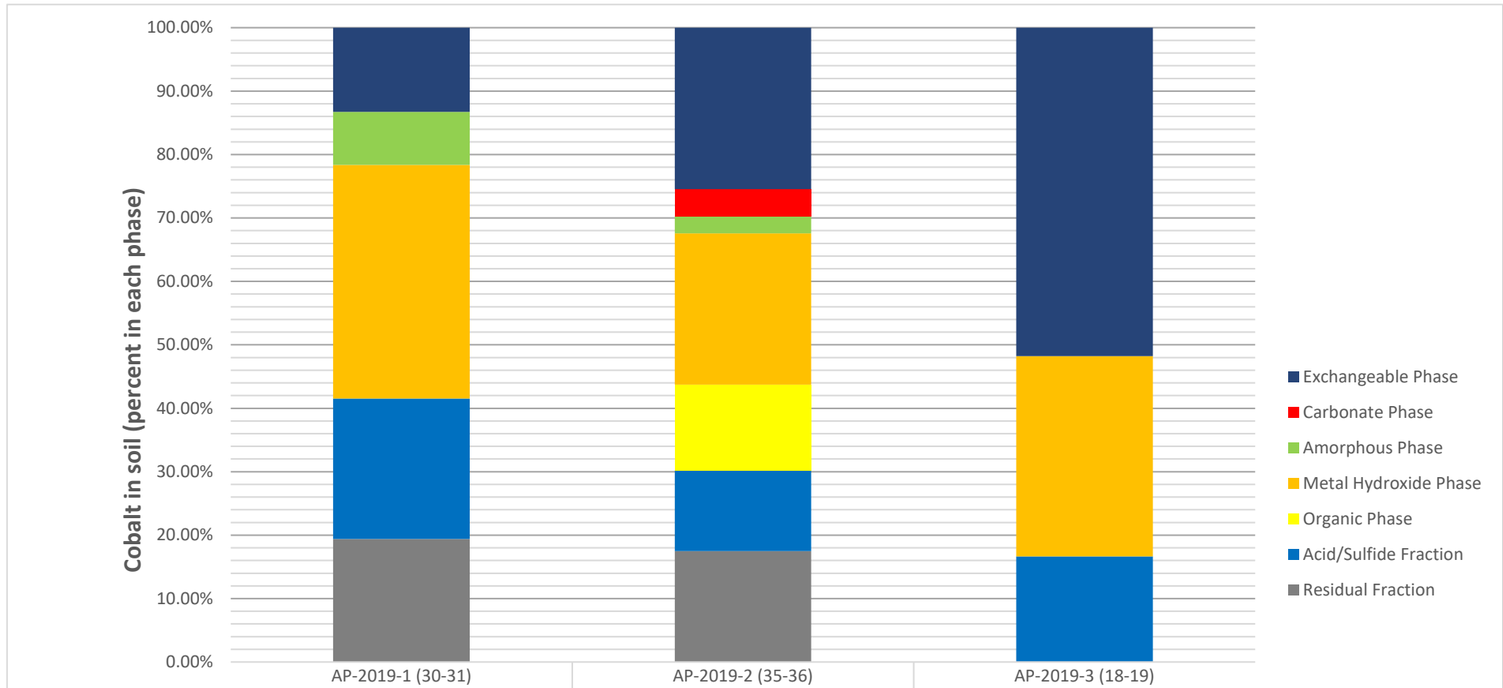
TITLE
SEQUENTIAL EXTRACTION

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	6



	AP-2019-1 (30-31)	AP-2019-2 (35-36)	AP-2019-3 (18-19)
Exchangeable Phase	13.27%	25.44%	51.79%
Carbonate Phase	0.00%	4.29%	0.00%
Amorphous Phase	8.35%	2.70%	0.00%
Metal Hydroxide Phase	36.86%	23.85%	31.55%
Organic Phase	0.00%	13.51%	0.00%
Acid/Sulfide Fraction	22.11%	12.72%	16.67%
Residual Fraction	19.41%	17.49%	0.00%

Borehole and depth below ground surface (Cobalt in perecent of total)

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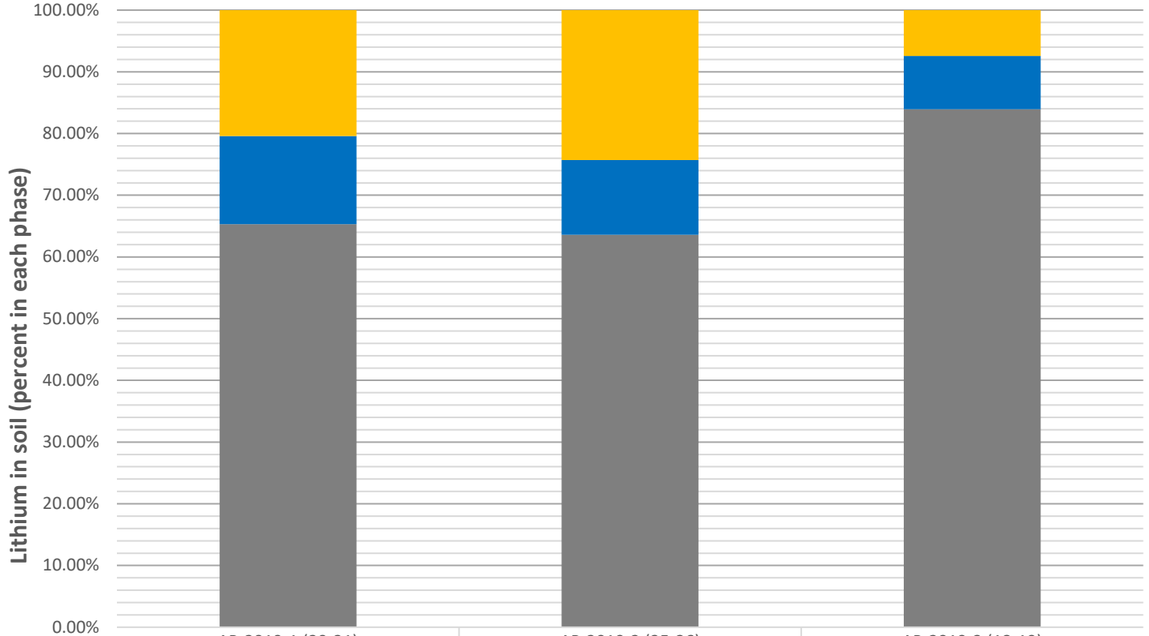
TITLE
SEQUENTIAL EXTRACTION

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	7



	AP-2019-1 (30-31)	AP-2019-2 (35-36)	AP-2019-3 (18-19)
Exchangeable Phase	0.00%	0.00%	0.00%
Carbonate Phase	0.00%	0.00%	0.00%
Amorphous Phase	0.00%	0.00%	0.00%
Metal Hydroxide Phase	20.41%	24.28%	7.41%
Organic Phase	0.00%	0.00%	0.00%
Acid/Sulfide Fraction	14.29%	12.14%	8.67%
Residual Fraction	65.31%	63.58%	83.92%

Borehole and depth below ground surface (Lithium in perecent of total)

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TITLE
SEQUENTIAL EXTRACTION

PROJECT NO.	PHASE	REV.	FIGURE
19122434	01	A	8

APPENDIX A

BORING LOGS

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			

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			
5	10.0/10.0	CL	(0 - 6) Silty CLAY, brown to gray, soft to firm, damp, low plasticity
10			(6 - 11) Sandy CLAY, red and orange with gray, clay ribbons, damp, soft to firm, weak cementation, moderate plasticity
15	10.0/10.0	SC	(11 - 20) Clayey Silty SAND, tan with red and gray, clay ribbons, moist, firm, weak cementation, moderate plasticity
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			

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	
			(11 - 18) Clayey SAND, wet, gray and tan to orange, soft to firm, sand content increases with depth
15	10.0/10.0		
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			

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

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

APPENDIX B

LABORATORY ANALYTICAL REPORTS

June 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

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

Table of Contents

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

nelap ACCREDITED

№ 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 P=PAINT W=WATER SL=SLUDGE A=AIR O=OTHER L=LIQUID SO=SOLID SE=SEDIMENT

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021]; TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐; GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐; VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐; SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐; 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐; 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐; 8321 HERB ☐ T PHOS, AMMONIA ☐; METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐; RCRA ☐ TX11 ☐ ___ ☐; PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐; CHLORIDE ☐ ANIONS ___ ☐; TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐; TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐; RCI ☐ FLASHPOINT ☐ DGAS ☐; TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐; APPENDIX III & IV; ALK, NO3, PO4, Na, Mg, K; FERROUS + FERRIC IRON

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	APPENDIX III & IV	ALK, NO3, PO4, Na, Mg, K	FERROUS + FERRIC IRON	FIELD NOTES
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	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	5-14-19	Fed Ex
Fed Ex	5/15/19 0943	[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

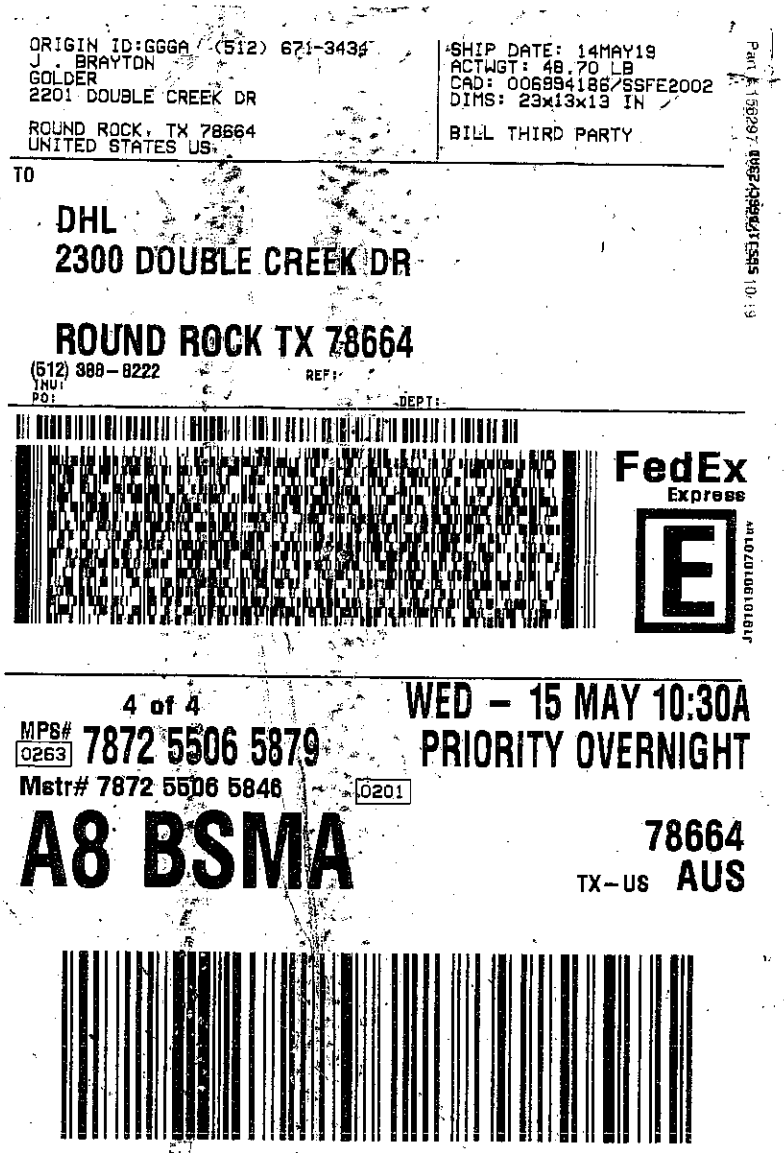
From: John DuPont
Sent: Tuesday, May 28, 2019 11:35 AM
To: Eric Lau
Subject: FW: CCR Analysis

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



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

TO

DHL
2300 DOUBLE CREEK DR

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

FedEx
Express

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

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: 0068994166/SSFE2002
DIMS: 23x14x14 IN

BILL THIRD PARTY

TO

DHL
2300 DOUBLE CREEK DR

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

FedEx Express

2 of 4

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

MPS# 0263 7872 5506 5857
Mstr# 7872 5506 5846 0201

A8 BSMA

78664
TX-US AUS

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

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

DHL Analytical, Inc. **Date:** *14-Jun-19*

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

CASE NARRATIVE

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

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

LOG IN

The samples were received and log-in performed on 5/15/19. 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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			

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			

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			

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

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

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	

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			

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			

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			

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			

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	

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			

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			

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	

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

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			

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	

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			

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	

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			

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	

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			

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

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

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	

Qualifiers:

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

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 10, 2019

DHL Analytical, Inc.

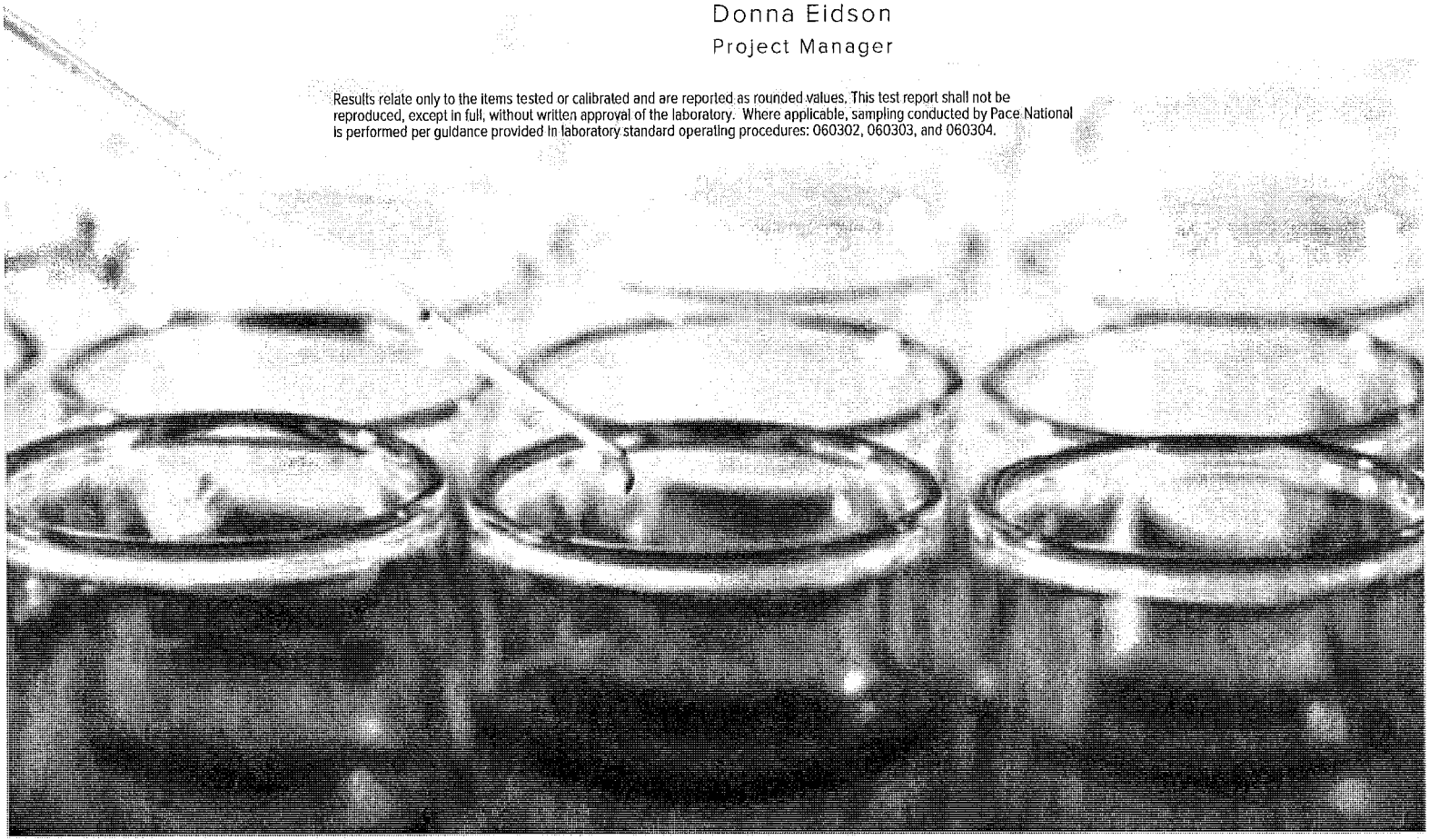
Sample Delivery Group:	L1100989
Samples Received:	05/21/2019
Project Number:	1905168
Description:	

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

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

	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

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

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
RADIUM-228	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	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
Combined Radium	3.15		1.09	0.978	06/03/2019 17:48	WG1287234

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
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

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

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

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

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

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

Radiochemistry by Method 904

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

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
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

Radiochemistry by Method 904

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

Radiochemistry by Method SM7500Ra B M

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

Radiochemistry by Method 904

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

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+/-	pCi/l	date / time	
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

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

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*							

Method Blank (MB)

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

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		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	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
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	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
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	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
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	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
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*							

Guide to Reading and Understanding Your Laboratory Report

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

Abbreviations and Definitions

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

Qualifier	Description

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

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

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

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

State Accreditations

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

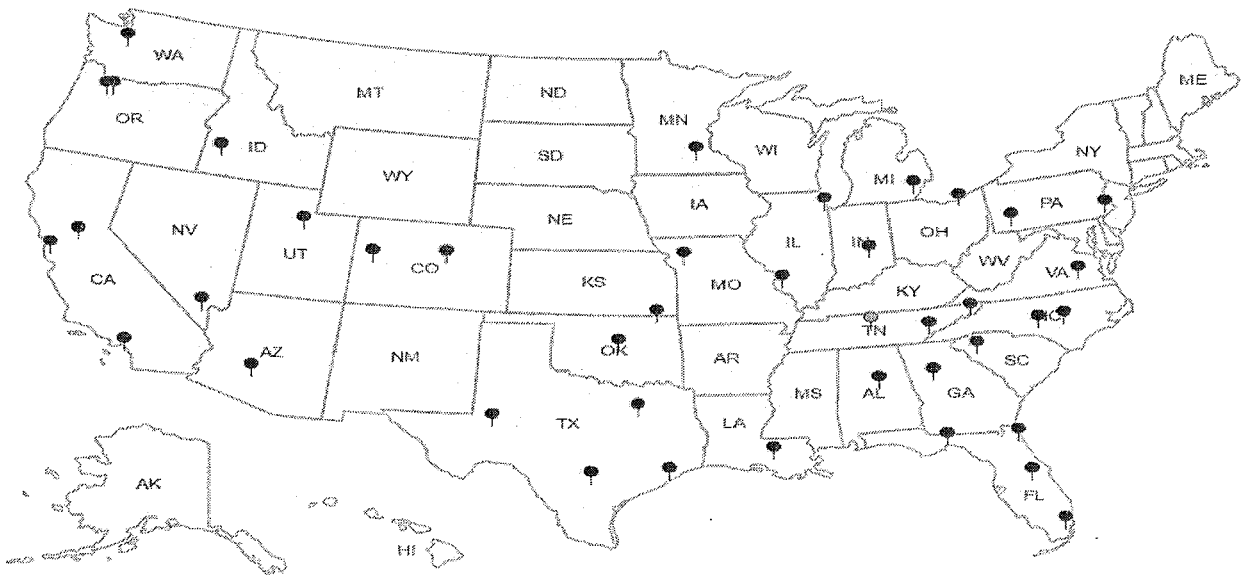
Third Party Federal Accreditations

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

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

Our Locations

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



Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRTX	SDG#:	1100989
Cooler Received/Opened On: 5/21/19	Temperature:	Amb
Received By: Brock Fariss		
Signature: Brock 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?		✓	

Kelsey Stephenson

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#

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					1
H-32	Aqueous	-02D	05/14/19 08:25 AM	1LHDPEHNO3		1				02
H-32	Aqueous	-02E	05/14/19 08:25 AM	1LHDPEHNO3	1					1
H-27	Aqueous	-03D	05/14/19 09:40 AM	1LHDPEHNO3		1				03
H-27	Aqueous	-03E	05/14/19 09:40 AM	1LHDPEHNO3	1					1
H-29	Aqueous	-04D	05/14/19 11:25 AM	1LHDPEHNO3		1				04
H-29	Aqueous	-04E	05/14/19 11:25 AM	1LHDPEHNO3	1					1
H-28	Aqueous	-05D	05/14/19 12:30 PM	1LHDPEHNO3		1				05
H-28	Aqueous	-05E	05/14/19 12:30 PM	1LHDPEHNO3	1					1
H-26	Aqueous	-06D	05/14/19 02:25 PM	1LHDPEHNO3		1				06
H-26	Aqueous	-06E	05/14/19 02:25 PM	1LHDPEHNO3	1					1
H-33	Aqueous	-07D	05/14/19 03:30 PM	1LHDPEHNO3		1				07
H-33	Aqueous	-07E	05/14/19 03:30 PM	1LHDPEHNO3	1					

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:	

pH adj @ 1511 RAD SCREEN: <0.5 mR/hr

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

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

Table of Contents

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

Nº 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. BRAXTON

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

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

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

ANALYSES: BTEX ☐ MTBE ☐ [METHOD 8021] | TPH 1005 ☐ TPH 1006 ☐ HOLD 1006 ☐ | GRO [METHOD 8015] ☐ DRO [METHOD 8105] ☐ | VOC 8260 ☐ VOC 624 ☐ VOC 8260/5035 ☐ | SVOC 8270 ☐ PAH 8270 ☐ HOLD PAH ☐ SVOC 625 ☐ | 8270 PEST ☐ 625 PEST/PCB ☐ 608 PCB ☐ | 8270 O-P PEST ☐ 8082 PCB ☐ 8270 PCB ☐ | 8321 HERB ☐ T PHOS, AMMONIA ☐ | METALS 6020 ☐ METALS 200.8 ☐ DISS. METALS ☐ | RCRA ☐ TX11 ☐ ☐ | PH ☐ HEX CHROM ☐ ALKALINITY ☐ COD ☐ | CHLORIDE ☐ ANIONS ☐ | TCLP-SVOC ☐ VOC ☐ PEST ☐ HERB ☐ | TCLP-METALS ☐ RCRA 8 ☐ TX-11 ☐ Pb ☐ | RCI ☐ FLASHPOINT ☐ DGAS ☐ | TDS ☐ TSS ☐ % MOISTURE ☐ CYANIDE ☐ | APPENDIX III & IV + Na, Mg, K, ALK, NO3+PO4 + FERROUS & FERRIC Fe

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ☐ NaOH ☐	ICE	UNPRESERVED	FIELD NOTES
LAKE SAMPLE	01	5-14-19	1005	W		7	X		X			
POND SAMPLE	02	5-14-19	1020	W		7	X		X			

RELINQUISHED BY: (Signature) DATE/TIME 5-14-19 1800 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) 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°C THERM #: 78
CUSTODY SEALS: ☐ BROKEN ☐ INTACT ☒ NOT USED
CARRIER: ☐ LONE STAR ☒ FEDEX ☐ UPS ☐ OTHER
☐ COURIER DELIVERY
☐ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

Eric Lau

From: John DuPont
Sent: Tuesday, May 28, 2019 11:35 AM
To: Eric Lau
Subject: FW: CCR Analysis

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

Appendix IV Parameters:

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

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

ORIGIN ID: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

TO

DHL
2300 DOUBLE CREEK DR

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

FedEx
Express

2 of 4
MPS# 0263 7872 5506 5857
Mstr# 7872 5506 5846

WED - 15 MAY 10:30A
PRIORITY OVERNIGHT

0201

A8 BSMA

78664
TX-US AUS

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 _____

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

DHL Analytical, Inc. **Date:** *30-May-19*

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

CASE NARRATIVE

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

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

LOG IN

The samples were received and log-in performed on 5/15/19. 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

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

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.

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

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

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

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

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

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

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

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			

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			

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	

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			

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			

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	

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			

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	

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			

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			

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			

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	

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

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			

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			

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	

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			

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	

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			

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	

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			

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

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

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	

Qualifiers:

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

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

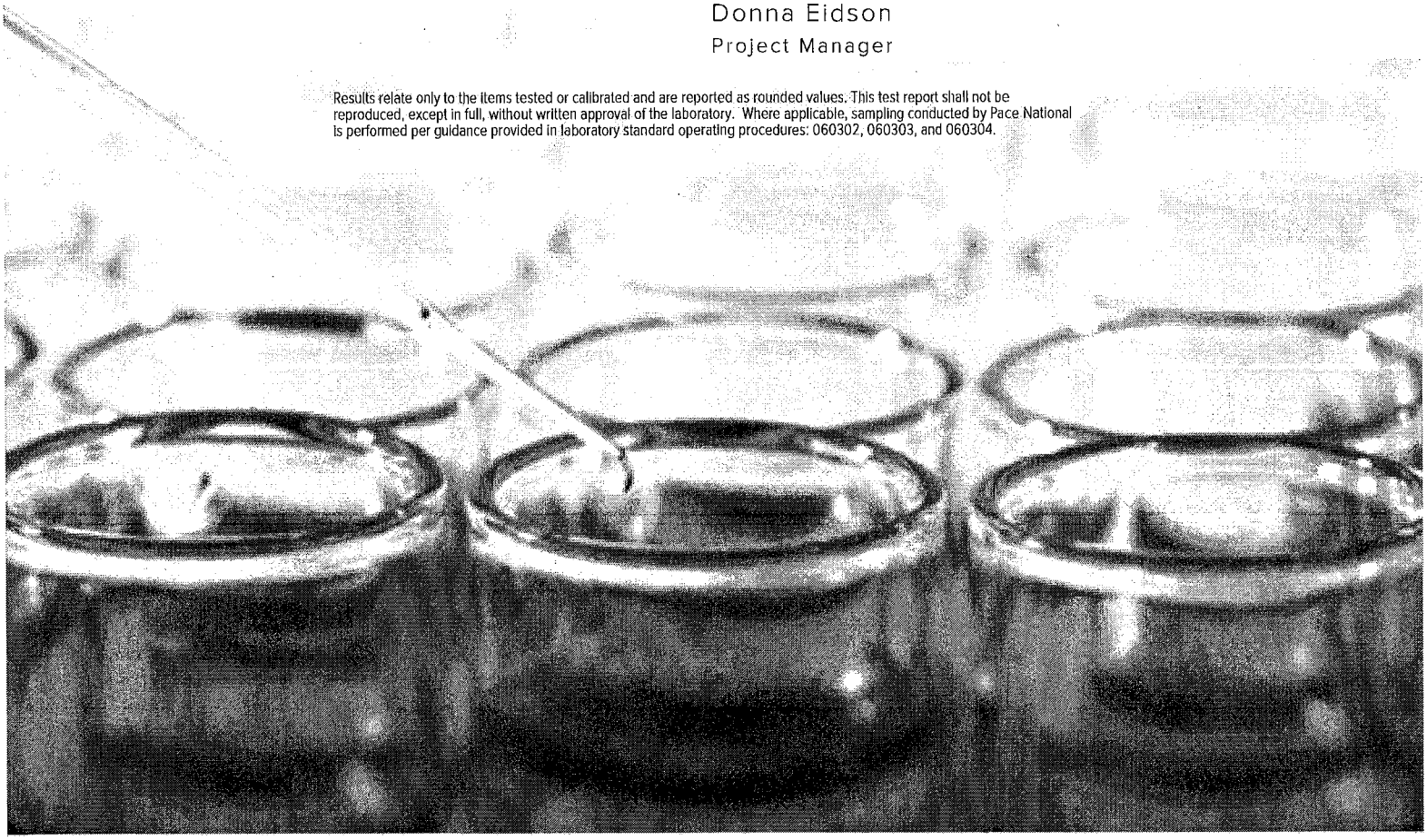
May 29, 2019

DHL Analytical, Inc.

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

Entire Report Reviewed By:

Donna Eidson
Project Manager



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ONE LAB. NATIONWIDE.

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

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

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result 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

Radiochemistry by Method 904

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

Radiochemistry by Method SM7500Ra B M

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

Method Blank (MB)

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

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

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

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

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

Laboratory Control Sample (LCS)

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

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

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

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

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

Method Blank (MB)

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

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

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

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

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

Laboratory Control Sample (LCS)

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

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

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

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

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

Guide to Reading and Understanding Your Laboratory Report

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

Abbreviations and Definitions

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

Qualifier	Description

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

ACCREDITATIONS & LOCATIONS

ONE LAB. NATIONWIDE.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

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

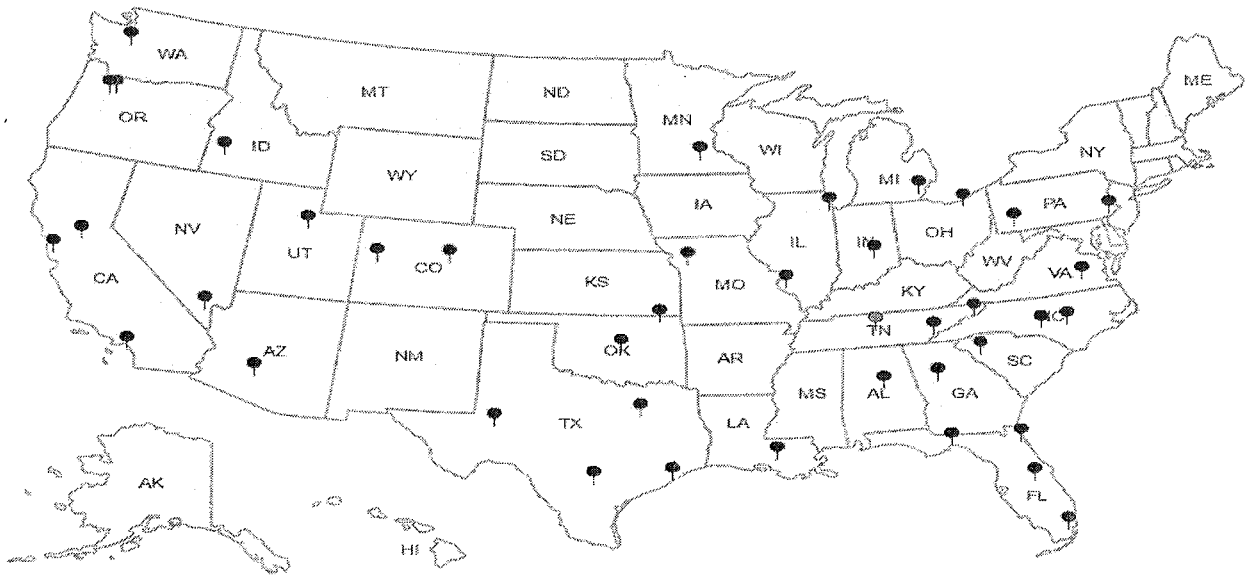
Third Party Federal Accreditations

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

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: [signature]		

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?		✓	

1100947

Page 1 of 1

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

VPS
Rec: 4

Amb

mR/hr

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.

Contents:

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.

Summary of Rietveld Quantitative Analysis X-ray Diffraction Results

Quantitative X-ray Diffraction Results

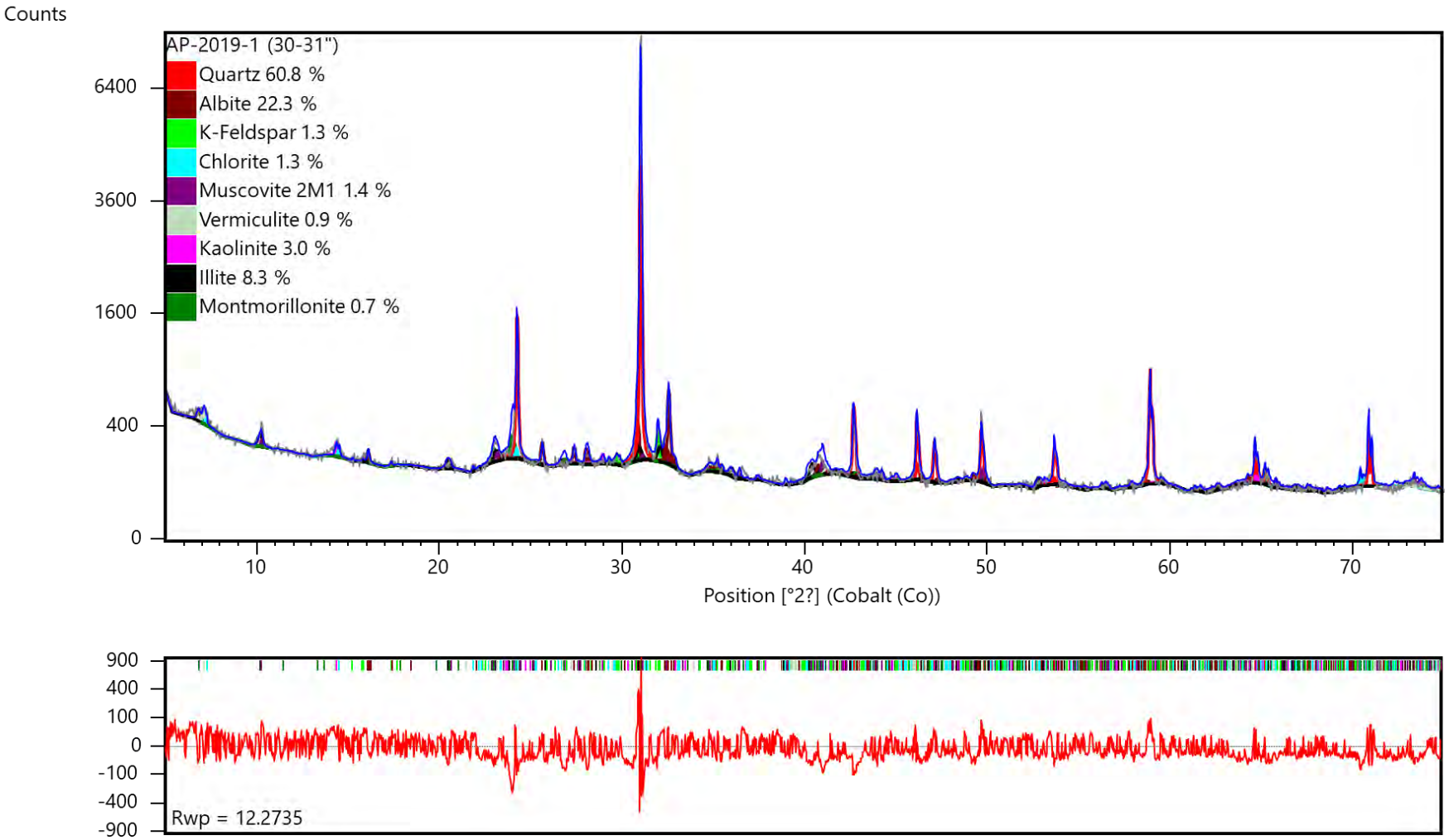
Mineral/Compound	1 AP-2019-1 (30-31")	2 AP-2019-2 (35-36")	3 AP-2019-3 (18-19")
	(wt %)	(wt %)	(wt %)
Quartz	60.8	66.0	99.2
Albite	22.3	16.2	0.8
K-Feldspar	1.3	1.4	--
Chlorite	1.3	2.7	--
Muscovite	1.4	3.2	--
*Vermiculite	0.9	0.7	--
*Kaolinite	3.0	3.4	--
Illite	8.3	6.1	--
*Montmorillonite	0.7	0.4	--
TOTAL	100	100	100

Zero values indicate that the mineral was included in the refinement, but the calculated concentration is below a measurable value.

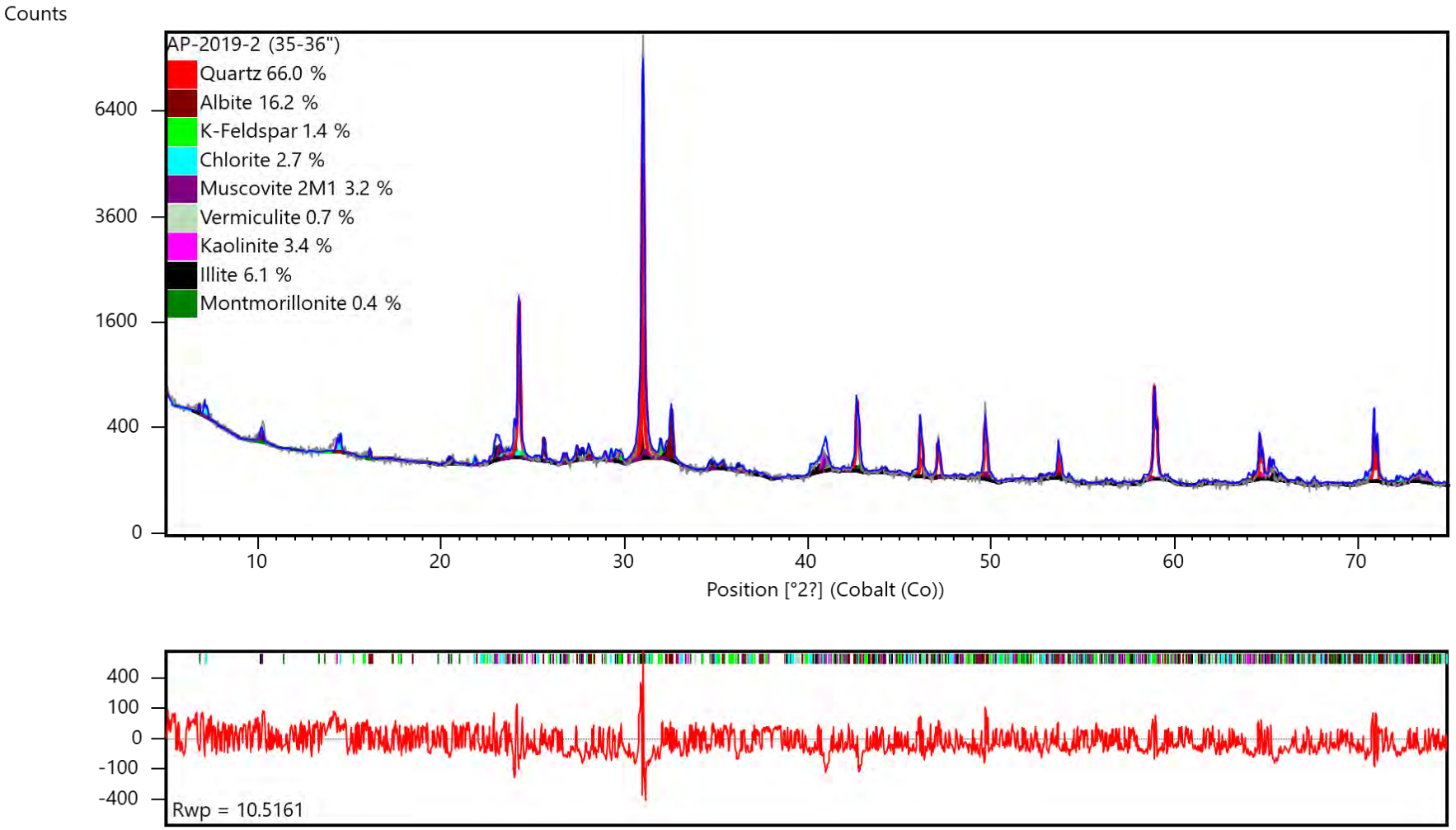
Dashes indicate that the mineral was not identified by the analyst and not included in the refinement calculation for the sample.

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

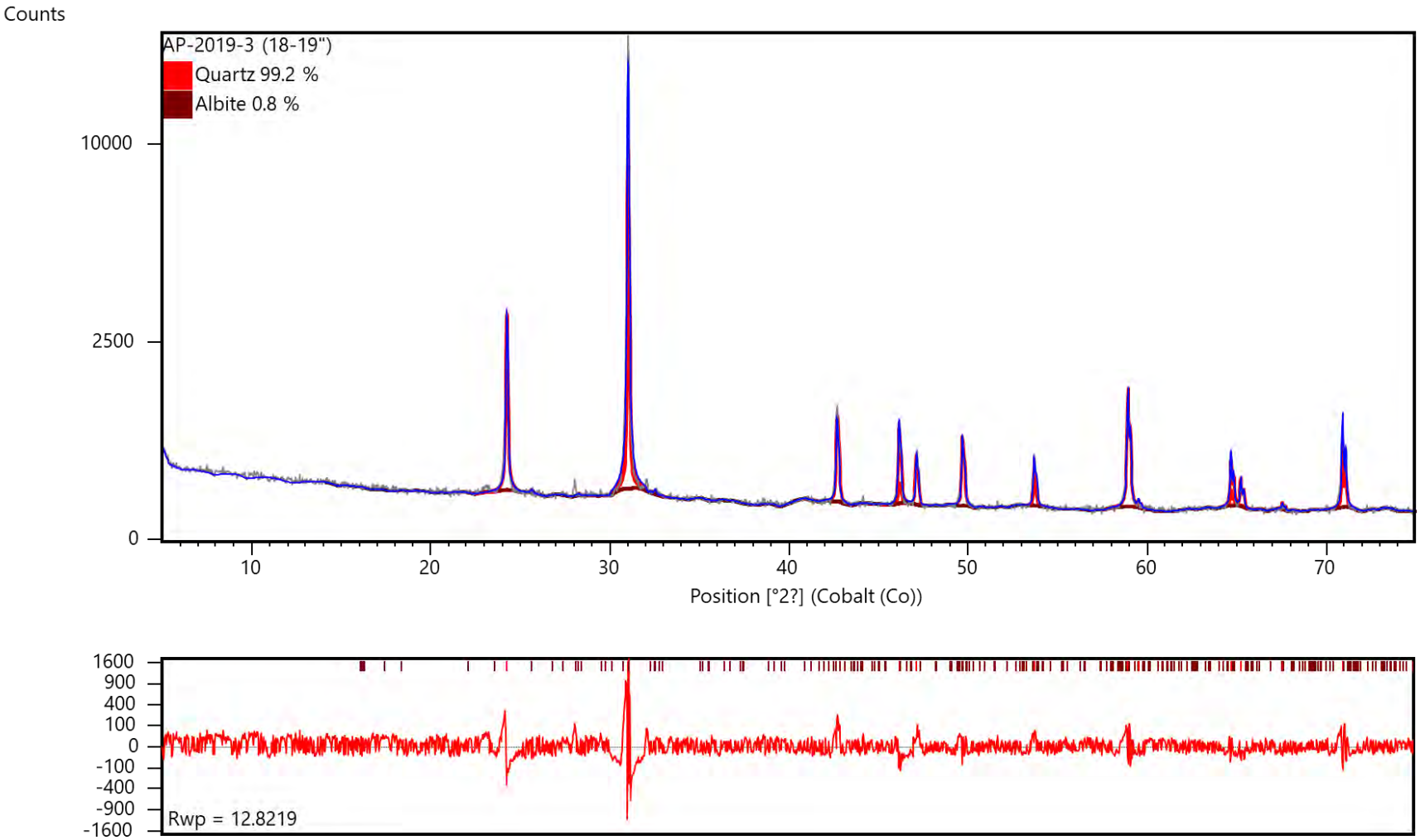
Mineral/Compound	Formula
Quartz	SiO_2
Albite	$NaAlSi_3O_8$
K-Feldspar	$KAlSi_3O_8$
Chlorite	$(Mg_3,Fe_2)Al(AlSi_3)O_{10}(OH)_8$
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$
Vermiculite	$(Mg,Fe,Al)_2(Al,Si)_4O_{10}(OH)_2 \cdot 4(H_2O)$
Kaolinite	$Al_2Si_2O_5(OH)_4$
Illite	$(K,H_3O)(Al,Mg,Fe)_2(Si,Al)_4O_{10}[(OH)_2,(H_2O)]$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



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



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



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

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 140-15490-1
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

Table of Contents

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)

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

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.

Detection Summary

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

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.

Eurofins TestAmerica, Knoxville

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.

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.

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.

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

This Detection Summary does not include radiochemical test results.

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

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

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

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**

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

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

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

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

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

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

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

Default Detection Limits

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

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

Prep: 3010A

SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.077	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.031	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cobalt	2.5	0.063	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.28	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.015	mg/Kg
Cobalt	2.5	0.045	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.027	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: 3010A

SEP: Metal Hydroxide

Default Detection Limits

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

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

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.016	mg/Kg
Cobalt	2.5	0.053	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.13	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.47	mg/Kg
Thallium	1.8	0.29	mg/Kg

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

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Barium	7.5	0.36	mg/Kg
Beryllium	0.75	0.063	mg/Kg
Cobalt	7.5	0.12	mg/Kg
Iron	15	8.8	mg/Kg
Li	7.5	0.44	mg/Kg
Manganese	2.3	0.37	mg/Kg
Mo	6.0	0.25	mg/Kg
Selenium	1.5	0.52	mg/Kg
Thallium	5.3	0.70	mg/Kg

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

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.012	mg/Kg
Cobalt	2.5	0.046	mg/Kg
Iron	5.0	2.9	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.25	mg/Kg
Mo	2.0	0.099	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.21	mg/Kg

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

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg

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

Prep: Residual

Analyte	RL	MDL	Units
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cobalt	2.5	0.15	mg/Kg
Iron	5.0	4.1	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

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

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Barium	2.5	0.12	mg/Kg
Beryllium	0.25	0.0075	mg/Kg
Cobalt	2.5	0.023	mg/Kg
Iron	5.0	4.1	mg/Kg
Li	2.5	0.15	mg/Kg
Manganese	0.75	0.052	mg/Kg
Mo	2.0	0.082	mg/Kg
Selenium	0.50	0.17	mg/Kg
Thallium	1.8	0.18	mg/Kg

Method: 6010B - Metals (ICP)

Prep: 3050B

Analyte	RL	MDL	Units
Boron	20	10	mg/Kg
Chromium	1.5	0.22	mg/Kg
Lead	1.5	0.28	mg/Kg

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

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

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 140-31128/14-A
Matrix: Solid
Analysis Batch: 31553

Client Sample ID: Method Blank
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 31553

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 31553

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Total/NA
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
Matrix: Solid
Analysis Batch: 31553

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Total/NA
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

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

Lab Sample ID: MB 140-30683/13-A
Matrix: Solid
Analysis Batch: 31713

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
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

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

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
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
Aluminum	60000		64600		mg/Kg	☼	7	30
Barium	680		733		mg/Kg	☼	7	30

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
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
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Method Blank
Prep Type: Step 1
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
Matrix: Solid
Analysis Batch: 31604

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

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

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

Lab Sample ID: LCS 140-31253/14-B ^5
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample
Prep Type: Step 2
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
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
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
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 2
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

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

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

Lab Sample ID: 140-15490-1 DU
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 3
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
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Method Blank
Prep Type: Step 4
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
Matrix: Solid
Analysis Batch: 31604

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

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

Lab Sample ID: LCSD 140-31341/15-B
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
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
Matrix: Solid
Analysis Batch: 31604

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 4
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
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Method Blank
Prep Type: Step 5
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

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

Lab Sample ID: LCS 140-31436/14-B ^5
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Lab Control Sample
Prep Type: Step 5
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
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
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
Matrix: Solid
Analysis Batch: 31651

Client Sample ID: AP-2019-1 (30-31)
Prep Type: Step 5
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

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

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

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

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

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	

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	

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

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

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	

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	

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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
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)
Lab Sample ID: 140-15490-3
Date Collected: 06/03/19 15:20
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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

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									

Lab Chronicle

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

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									

Lab Chronicle

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

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									

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Method Summary

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

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL KNX
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
7470A	SEP Mercury (CVAA) - Total	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
3050B	Preparation, Metals	SW846	TAL KNX
7470A	Preparation, Mercury	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

TAL KNX = Eurofins TestAmerica, Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

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

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	

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	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice (circled)	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010B_SEP - 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		" "

RT: 1.2°C CT: 1.2°C, 1 Cooler
FedEx ✓ Custody seal intact
trK# 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 (signature)	06/04/19 1245	Golder	(signature)	6/5/19 0920	TA-Knox
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

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?	Comments/Actions Taken
1. Are the shipping containers intact?	/			☐ **Containers, Broken**	
2. Were ambient air containers received intact?			/	☐ Checked in lab	
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : 5C6 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	

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 #: 1400526B PM Instructions:

Sample Receiving Associate: Date: 6/5/19

QA026R31.doc, 112618

APPENDIX C

GROUNDWATER SAMPLING RECORDS

RECORD OF WATER LEVEL READINGS

GOLDER

Project Name: LUMINANT - MLSES - PONDS Location: TAYLOR, 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	

GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 1912262-C Project Name: LUMINANT - MCSES Date: 5-14-19

Sample Number: H-26

Sampling Location (well ID, etc.): H-26

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 13.21

Casing Stickup (ft.): -

Starting Water Level (ft. BGL): 13.21

Total Depth (ft. BGL): -

Casing Diameter (in ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

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 (Y / N)	Preservation	Remarks (quality control sample, other)
Time	Volume	Composition (G, P)	No.			
1425	250mL	P	1	N	—	GEN CHEM
1425	500mL	P	1	N	HNO_3	METALS

Comments:

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Round Rock, TX 78664
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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 191222G2-C Project Name: LUMINAULT - MCSES Date: 5-14-19

Sample Number: A-27

Sampling Location (well ID, etc.): A-27

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 22.02

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 22.02

Total Depth (ft. BGL): —

Casing Diameter (in ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

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		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
0940	250mL	P	1	N	—	GEN CHEM
0940	500mL	P	1	N	HNO_3	METALS

Comments:

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GROUNDWATER SAMPLING RECORD

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Project Number: 191222G2-C Project Name: LUMINANT - MCSES Date: 5-14-19

Sample Number: H-28

Sampling Location (well ID, etc.): H-28

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 7.12

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 7.12

Total Depth (ft. BGL): —

Casing Diameter (In ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

Time	Cum. Vol (gal. or L)	Purge Rate (gal. or L /m)	Temp (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1157									
1201	—	.2	22.6	6.29	1580	0.39	-34	3.8	7.29
1211		1	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		Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)	Preservation	(quality control sample, other)
1230	250mL	P	1	N	—	GEN CHEM
1230	500mL	P	1	N	HNO_3	METALS

Comments:

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GROUNDWATER SAMPLING RECORD

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Project Number: 191222G2-C Project Name: LUMINANT - MCSES Date: 5-14-19

Sample Number: H-29

Sampling Location (well ID, etc.): H-29

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 22.61

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 22.61

Total Depth (ft. BGL): —

Casing Diameter (in ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

Time	Cum. Vol. (gal. or L)	Purge Rate (gal. or L /m)	Temp. (oC)	pH	Spec. Cond. (mmhos/cm)	D.O	Redox (mV)	Turbidity & Color	Water Depth (ft BMP)
1053									
1102	—	.2	21.9	6.46	1710	0.71	-86	7.2	22.88
1107		1	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:

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GROUNDWATER SAMPLING RECORD

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Project Number: 191222G2-C Project Name: LUMINANT - MLSES Date: 5-14-19

Sample Number: H-31

Sampling Location (well ID, etc.): H-31

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): –

Filter Pack Interval (ft. BGL): –

Starting Water Level (ft. BMP): 22.73

Casing Stickup (ft.): –

Starting Water Level (ft. BGL): 22.73

Total Depth (ft. BGL): –

Casing Diameter (in ID): 2.0

Casing Volume (gal.): –

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: Same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

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		1	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:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINANT - MCSES Date: 5-14-19

Sample Number: H-32

Sampling Location (well ID, etc.): H-32

Sampled by: JTB

Measuring Point (MP) of Well: TOC/PVC

Screened Interval (ft. BGL): —

Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 23.16

Casing Stickup (ft.): —

Starting Water Level (ft. BGL): 23.16

Total Depth (ft. BGL): —

Casing Diameter (In ID): 2.0

Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):

Cleaning Equipment: alconox & DI rinse

Purging: peristaltic / bladder Sampling: same

Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)

Water Level: KECK Thermometer: HORIBA

pH Meter: HORIBA Field Calibration: 7-4

Conductivity Meter: HORIBA Field Calibration: 1413

Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

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		1	22.7	6.01	1540	0.31	-76	9.2	23.35
0818		1	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:

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GROUNDWATER SAMPLING RECORD

PAGE 1 of 1

Project Number: 19122262-C Project Name: LUMINANT - MCSES Date: 5-14-19

Sample Number: H-33
Sampling Location (well ID, etc.): H-33
Sampled by: JTB
Measuring Point (MP) of Well: TOC/PVC
Screened Interval (ft. BGL): —
Filter Pack Interval (ft. BGL): —

Starting Water Level (ft. BMP): 13.42
Casing Stickup (ft.): —
Starting Water Level (ft. BGL): 13.42
Total Depth (ft. BGL): —
Casing Diameter (in ID): 2.0
Casing Volume (gal.): —

QUALITY ASSURANCE

METHODS (describe):
Cleaning Equipment: alconox & DI rinse
Purging: peristaltic / bladder Sampling: Same
Disposal of Discharged Water: on site

INSTRUMENTS (Indicate make, model, I.d.)
Water Level: KECK Thermometer: HORIBA
pH Meter: HORIBA Field Calibration: 7-4
Conductivity Meter: HORIBA Field Calibration: 1413
Filter / Filter Size: Other:

SAMPLING MEASUREMENTS

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	Preservation	Remarks
Time	Volume	Composition (G, P)	No.	(Y / N)		(quality control sample, other)
1530	250mL	P	1	N	—	GEN CHEM
1530	500mL	P	1	N	HNO_3	METALS

Comments:

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APPENDIX B

Tier II and Tier III Monitored Natural Attenuation Evaluation

GOLDER

REPORT

MARTIN LAKE ASH POND AREA TIER II AND III MNA EVALUATION

Submitted to:

Luminant Generation Company LLC

6555 Sierra Drive
Irving, Texas 75039

Submitted by:

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

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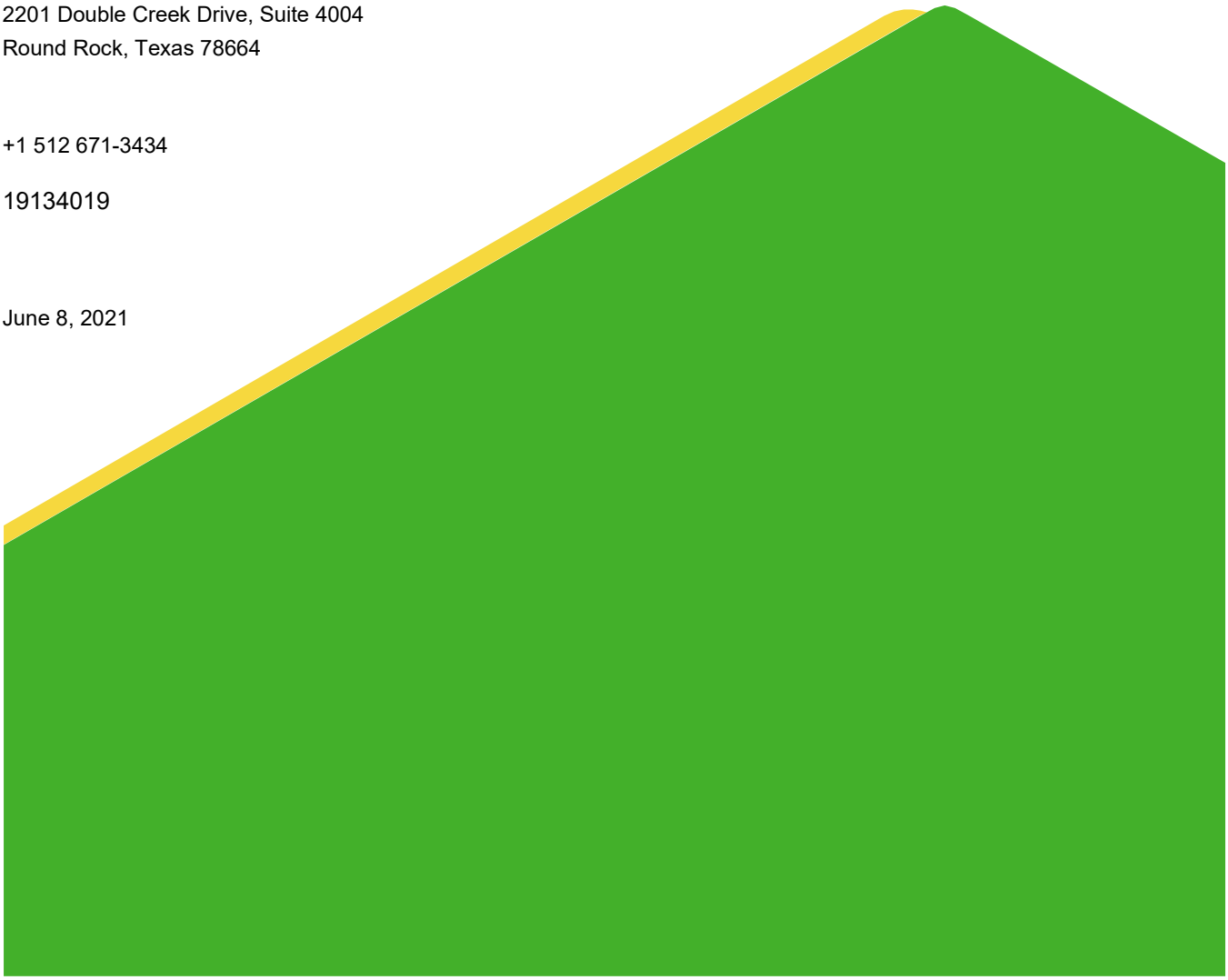
19134019

June 8, 2021



Distribution List

Renee Collins, Luminant

David Mitchell, Luminant

Eric Chavers, Luminant

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TABLES

FIGURES

APPENDICES

1.0 OVERVIEW

Luminant Generation Company LLC (Luminant) operates 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. Luminant manages Coal Combustion Residuals (CCR) generated from the MLSES in the Ash Pond Area in accordance with the applicable requirements of 40 Code of Federal Regulations (CFR) Part 257 Subpart D as amended (CCR Final Rule). A map of the Ash Pond Area is provided on Exhibit 1.

In September 2019, pursuant to 40 CFR §257.96(a), Golder Associates Inc. (Golder) completed an assessment of corrective measures (ACM) for the Ash Pond Area (Golder 2019a). The ACM identified MNA as a potential groundwater response technology for beryllium, cobalt, and lithium detected at Statistically Significant Levels (SSLs) above the groundwater protection standards (GWPSs) established for the Ash Pond Area. To supplement the findings of the ACM, Golder was retained by Luminant to further evaluate the overall feasibility of MNA as a groundwater remedial alternative for the Ash Pond Area in accordance with 40 CFR §257.97. Golder based the MNA feasibility evaluation on United States Environmental Protection Agency (USEPA) guidance for using MNA as a remedial strategy (USEPA 2007a and 2007b) and best practices in the Interstate Technology Regulatory Council (ITRC) document: "A Decision Framework for Applying Monitored Natural Attenuation Processes to Metals and Radionuclides in Groundwater" (ITRC 2010).

USEPA guidance recommends that the overall feasibility of MNA as a groundwater response technology be evaluated based on the following multi-tier approach (USEPA 2007a, b):

1) Demonstrate active constituent removal from groundwater and dissolved plume stability (Tier I).

2) Determine the mechanisms and rates of the operative attenuation processes (Tier II).

3) Determine the long-term capacity for attenuation and the stability of immobilized constituents (Tier III).

A Tier I MNA Evaluation for the Ash Pond Area was completed in December 2019 (Golder 2019b). The Tier I Evaluation concluded that sufficient evidence was present to satisfy the Tier I criteria for successful MNA implementation to address beryllium, cobalt, and lithium groundwater SSLs. Further geochemical evaluation (i.e., Tier II and Tier III Evaluation) of MNA was recommended in the Tier I report. This memorandum presents the findings of the Tier II and Tier III MNA Evaluation for the Ash Pond Area.

The results of the Tier II and III evaluation presented in this document will be used to further assess the performance and reliability of MNA as a potential remedial alternative as required by 40 CFR §257.97. Following completion of this multi-tier evaluation, the fourth and final tier of an MNA program, which involves the design of a performance monitoring program and the development of a contingency plan, will be completed.

2.0 TIER II AND TIER III EVALUATION APPROACH

A Tier II and III evaluation is used to determine the mechanism(s), rates, and stability of constituent attenuation with respect to the MNA criteria (USEPA 2007a, b). In 2019, Golder collected samples of groundwater, lake water (Martin Lake), and CCR impoundment pond water as part of a Nature and Extent evaluation and Tier I evaluation in accordance with the CCR Final Rule. Ash Pond Area groundwater collection and analysis continued throughout and after the completion of the Tier I evaluation, and the water quality results are used in the Tier II and III site evaluation. The additional groundwater collection consisted of three sampling events (September 2019, May 2020, and October 2020). Data from those events are presented in Appendix A. The overall quality of

groundwater and trends for constituents with SSLs were described in detail in the Tier I report (Golder 2019a). No substantial changes in groundwater quality have occurred that would change the findings of the Tier I evaluation.

The Tier II and III evaluation expands upon the following updated Tier I findings related to groundwater, as follows:

- **Plume Stability:** Based on the water quality monitoring data, groundwater concentrations of beryllium, cobalt, and lithium outside of the ash ponds appear to be stable or decreasing, accounting for statistically determined outliers (Figure 1a, b, c). Beryllium and cobalt are unlikely to originate from the ash ponds due to their absence in pond water. It is also considered unlikely that lithium in groundwater originates from the ash ponds as its concentration was much lower in pond water than in groundwater from background monitoring wells at the Ash Pond Area.
- **Magnitude of Exceedances**: Occasional exceedances of the lithium Groundwater Protection Standard (GWPS) in some wells do not amount to levels that would be considered an SSL per the CCR Final Rule (Golder 2019b). The highest level of beryllium in groundwater (since monitoring began) at the Ash Pond Area was observed at downgradient well H-31 (in September 2019 and May 2020). However, results from the subsequent sampling event (October 6, 2020) indicate the beryllium concentration decreased substantially, from >0.030 mg/L to 0.0092 mg/L, which is consistent with historical beryllium concentrations at well H-31. The cobalt GWPS exceedances in downgradient wells H-28, H-29, H-31, and H-32 fluctuate over time, but generally have presented a stable trend at all four wells. The observed variability in cobalt concentrations may be related to changes in flow conditions and/or natural geochemical variation rather than a continuous source of cobalt.
- **Ash Pond Water:** Historical records are not available for ash additions or pond water concentrations over the lifespan of the Ash Ponds. However, based on recent pond water data, beryllium and cobalt are not present in the Ash Ponds at levels above their respective detection limits. Lithium in the Ash Ponds was measured at concentrations of 0.119 mg/L in May 2019 and 0.124 mg/L in May 2020, which are below the GWPS of 0.177 mg/L. This indicates the Ash Ponds are unlikely to cause the SSLs of beryllium and cobalt as well as the occasional GWPS exceedances of lithium (lithium is currently not at SSLs based on a 95% confidence interval statistical evaluation). Instead, an alternative source for these constituents may be present in the MLSES Ash Pond area.
- **Groundwater Chemistry:** The groundwater monitoring results and the findings of the geochemical modeling support the potential for natural attenuation of beryllium, cobalt and, to some degree, lithium. Equilibrium of groundwater with the mineral phase ferrihydrite [$Fe(OH)_{3(am)}$], an effective sorbent for trace metals, was indicated in all groundwater samples. Modeling results are consistent with the findings from the sequential extraction analysis presented in the Tier 1 evaluation, which demonstrate carbonate, amorphous, organic, and metal hydroxide phases sequester beryllium, cobalt, and some lithium in overburden at the MLSES Ash Pond Area. Further, differences in relative abundance of the major ions in groundwater indicate that Ash Pond water is geochemically distinct from both groundwater at the Ash Pond Area and Martin Lake. Detailed findings are presented in the Tier I evaluation (Golder 2019b).
- **Confirmation of Attenuation/Immobilization:** Based on both mineralogical and chemical analysis, it is evident that attenuation of beryllium, cobalt, and lithium by aquifer materials is occurring. Iron, capable of forming (hydr)oxide or amorphous phases that facilitate metals attenuation (Dzombak and Morel 1990), was identified in all aquifer solids samples (in agreement with modeling indicating ferrihydrite precipitation). The

ubiquitous presence of aluminum, in the form of aluminum oxides and clay minerals, provides an additional well-studied attenuation reservoir (Karamalidis and Dzombak 2011; Prodromou 2016; Uddin 2017). Thus, aquifer solids samples from the Ash Pond Area demonstrate sequestration of beryllium, cobalt, and to a lesser extent, lithium is occurring.

The Tier II and III evaluation presented in this document builds upon the results of the Tier I evaluation by undertaking the following:

- Characterization of temporal and geographical trends, where present, to estimate site-wide attenuation rates using temporal and spatial trends in groundwater quality data.
- Geochemical modeling to determine the aqueous speciation of beryllium, cobalt, and lithium, and evaluate saturation indices of minerals relevant to their attenuation.
- Determination of the capacity of different mechanisms to attenuate beryllium, cobalt, and lithium, including adsorption, precipitation and co-precipitation, and physical attenuation (dilution/dispersion).
- Geochemical modeling to assess the stability and reversibility of attenuation due to adsorption.

Additionally, the results from the following analyses described in the Tier I evaluation for aquifer solids are utilized as part of the Tier II and III evaluation:

- Mineralogical analysis of aquifer solids to identify and quantify the major mineral components.
- Chemical analysis and sequential extraction procedure (SEP) of aquifer solids to quantify the total metal content and identify the environmentally available fractions of metals.

The approach to and results of the Tier II and Tier III evaluation are presented in the next sections to establish a basis for the likely success of MNA at the MLSES Ash Pond Area.

3.0 MODELING APPROACH

3.1 General Approach

3.1.1 Estimation of Attenuation Rates

To evaluate the attenuation of beryllium, cobalt, and lithium in groundwater at the Ash Pond Area and to assess the rate of attenuation, the point decay method (Newell et al. 2009) was applied. The point decay method is used to determine the rate at which a constituent's concentrations are increasing or decreasing in groundwater at a single well between sampling events. This method can thus be used to predict when the constituent's concentrations will fall back below regulatory limits.

Equation 1 describes first-order decay for a constituent:

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

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

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

Groundwater quality data from the upgradient and downgradient wells collected from October 2015 to October 2020 were used to determine the mean first-order decay rate for each constituent of interest. Due to variable detection limits, results that were reported as below detection were not used in the point decay analysis. Equation 1 and the mean first-order decay rate were used to calculate the number of years required for beryllium, cobalt, and lithium concentrations greater than their respective GWPS to decrease below those thresholds.

3.1.2 Geochemical Speciation Modeling

Baseline geochemical modeling was conducted to evaluate general groundwater, lake water, and pond water 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 beryllium, cobalt and lithium. 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 (Allison et al. 1991).

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, cobalt, and lithium) and trilinear plots (also known as Piper plots) displaying the relative abundance of major ions. The Minteq.v4 database was used as the basis for the Pourbaix diagrams.

3.1.3 Groundwater Modeling

Golder developed a three-dimensional numerical groundwater model based on the MODFLOW groundwater-flow source code created by the USGS (McDonald and Harbaugh 1988) using Visual MODFLOW (Version 4.6). The groundwater model simulates steady-state groundwater flow conditions in the Ash Pond Area. The results of the groundwater model were incorporated into the reactive transport geochemical model discussed in Section 3.1.3. The groundwater model was developed based on:

- Natural hydrologic boundaries wherever possible.
- Ground surface topography, lake bathymetry, and pond geometries.
- Geologic layers with representative structural properties based on boring logs.
- Hydraulic properties of geologic layers based on historical aquifer tests conducted at the site.
- Historical groundwater elevation measurements.

Details on key parameters used to develop the groundwater model are presented in Appendix B.

3.1.4 Predictive Geochemical Modeling

Additional geochemical modeling was performed to assess viable attenuation mechanisms and predict the quantity and stability of the attenuated constituents of interest. To do so, Golder used PHAST, a three-dimensional reactive transport modeling computer program developed by the USGS that simulates

multicomponent reactive solute transport in a three-dimensional saturated groundwater flow system (Parkhurst et al. 2010). PHAST is a versatile groundwater flow and solute-transport simulator with capabilities to model a wide range of equilibrium and kinetic geochemical reactions. The flow and transport calculations are based on a modified version of HST3D that is restricted to constant fluid density and constant temperature. PHAST can be used to simulate both confined and unconfined flow using both a steady state and transient flow solution. The geochemical reactions are simulated with the geochemical model PHREEQC-RM (based on PHREEQC version 3.4), which is embedded in PHAST, resulting in a full three-dimensional reactive transport model. In the application used here, parameters from the site groundwater flow model developed in MODFLOW (i.e. hydraulic conductivities of layers, model layering, model architecture, water balance, groundwater velocities, and fluid head calculations) were directly used as initial and target model values to ensure seamless model coordination with MODFLOW, without the need to rebuild a groundwater flow model independently in another software package capable of simulating geochemical reactions.

3.1.5 Source Control Modeling

The WAP, EAP and NSP were historically considered unlined surface impoundments under §257.71(a)(1)(ii) of the CCR Rule; however, the ponds were constructed with the following liner systems:

- The WAP is constructed with a liner consisting of an 18-inch compacted clay liner, overlain by two 60-mil High-density Polyethylene (HDPE) geomembrane liners with a geonet drainage layer between the geomembranes. A 4-inch concrete revetment mat is installed on top of the upper geomembrane liner.
- The EAP is constructed with a liner consisting of an 18-inch 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 concrete revetment mat is installed on top of the upper geomembrane liner.
- The NSP is constructed with liner consisting of two 60-mil HDPE geomembrane liners with a geonet drainage layer between the geomembranes, overlain by a 4-inch concrete revetment mat.

To satisfy the requirements of §257.71(a)(1)(ii) of the CCR Rule, the WAP, EAP and NSP are being or have been relined as follows:

- The existing liner system will remain in place.
- A 6-inch soil levelling layer will be placed on top of the revetment mat.
- A geosynthetic clay liner (GCL) will be placed on top of the soil leveling layer.
- A 60-mil HDPE geomembrane will be placed on top of the GCL.

The EAP was relined in 2020 as described above. It is anticipated that relining of the WAP will be completed in 2021 and NSP completed in 2022. The new WAP, EAP and NSP liner systems are assumed to achieve a k (conductivity) of 10^{-9} cm/sec and a porewater flux rate from the WAP, EAP, and NSP of zero at year 2021.

Source control (i.e. reduction in leakage through the WAP, EAP and NSP) was modeled in PHAST using the same parameters and site layout from the three-dimensional numerical groundwater flow model. Calibration of the geochemical parameters is discussed in Section 3.2. Following model calibration, the predictive modeling simulated the re-lining of the WAP, EAP, and NSP based on the aforementioned liner with a k (conductivity) value of 10^{-9} cm/sec and a porewater flux rate from the WAP, EAP, and NSP of zero at year 2021. The hydraulic head of the WAP, EAP, and NSP was decreased to match the hydraulic head of surrounding cells outside the CCR

Units, simulating the drying of the ash as the new liners are installed. The PHAST model was then run forward for 50 years to assess potential future constituent migration, natural attenuation, and groundwater conditions.

3.1.6 Mineral Precipitation and Co-precipitation

The potential for mineral precipitation was assessed in PHAST by PHREEQC using a saturation index (SI) calculated according to Equation 3.

$$SI = \log (IAP/Ksp) \qquad \text{(Equation 3)}$$

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

Co-precipitation was evaluated based on published literature and known association between minerals and the constituents of interest. For example, cobalt is known to co-precipitate with iron oxyhydroxides as well as adsorb to Hfo (Nordstrom and Alpers 1999). Therefore, minerals identified by PHAST/PHREEQC to be at equilibrium (SI > -0.5) were evaluated for their potential to host beryllium, cobalt, and lithium.

3.1.7 Adsorption Capacity and Attenuation

Adsorption is an important mechanism by which constituents in groundwater can be attenuated. The adsorptive partitioning between dissolved and solid phases was simulated during baseline modeling using PHREEQC and for predictive modeling using PHAST with a two-layer surface complexation model (SCM). The SCM approach is described in Davis and Kent (1990), with additional parameterization based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2011) utilizing iron (hydrous ferric oxide [Hfo]) as ferrihydrite [$Fe(OH)_{3(am)}$], and aluminum (hydrous aluminum oxide [Hao]) as gibbsite [$Al(OH)_{3(am)}$], as adsorbing surfaces.

The amount of Hfo and Hao available at the site for attenuation was based on the amorphous and metal hydroxide phase iron and aluminum concentrations measured in the SEP as described in the Tier I evaluation (Golder 2019b). The minimum, mean, and maximum iron and aluminum concentrations in aquifer solids samples were used in the adsorption models to capture the range of expected site concentrations. The Hfo and Hao surface properties (i.e. surface area, site density, and types of surface sites) from Dzombak and Morel (1990) and Karamalidis and Dzombak (2011) were used to quantify the iron and aluminum adsorption sites per mole of mineral.

The calculation methodology of Appelo and Postma (2010) was used to determine the specific quantity of sites on each mineral surface type as a function of the amount of mineral available to participate in these reactions. The methodology assumes the number of surface sites (sites) equals the product of the moles of iron ([Fe]) and the moles of sites per mole of iron ([sites]/[Fe]= 0.2 moles of sites per mole of iron). To determine the amount of ferrihydrite available for sorption, the Appelo and Postma methodology further assumes the mass of ferrihydrite (M_{HFO}) in grams (g) available equals the product of the [Fe] and the molecular weight of ferrihydrite (MW_{HFO} = 88.85 g/mole). The same approach was used to calculate the number of sites from gibbsite, assuming the

[sites]/[Al] is 0.41 moles of sites per mole of aluminum and the molecular weight of gibbsite is 78.003 g/mole. The range of Hfo and Hao present in soils at the Ash Pond Area with associated calculations is presented in Table 1.

The thermodynamic database Minteq V.4, described in Section 3.1.1, was modified for adsorption modeling because new and updated thermodynamic data have been released in the scientific literature. These new data are important to include as they allow further refinement of potential reactions, or for correction of previous data that may have been less accurate or more broadly defined. For the geochemical modeling of the Ash Pond Area, numerous updates to the database were made, including the addition of data relating to partitioning coefficients for metals on gibbsite, developed by Karamalidis and Dzombak (2011). The database does not contain partitioning coefficients for ferrihydrite or gibbsite for lithium. Thus, the potential for lithium adsorption could not be assessed and modeling of lithium attenuation primarily focused on physical processes.

Table 1: Calculations of ferrihydrite and gibbsite surface parameters for predictive modeling

Parameter	Units	Ferrihydrite			Gibbsite		
		Minimum	Mean	Maximum	Minimum	Mean	Maximum
Geometric Mean of Aquifer Solids Composition	mg/kg X	2357	3900	4900	880	1700	1800
	mmol X	42.21	69.84	87.74	32.61	63.00	66.71
	mol X	4.22E-02	6.98E-02	8.77E-02	3.26E-02	6.30E-02	6.67E-02
Surface Site Concentration	mol weak sites / mol X	0.2	0.2	0.2	0.41	0.41	0.41
	mol strong sites / mol X	0.005	0.005	0.005	---		
Surface Sites	mol weak	8.4E-03	1.4E-02	1.8E-02	1.3E-02	2.6E-02	2.7E-02
	mol strong	2.1E-04	3.5E-04	4.4E-04	---		
Mass of Ferrihydrite or Gibbsite	grams	3.75	6.20	7.80	2.90	5.60	5.93

Notes:
X = Fe or Al depending on the mineral
Gibbsite only has one site 'type'

3.2 Model Calibration

Calibration of the unconfined flow reactive transport model involved adjusting the flux from the WAP, EAP, and NSP, the concentration of the constituents of interest (beryllium, cobalt, and lithium), and the starting date for ash placement in each impoundment. This calibration process simulated the gradual addition of ash to the impoundments and was generally based on records of impoundment construction and certification (PBW 2017). The lithium flux from the impoundments was used as a near-conservative tracer to set the initial date of establishment, calibrate the flux, and to validate the flow solution used in the reactive transport modeling was similar to that used for groundwater modeling efforts. The preliminary hydraulic head for PHAST targeted the steady-state solution imported from MODFLOW and achieved a coefficient of determination (R^2) value of 0.9995 based on 150 sample point locations (Figure 2).

A hypothetical source solution was developed to represent the water quality in the CCR Units (WAP, EAP, and NSP). Beryllium, cobalt, and lithium concentrations in the hypothetical source solution were increased relative to actual reported concentrations to achieve reasonable calibration with measured values in downgradient wells.

Beryllium and cobalt were not measured above their respective detection limits in pond water samples during the May 2019 and 2020 sampling events (Appendix A), but their concentrations were artificially increased to 0.070 and 3.0 mg/L, respectively in the hypothetical source solution. Lithium was measured at 0.119 to 0.124 mg/L in pond water, but for modeling purposes was increased to 1.4 mg/L to achieve calibration.

The surface site densities for Hfo and Hao were adjusted for non-conservative parameters (beryllium and cobalt) within the range of the measured minimum and maximum aluminum and iron concentrations in aquifer solids for calibration. Background water quality was based on water quality results from background monitoring well H-33 and was set to equilibrium with adsorptive surfaces. Calibration results for beryllium, cobalt, and lithium demonstrated good agreement in downgradient monitoring wells (Table 2); however, historical variability in source concentrations and volumes of ash additions to the WAP, EAP, and NSP has likely occurred. In addition, compositional heterogeneity in terms of aquifer characteristics is also likely to be present along the groundwater flow pathway but is not captured within the model. However, overall, use of the minimum surface site concentrations of Hfo and Hao calculated in Table 1 showed the best agreement with the non-conservative constituent target concentrations presented in Table 2.

Table 2: Calibration of parameters in PHAST for predictive modeling as compared to the target values measured in 2020 in downgradient wells

Downgradient Monitoring Well	Units	Beryllium		Cobalt		Lithium	
		Target Value	Modeled	Target Value	Modeled	Target Value	Modeled
H-28	mg/L	0.0051	0.0043	0.145	0.165	0.173	0.170
H-29	mg/L	0.0013	0.0046	0.377	0.408	0.164	0.158
H-31	mg/L	0.0092	0.0207	0.208	0.132	0.120	0.122
H-32	mg/L	0.0061	0.0021	0.178	0.037	0.095	0.095

The Peclet and Courant numbers included in the reactive transport modeling were used to evaluate model validity and control numerical dispersion. These values are calculated based on the cell size, time step, dispersivity, and average velocity of groundwater in the model. Equation 4 was used to control numerical dispersion using an upstream-in-space and backwards-in-time differencing solution based on a derivation of the Peclet and Courant numbers:

$$\frac{\Delta X}{2} + \frac{V_x \Delta t}{2} \ll \alpha \qquad \text{(Equation 4)}$$

Where:

ΔX= Cell size (50 ft)

V_x= Average Velocity (4 feet/year)

Δt = Timestep (0.25 years)

α= Longitudinal dispersivity (30 ft)

3.3 Long-Term Stability of Attenuated Constituents

The long-term stability of constituent attenuation and potential for re-mobilization was evaluated using the results of 50-year predictive modeling. Specifically, the responses of the constituents of interest to modeled changes in pH and redox of groundwater at downgradient wells were evaluated. Variations in pH and redox are the most likely changes in groundwater chemistry that will occur in an aquifer over time, affecting the stability of the non-conservative constituents of interest (ITRC 2010). For example, if the pH or redox should decrease substantially over time, causing the dissolution of ferrihydrite, re-mobilization of adsorbed beryllium and cobalt would be likely. In contrast, if pH were to increase substantially (>8), cobalt precipitation as cobalt hydroxide will enhance the long-term stability of cobalt attenuation, likely maintaining low levels of cobalt in groundwater (Nordstrom and Alpers 1999; Smith 1999). The long-term stability and reversibility of attenuation were also evaluated for scenarios involving complete source control (i.e. the lining of the ash ponds), reducing any flux from the WAP, EAP, and NSP.

3.4 Data Handling and Geochemical Modeling Assumptions

Assumptions related to data handling practices and geochemical modeling were as follows:

- **Groundwater continuity:** Groundwater, lake water, and pond water quality data from sampling events conducted May 2019 to October 2020 were evaluated. These sampling events were selected because all wells related to the Ash Pond Area and lake water and pond water were sampled and analyzed for the full suite of parameters described in the Tier I evaluation during these sampling events, and the resulting data are assumed to provide a comprehensive overview of Ash Pond Area conditions. Trend analysis of pH, beryllium, cobalt, and lithium in groundwater made use of all available sampling events from each well (up to 14 samples from some wells), dating back to October 2015.
- **Background groundwater chemistry:** Groundwater samples collected from H-33 were assumed to represent natural background conditions for the purpose of geochemical and predictive modeling.
- **Pond and lake water chemistry:** The pond and lake water samples collected from the East CCR unit pond and adjacent lake were assumed to be representative of the ash ponds and Martin Lake, respectively.
- **Redox values:** Oxidation-reduction potential (ORP) values measured in the field were converted to redox potential (Eh) by adding 200 millivolts (mV) to the field-measured values as per YSI (2015).
- **Non-detect values:** Constituents with concentrations less than their respective method detection limits were assumed to have a concentration equal to the reporting limit in model simulations.
- **Total recoverable concentrations:** Total recoverable fraction results were used for geochemical modeling.
- **Charge balance:** Groundwater compositions with charge balance errors less than 10% were considered valid. Compositions with charge balance errors greater than 10% were included in the assessment but would be considered less reliable.

4.0 MODELING RESULTS

4.1 Hydrogeology

The geology of the Ash Pond Area consists of an upper zone of partially saturated sandy silt and clay that is generally 30 to 40 feet thick, and a lower zone of saturated fine sand and silty sand that is generally 5 to 20 feet thick (PBW 2017). The lower zone of fine sand and silty sand represents the uppermost aquifer at the site. The

groundwater model consisted of two-layers representing the two geological zones identified at the site. The model incorporated site-specific characteristics such as ground surface topography, groundwater elevation measurements, geometries and water elevations of the Ash Ponds and Martin Lake, and hydraulic characteristics of the site geologic units based on historical aquifer tests conducted as part of an Affected Property Assessment of the Ash Pond Area under the regulatory authority of the Texas Commission on Environmental Quality (TCEQ) (PBW 2011). Groundwater potentiometric heads in the model were calibrated based on groundwater elevations and inferred flow conditions observed at the site; specifically, to conditions observed during the September 2019 CCR groundwater monitoring event. Consistent with observations during the September 2019 and other groundwater monitoring events, groundwater was modeled to generally flow from west to east toward Martin Lake, with an average groundwater flow velocity in the uppermost aquifer of approximately 4 feet per year. Additional groundwater model details are provided in Appendix B.

4.2 Capacity of Attenuation Mechanisms

4.2.1 Adsorption to Iron and Aluminum Oxyhydroxides

The Hfo and Hao surface area and sorption site calculations for the minimum, mean, and maximum iron and aluminum concentrations in aquifer solids are presented in Table 2. Adsorption modeling in PHAST revealed adequate capacity to attenuate both beryllium and cobalt based on current levels measured in downgradient monitoring wells. The term “adequate”, as used in this document, refers to the capacity needed to attenuate constituents in groundwater to a level that meets the site-specific GWPS (ITRC 2010). Lithium attenuation by Hfo and Hao was not modeled due to a lack of adsorption constants and the general understanding that lithium behavior in groundwater is near-conservative (e.g., Hem 1992). Figures 3 and 4 show the modeled concentrations over time for beryllium and cobalt, respectively, for the four downgradient monitoring wells.

Modeled attenuation of beryllium and cobalt onto aquifer solids (0.05 to 0.3 mg/kg and 0.5 to 2.3 mg/kg, respectively), using minimum surface site densities (Hfo and Hao), showed the best agreement with the range of beryllium and cobalt concentrations (0.1 to 0.2 mg/kg and 0.5 to 1.8 mg/kg, respectively), measured in SEP steps 3 and 4 (Golder 2019b). The lack of beryllium and cobalt in pond porewater further supports adequate attenuation capacity exists downgradient of the CCR Units. Modeling of mineral precipitation also identified consistent equilibrium of groundwater with ferrihydrite in all downgradient wells from May 2019 and May 2020 (events where iron was measured in groundwater; Appendix A). Thus, if the concentrations of beryllium and cobalt in porewater in the CCR Units remain below the GWPS (or below detection limits, as was the case during the most recent sampling), then the downgradient capacity to attenuate these constituents by iron and/or aluminum oxyhydroxides will not be exceeded.

4.2.2 Co-precipitation

In addition to adsorption, co-precipitation, or the direct incorporation of trace metals such as beryllium or cobalt into precipitated iron oxide-oxyhydroxides, has been well studied in literature (e.g., Butt et al. 2000; Dzombak and Morel 1990; Smith 1999). For the aquifer solids analyzed by sequential extraction described in the Tier I evaluation (Golder 2019b), all samples reported higher concentrations of cobalt in the combined amorphous and metal hydroxide phases than indicated by the adsorption modeling. This suggests that cobalt may also be attenuated during the formation of ferrihydrite as opposed to following its formation (Butt et al. 2000; Tebo et al. 2004). Some cobalt was also identified by SEP to be associated with carbonate minerals, also likely due to co-precipitation.

Beryllium was also found to be associated with amorphous and metal hydroxide phases, but to a lesser degree. This suggests that beryllium may also be attenuated during the formation of ferrihydrite. Co-precipitation is not considered a relevant attenuation mechanism for lithium.

4.2.3 Physical Attenuation

Figure 5 presents the predicted concentrations over time for lithium at downgradient monitoring wells, accounting for the dilution and dispersion downgradient of the CCR Units. The highest concentration of lithium in porewater was measured at 0.124 mg/L in May 2020, which was below the established GWPS of 0.177 mg/L for the Ash Pond Area. To achieve optimal calibration for lithium in the PHAST model, a simulated lithium source value of 1.4 mg/L (Table 2) was needed, resulting in a calculated range of downgradient physical attenuation factors between 5.6 and 74.8 which occurred at well H-31 (measured concentrations ranging from 0.0187 to 0.249 mg/L). Thus, at current porewater concentrations, at just the minimum dilution factor of 5.6, physical attenuation alone should be adequate to reduce lithium concentrations to below the GWPS across the Ash Pond Area, with source control (Table 2).

4.2.4 Attenuation Rates

The results of the point decay analysis for groundwater at background and downgradient wells between October 2015 and October 2020 (the CCR groundwater monitoring period) are provided in Table 3, as average site attenuation rates. This evaluation reveals that, despite concentrations generally increasing or remaining near-constant in **background** wells over time (as indicated by positive point decay constants), beryllium, cobalt, and lithium concentrations in **downgradient** wells have decreased (negative point decay constants) over that same monitoring period. The average downgradient decay rates can be used to estimate the number of years it would take for elevated groundwater concentrations to decrease to the GWPS based on current trends. Use of maximum concentrations of beryllium, cobalt and molybdenum reported from downgradient monitoring wells in 2020 indicates that it will take 17 years, 2 years, and <1 year, respectively, to attenuate to concentrations below their respective GWPS based on these decay rates. Of note, lithium is not currently categorized as an SSL at any well even though monitoring well H-31 exceeded its GWPS in May 2020 before decreasing to below the GWPS by October 2020.

Table 3: Average Point Decay Trend Constants for Beryllium, Cobalt, and Lithium at the Ash Pond Area

Constituents	Background Wells (yr^{-1})	Downgradient Wells (yr^{-1})	GWPS (mg/L)	Maximum Measured 2020 Values (mg/L)	Time to Achieve Compliance (years)
Beryllium	0.77	-0.12	0.004	0.0331	17
Cobalt	0.04	-0.87	0.0564	0.449	2
Lithium	-0.03	-0.38	0.177	0.249	<1

Predictive modeling in PHAST used a more conservative approach to estimating time to compliance by taking into account source control and increased source concentrations needed to achieve model calibration as previously described (Table 2). Based on this approach, estimated times to attenuation to concentration below GWPS increased to 30, 50, and 50 years for beryllium, cobalt, and lithium, respectively. This is due to the elevated source values for cobalt and lithium (3.0 and 1.4 mg/L) required to achieve model calibration. The simulated source values used were 1,000 times (cobalt) and nearly 10 times (lithium) higher than actual measured

porewater values. Therefore, PHAST modeling presents the most conservative approach to determining the rate of attenuation. The actual time in which significant attenuation can likely be achieved falls between the two approaches used (i.e. the point decay method and the PHAST method).

4.3 Long-Term Stability of Attenuated Constituents

The expected trends over time for pH and Eh are presented in Figures 6 and 7, respectively. Variations in pH and Eh are arguably the most important factors, other than physical attenuation, controlling the long-term stability of beryllium and cobalt. Predictive modeling in PHAST suggests that pH and Eh in the Ash Pond Area will remain stable. The pH, initially ranging from approximately 6.5 to 6.7 is simulated to gradually stabilize at 6.6, whereas Eh, initially ranging from approximately 495 to 505 mV, will only decrease slightly to 490 mV. At these predicted pH and Eh ranges, ferrihydrite, the primarily mechanism for attenuation of beryllium and cobalt, is modeled to remain stable across the Ash Pond Area.

The long-term stability of beryllium, cobalt, and lithium can be summarized as follows:

- **Beryllium:** For the range of pH and Eh values predicted at the site in the 50 years after closure and source control, beryllium levels are predicted to remain stable or show a decreasing trend (Figure 3). It is not anticipated that attenuated beryllium will re-mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the Ash Pond Area, Stenge and Peterson (1989) list a partitioning coefficient of 70 to 80,000 L/kg for beryllium while Hfo and Hao will remain stable. Thus, with source control and stable pH and Eh, long-term stability of beryllium is expected.
- **Cobalt:** Attenuated cobalt should remain stable based on the range of pH and Eh values predicted at the site in the 50 years after closure and source control (Figure 4). It is not anticipated that attenuated cobalt will mobilize and exceed the GWPS in the future once compliance is achieved. For the anticipated pH range of the Ash Pond Area, Stenge and Peterson (1989) list a partitioning coefficient of 1.9 to 200 L/kg for cobalt while Hfo and Hao will remain stable. Additionally, the stability of ferrihydrite will also ensure any co-precipitated cobalt will remain sequestered. Thus, with source control and stable pH and Eh, long-term stability of cobalt is anticipated.
- **Lithium:** Lithium long-term stability is primarily controlled by physical attenuation. Currently, lithium is not reported at an SSL at the Ash Pond Area and porewater lithium is below the GWPS. Therefore, with the addition of source control, it is not anticipated that the long-term stability of lithium will be a concern at the Ash Pond Area.

5.0 TIER II EVALUATION

The purpose of the Tier II evaluation is to “Identify mechanisms and rates of the operative attenuation process” (USEPA 2007a). Based on this definition, the following modeling results and observations support MNA as a viable corrective measure for the Ash Pond Area CCR Units:

- **Adsorption Capacity Modeling:** PHAST modeling results show that adsorption is likely attenuating beryllium and cobalt downgradient of the CCR Unit. This is concluded based on equilibration of site-specific groundwater compositions with the range of Hfo and Hao concentrations observed in SEP results of Ash Pond Area aquifer solids. Predictive modeling (Figures 3, 4, and 5) also demonstrates the aquifer’s capacity to adsorb constituents from the CCR Units at much higher levels than have been measured to date. In addition to metal oxyhydroxides, clay minerals and/or particulate organics can also act as a substrate for attenuation (Prodromou 2016; Uddin 2017), but this mechanism was not included in the current evaluation.

The model findings are supported by the results of the sequential extraction testing. The presence of beryllium, cobalt, and to a minor degree lithium, in the amorphous and metal oxyhydroxide fractions of soils indicates that adsorption is occurring across the monitored area downgradient of the CCR Unit.

- **Co-precipitation:** In addition to adsorption, co-precipitation or the direct incorporation of trace metals into precipitated iron oxide-oxyhydroxides is a well-documented process. For the aquifer solids analyzed by sequential extraction (Golder 2019b), all samples reported higher concentrations of cobalt in the amorphous and metal hydroxide phases than indicated by adsorption modeling. Beryllium was also found to be associated with amorphous and metal hydroxide phases, but to a lesser degree. This suggests that beryllium and cobalt may also be attenuated during the formation of ferrihydrite. Cobalt was also identified by SEP to be associated with carbonate minerals in one sample, likely the result of co-precipitation. Co-precipitation is not considered a relevant attenuation mechanism for lithium.
- **Estimated Ash Pond Area Attenuation Rates:** Groundwater concentrations of beryllium, cobalt, and lithium are decreasing in downgradient monitoring wells over time, resulting in negative calculated point decay rates. Using the mean decay rate, maximum concentrations of beryllium, cobalt, and lithium observed in downgradient monitoring wells in 2020 would take approximately 17 years, 2 years, and <1 year, respectively, to attenuate to below their respective GWPS. Lithium concentrations in downgradient monitoring wells are already below the GWPS upon the most recent October 2020 sampling event.
- **Dilution and Dispersion Modeling:** Lithium levels at downgradient monitoring wells can be used to estimate the degree of dilution and dispersion occurring downgradient of the CCR Units. Using a source value for lithium of 1.4 mg/L in the PHAST model, a minimum and maximum downgradient physical attenuation factor of 5.6 and 74.8, respectively, were determined. Thus, at current porewater concentrations, at just the minimum dilution factor of 5.6, physical attenuation alone would be adequate to reduce beryllium, cobalt, and lithium levels to below their respective GWPS across the Ash Pond Area.

Based on these findings, beryllium, cobalt, and lithium are considered to be candidates for an MNA remedy application and deemed to meet the criteria for Tier II MNA in accordance with USEPA guidance (USEPA 2007a and 2007b).

6.0 TIER III EVALUATION

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

- **Adsorption Capacity Modeling:** Predictive modeling has demonstrated that porewater concentrations of beryllium, cobalt, and lithium could increase to 0.070, 3.0, and 1.4 mg/L, respectively, and levels at downgradient monitoring wells would attenuate to below their respective GWPS in a reasonable time frame. The time frame is defined here as ‘reasonable” when it is comparable to time frames associated with other active remediation options described in an assessment of corrective measures (Golder 2019a; ITRC 2010). However, beryllium and cobalt concentrations in pond water samples from the CCR Units across two sampling events were never above detection (<0.0003 and < 0.003 mg/L, respectively) while lithium levels were below its GWPS (0.177 mg/L). Therefore, based on the current concentrations in the CCR Units, the current concentrations observed in downgradient monitoring wells, and the anticipated source control

activities, it is concluded that the combined long-term attenuation from sorption, dilution, and dispersion is sufficient to attenuate the beryllium, cobalt, and lithium mass in the CCR Units to concentrations below the GWPS. In addition to aluminum and iron oxyhydroxides, beryllium and cobalt (as well as lithium to a minor extent) are known to be attenuated by other sorbents (e.g., manganese (hydr)oxides, clay minerals, and particulate organic matter) not included in the modeling, providing additional sorption capacity at the Ash Pond Area.

- **Stability of Constituents:** Stability modeling indicates that the pH and Eh (i.e. the factors controlling adsorption, which is the primary attenuation mechanism) will remain stable over time. As such, both the sorption effectiveness as well as the stability of the ferrihydrite adsorptive surfaces will remain constant. The stability of gibbsite, another adsorptive surface considered in the modeling, is less dependent on pH and Eh and will remain stable even if unexpected fluctuations in pH and Eh occur. The total aluminum and iron contents in aquifer solids, based on the Tier I evaluation (Golder 2019b), range from 20,000 to 62,000 mg/kg and 8,000 to 13,000 mg/kg, respectively, indicating a significant reservoir potentially available for attenuation, and a reservoir that is resilient to changes in pH and Eh. It should be noted that there is no historical basis to expect large future deviations in groundwater pH and/or redox conditions.

7.0 CONCLUSION

This report presents the results of a Tier II and III evaluation conducted to determine the feasibility of using MNA as a remedial strategy for beryllium, cobalt, and lithium at the Martin Lake Ash Pond Area CCR Units. This evaluation has been completed in accordance with guidance and best practices promulgated by the USEPA (USEPA 2007a and 2007b) and the ITRC (ITRC 2010). Based on the results of this evaluation, the following is concluded regarding the constituents of interest:

- Beryllium: Physical and chemical attenuation of beryllium is occurring. Beryllium levels in groundwater are stable, and the aquifer has adequate capacity to attenuate beryllium in a reasonable timeframe. Modeling indicates that beryllium attenuation will be efficient and stable in the long term. Beryllium in CCR unit porewater has never been measured above detection limits. Therefore, beryllium is considered a candidate for MNA at the Martin Lake Ash Pond Area.
- Cobalt: Physical and chemical attenuation of cobalt is occurring. Cobalt levels are stable, and the aquifer has adequate capacity to attenuate cobalt in a reasonable timeframe. Modeling indicates that cobalt attenuation will be efficient and stable in the long term. Cobalt in CCR unit porewater has never been measured above detection limits. Therefore, cobalt is considered a candidate for MNA at the Martin Lake Ash Pond Area.
- Lithium: Physical attenuation of lithium is occurring, levels are stable, and the aquifer has adequate capacity to attenuate lithium. Lithium in porewater of the CCR Units is currently below the GWPS. Therefore, lithium is considered a candidate for MNA at the Martin Lake Ash Pond Area.

It is recommended that a Tier IV evaluation be completed to design a long-term MNA monitoring plan in the event that MNA is selected as the final remedy for beryllium, cobalt, and lithium at the Martin Lake Ash Pond Area.

Signature Page

Golder Associates Inc.

PJ Nolan, PhD
Senior Project Geochemist

Patrick J. Behling, PE
Principal Engineer

William F. Vienne
Senior Hydrogeologist

https://golderassociates.sharepoint.com/sites/127388/project files/5 technical work/2000-martin lake ash ponds/tier ii report/final/final revised june 2021/19134019-r-reva-martin lake ash pond area_mna eval_06032021.docx

8.0 REFERENCES

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Figures

LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

REFERENCE(S)

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

CLIENT
LUMINANT
MARTIN LAKE SES ASH POND AREA

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

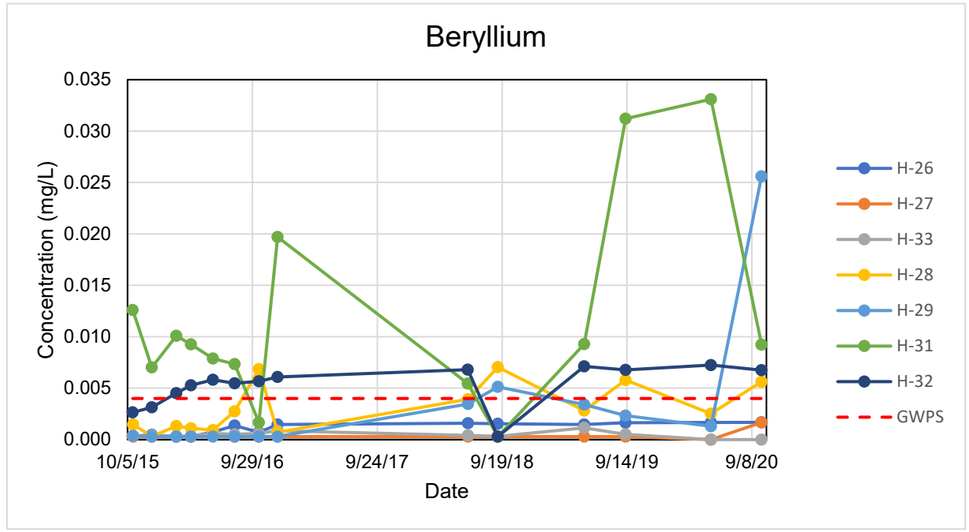
TITLE
DETAILED SITE PLAN - ASH POND AREA

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	EXHIBIT
19134019	0	1

(a)



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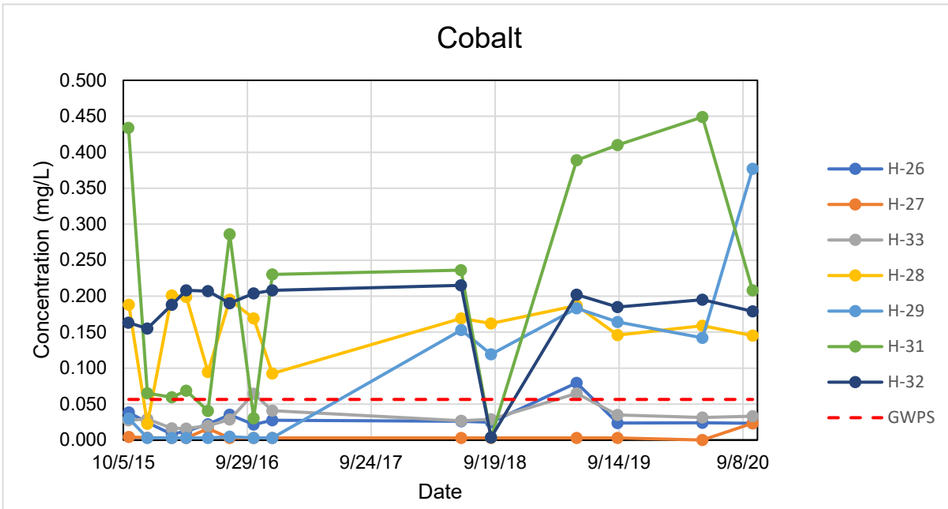

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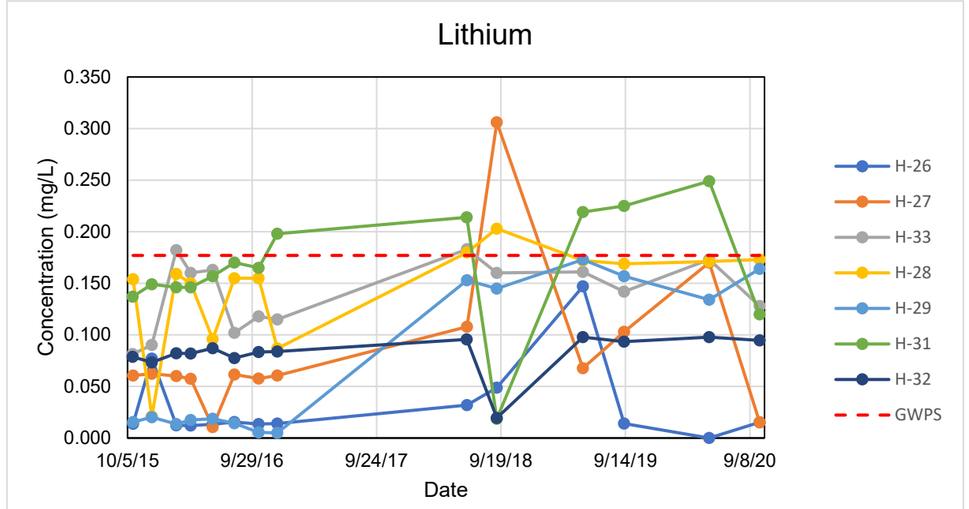


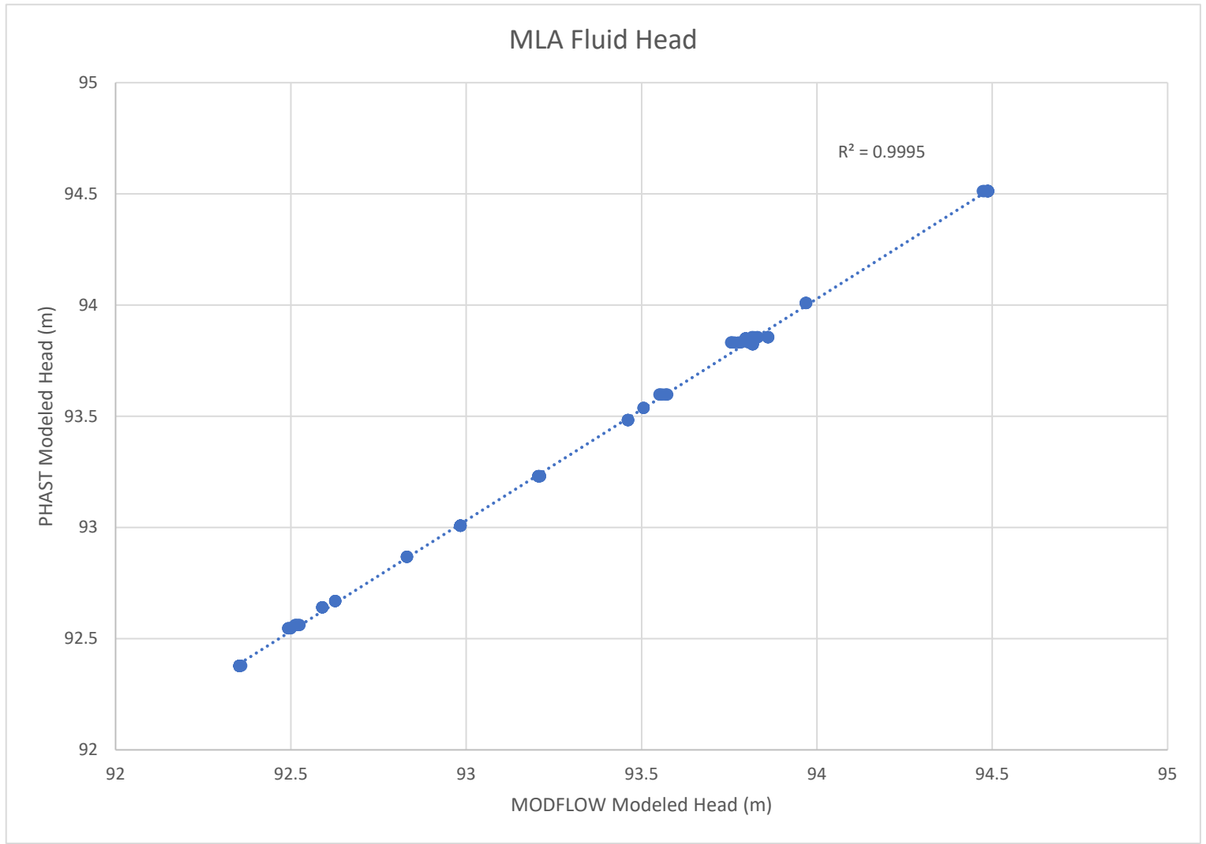
CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
CONSTITUENT TRENDS

PROJECT NO.	PHASE	REV.	FIGURE
19134019	2000	A	1a-c



CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
PHAST FLUID HEAD CALIBRATION

PROJECT NO.	PHASE	REV.	FIGURE
19134019	2000	A	2

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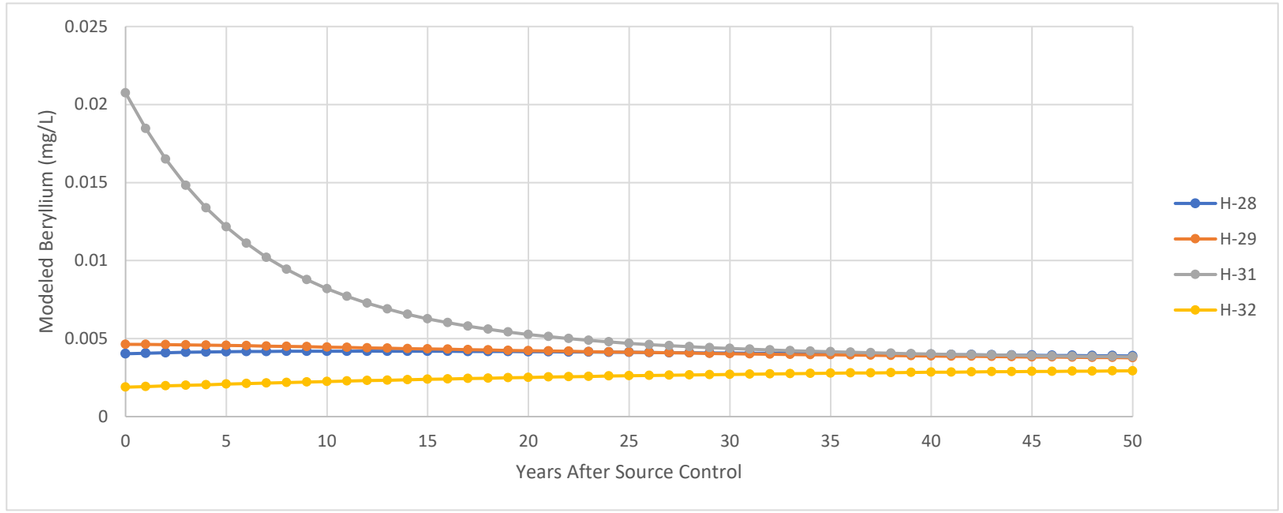

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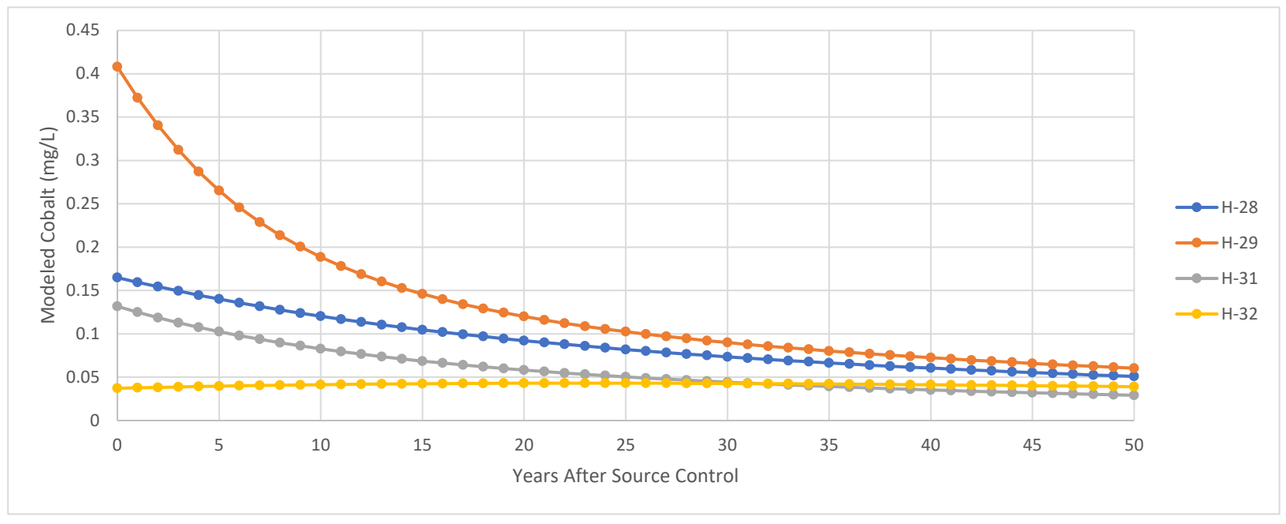


CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

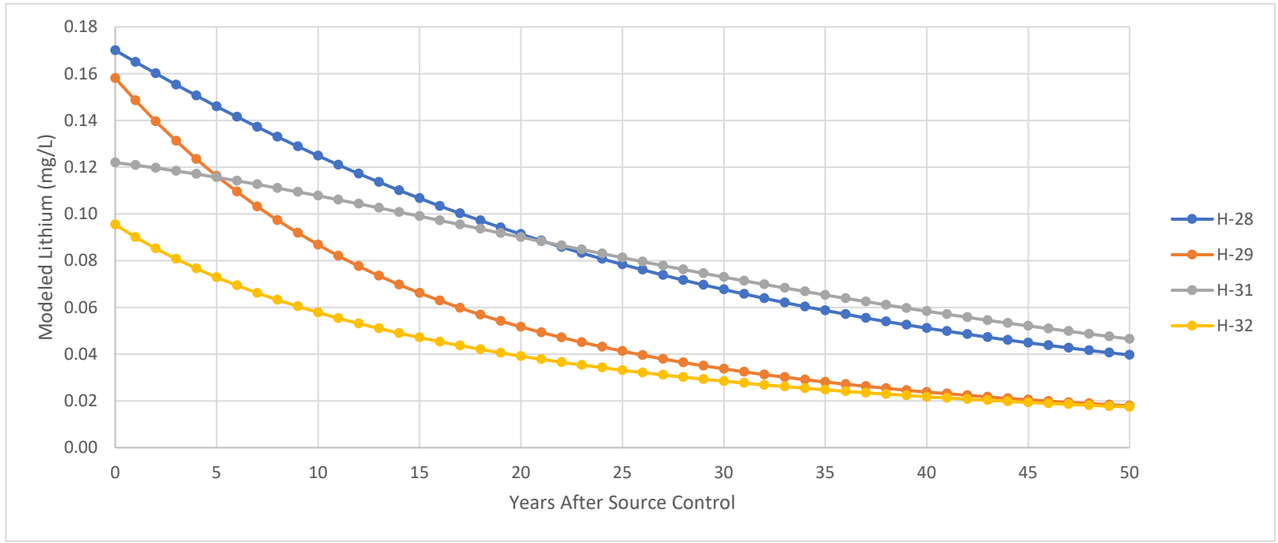
CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
GEOCHEMICAL MODELING RESULTS FOR (3) BERYLLIUM AND (4) COBALT

PROJECT NO.	PHASE	REV.	FIGURE
19134019	2000	A	3&4

(5)



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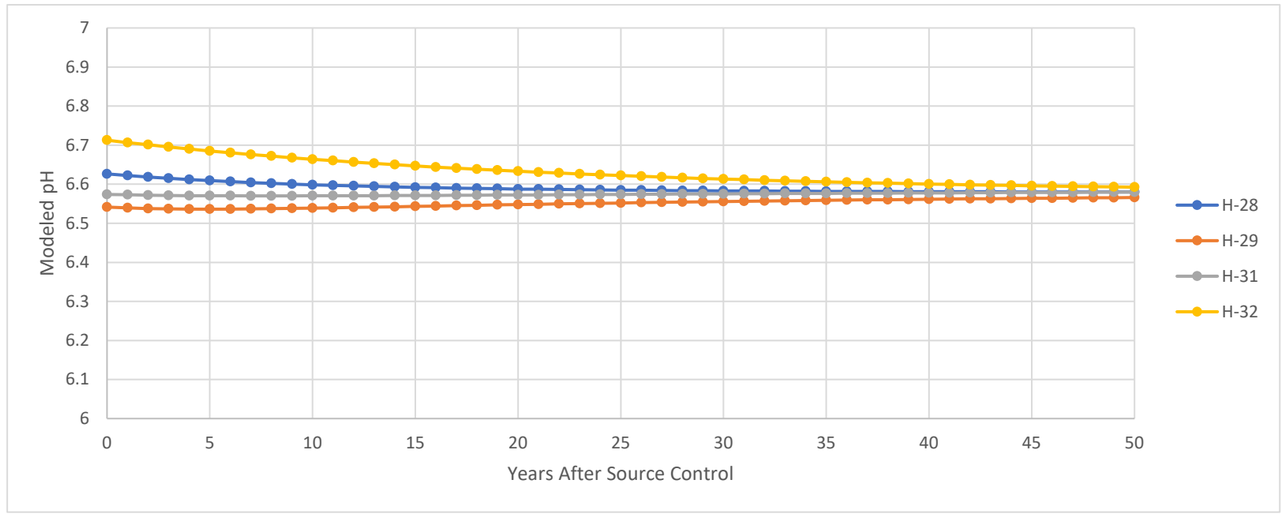


CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

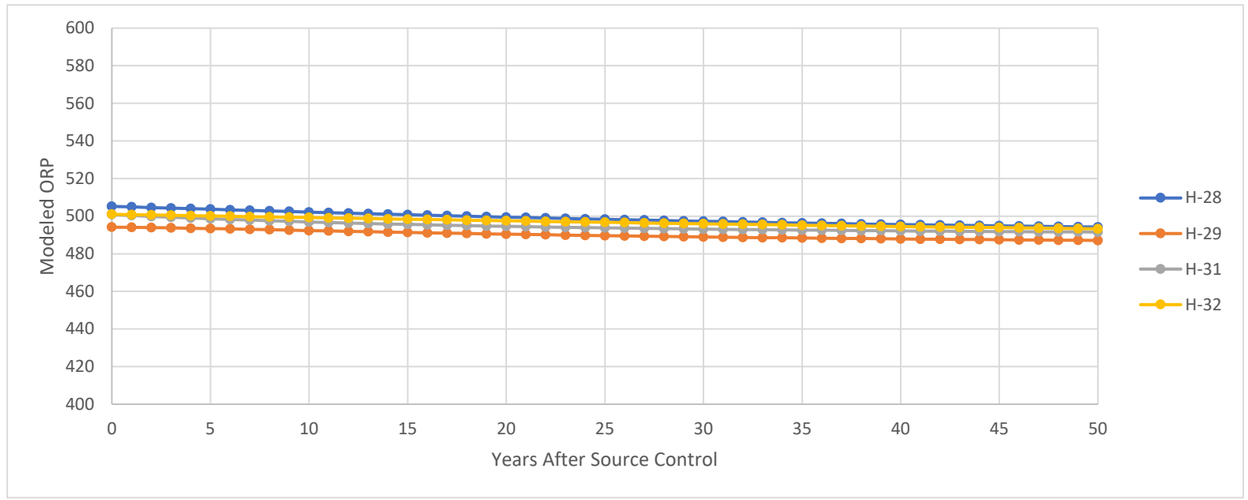
CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
GEOCHEMICAL MODELING RESULTS FOR (5) LITHIUM AND (6) pH

PROJECT NO.	PHASE	REV.	FIGURE
19134019	2000	A	**5&6**

(7)



CLIENT
LUMINANT
MARTIN LAKE SES
ASH POND AREA

CONSULTANT
GOLDER

PROJECT
TIER II AND TIER III MNA GEOCHEMICAL EVALUATION

TITLE
GEOCHEMICAL MODELING RESULTS FOR REDOX

PROJECT NO.	PHASE	REV.	FIGURE
19134019	2000	A	7

APPENDIX A

Laboratory Analytical Reports

May 26, 2020

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

Order No.: 2005111

RE: Luminant-MLSES-MNA

Dear Will Vienne:

DHL Analytical, Inc. received 7 sample(s) on 5/14/2020 for the analyses presented in the following report.

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

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

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-20-25

Table of Contents

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

CHAIN-OF-CUSTODY

№ 68280

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

DATE: 5-13-20 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 2005111
PROJECT LOCATION OR NAME: LUMINANT - MLSES - MNA
CLENT PROJECT #: 19134019 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: BTEX ❑ MTBE ❑ [METHOD 8021]	TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑	GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑	VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑	SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑	8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑	8270 O-P PEST ❑ 8082 PCB ❑ 8270 PCB ❑	8321 HERB ❑ T PHOS, AMMONIA ❑	METALS 6020 ❑ METALS 200.8 ❑ DISS. METALS ❑	RCRA ❑ TX11 ❑	PH ❑ HEX CHROM ❑ ALKALINITY ❑	CHLORIDE ❑ ANIONS	TCLP-SVOC ❑ VOC ❑ PEST ❑ HERB ❑	TCLP-METALS ❑ RCRA 8 ❑ TX-11 ❑ Pb ❑	RCI ❑ FLASHPOINT ❑ DGAS ❑	TDS ❑ TSS ❑ % MOISTURE ❑ CYANIDE ❑	NO_3 PO_4 Na Mg K Ferrous Fe Ferric Fe	FIELD NOTES
H-31	01	5-13-20	1010	W	P	5		X		X												X						X X	
H-32	02	↓	1100	W	P	5		X		X												X						X X	
H-27	03		1150	W	P	5		X		X												X						X X	
H-28	04		1240	W	P	5		X		X												X						X X	
H-29	05		1330	W	P	5		X		X												X						X X	
H-26	06		1535	W	P	5		X		X												X						X X	
H-33	07	↓	1630	W	P	5		X		X												X						X X	

RELINQUISHED BY: (Signature) DATE/TIME 5-13-20 1800 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 5.14.2020 0905 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: 3.1, 2.3, 4.1 THERM #: 78
CUSTODY SEALS: ❑ BROKEN ☒ INTACT ❑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder**

Date Received: **5/14/2020**

Work Order Number **2005111**

Received by: **JH**

Checklist completed by: _____ (Signature) 5/14/2020 (Date)

Reviewed by _____ (Initials) 5/14/2020 (Date)

Carrier name: FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**3.1** °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted?		Checked by

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

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Luminant-MLSES-MNA	**LRC Date:** 5/26/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005111**
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	**X**				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			**X**		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	**X**				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	**X**				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	**X**				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	**X**				
		3) Were calculations checked by a peer or supervisor?	**X**				
		4) Were all analyte identifications checked by a peer or supervisor?	**X**				
		5) Were sample detection limits reported for all analytes not detected?	**X**				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			**X**		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			**X**		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			**X**		
		9) If required for the project, TICs reported?			**X**		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			**X**		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			**X**		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	**X**				
		2) Were blanks analyzed at the appropriate frequency?	**X**				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	**X**				
		4) Were blank concentrations < MDL?	**X**				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			**X**		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	**X**				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	**X**				
		3) Were LCSs analyzed at the required frequency?	**X**				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	**X**				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	**X**				
		6) Was the LCSD RPD within QC limits (if applicable)?	**X**				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	**X**				
		2) Were MS/MSD analyzed at the appropriate frequency?	**X**				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		**X**			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	**X**				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	**X**				
		2) Were analytical duplicates analyzed at the appropriate frequency?	**X**				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	**X**				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	**X**				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	**X**				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	**X**				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	**X**				**R10-01**
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	**X**				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	**X**				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Luminant-MLSES-MNA	**LRC Date:** 5/26/2020
Reviewer Name: Angie O'Donnell	**Laboratory Work Order: 2005111**
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).
3 NA = Not applicable.
4 NR = Not Reviewed.
5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 25-28, 2019. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

05/26/20

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *26-May-20*

CLIENT: Golder
Project: Luminant-MLSES-MNA
Lab Order: 2005111

CASE NARRATIVE

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

Method SW6020B - Metals Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
Method M3500-FE D - Ferrous Iron Analysis (This parameter is not NELAP Certified)
Method M3500-FE D - Ferrous Iron Analysis (Calculated) (This parameter is not NELAP Certified)
Method M4500-P E - Orthophosphate Analysis

Exception Report R1-01

The samples were received and log-in performed on 5/14/2020. A total of 7 samples were received and analyzed. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals Analysis, the recovery of Sodium for the Matrix Spike and Matrix Spike Duplicate (2005111-01 MS/MSD) was above the method control limits. This is flagged accordingly in the QC Summary Report. This analyte was within method control limits in the associated LCS. No further corrective action was taken.

Exception Report R10-01

The Ferric Iron is calculated as the Total Iron minus the Ferrous Iron. The result of Ferrous Iron for Sample H-31 was slightly greater than the result of Total Iron. The result was within acceptable analytical variation limits. No further corrective action was taken.

DHL Analytical, Inc.

Date: *26-May-20*

CLIENT: Golder
Project: Luminant-MLSES-MNA
Lab Order: 2005111

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005111-01	H-31		05/13/20 10:10 AM	5/14/2020
2005111-02	H-32		05/13/20 11:00 AM	5/14/2020
2005111-03	H-27		05/13/20 11:50 AM	5/14/2020
2005111-04	H-28		05/13/20 12:40 PM	5/14/2020
2005111-05	H-29		05/13/20 01:30 PM	5/14/2020
2005111-06	H-26		05/13/20 03:35 PM	5/14/2020
2005111-07	H-33		05/13/20 04:30 PM	5/14/2020

Lab Order: 2005111
Client: Golder
Project: Luminant-MLSES-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005111-01A	H-31	05/13/20 10:10 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
	H-31	05/13/20 10:10 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-01B	H-31	05/13/20 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-31	05/13/20 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-01C	H-31	05/13/20 10:10 AM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-31	05/13/20 10:10 AM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-31	05/13/20 10:10 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-02A	H-32	05/13/20 11:00 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
	H-32	05/13/20 11:00 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-02B	H-32	05/13/20 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-32	05/13/20 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-02C	H-32	05/13/20 11:00 AM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-32	05/13/20 11:00 AM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-32	05/13/20 11:00 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-03A	H-27	05/13/20 11:50 AM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-03B	H-27	05/13/20 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-27	05/13/20 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-03C	H-27	05/13/20 11:50 AM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-27	05/13/20 11:50 AM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-27	05/13/20 11:50 AM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-04A	H-28	05/13/20 12:40 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-04B	H-28	05/13/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-28	05/13/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-04C	H-28	05/13/20 12:40 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-28	05/13/20 12:40 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-28	05/13/20 12:40 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-05A	H-29	05/13/20 01:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-05B	H-29	05/13/20 01:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359

Lab Order: 2005111
Client: Golder
Project: Luminant-MLSES-MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005111-05B	H-29	05/13/20 01:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-05C	H-29	05/13/20 01:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-29	05/13/20 01:30 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-29	05/13/20 01:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-06A	H-26	05/13/20 03:35 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-06B	H-26	05/13/20 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-26	05/13/20 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-06C	H-26	05/13/20 03:35 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-26	05/13/20 03:35 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-26	05/13/20 03:35 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
2005111-07A	H-33	05/13/20 04:30 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005111-07B	H-33	05/13/20 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	H-33	05/13/20 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
2005111-07C	H-33	05/13/20 04:30 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	H-33	05/13/20 04:30 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	H-33	05/13/20 04:30 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353

Lab Order: 2005111
Client: Golder
Project: Luminant-MLSES-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005111-01A	H-31	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-31	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:09 PM	UV/VIS_2_200518B
	H-31	Aqueous	M3500-Fe D	Ferrous Iron	96388	100	05/18/20 02:30 PM	UV/VIS_2_200518B
2005111-01B	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 12:46 PM	ICP-MS5_200519B
	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	50	05/20/20 01:19 PM	ICP-MS5_200520B
2005111-01C	H-31	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:26 PM	TITRATOR_200514B
	H-31	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 01:51 PM	IC2_200514A
	H-31	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:29 PM	UV/VIS_2_200514B
2005111-02A	H-32	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-32	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:09 PM	UV/VIS_2_200518B
	H-32	Aqueous	M3500-Fe D	Ferrous Iron	96388	5	05/18/20 02:30 PM	UV/VIS_2_200518B
2005111-02B	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 11:55 AM	ICP-MS5_200519B
	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 01:42 PM	ICP-MS5_200520B
2005111-02C	H-32	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:29 PM	TITRATOR_200514B
	H-32	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 03:27 PM	IC2_200514A
	H-32	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:30 PM	UV/VIS_2_200514B
2005111-03A	H-27	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-27	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:10 PM	UV/VIS_2_200518B
2005111-03B	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 11:57 AM	ICP-MS5_200519B
	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 01:44 PM	ICP-MS5_200520B
2005111-03C	H-27	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:38 PM	TITRATOR_200514B
	H-27	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 02:07 PM	IC2_200514A
	H-27	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:30 PM	UV/VIS_2_200514B
2005111-04A	H-28	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-28	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:11 PM	UV/VIS_2_200518B
2005111-04B	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 11:59 AM	ICP-MS5_200519B
	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 01:46 PM	ICP-MS5_200520B
2005111-04C	H-28	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:41 PM	TITRATOR_200514B

Lab Order: 2005111
Client: Golder
Project: Luminant-MLSES-MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005111-04C	H-28	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 02:23 PM	IC2_200514A
	H-28	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:30 PM	UV/VIS_2_200514B
2005111-05A	H-29	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-29	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:12 PM	UV/VIS_2_200518B
2005111-05B	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 12:01 PM	ICP-MS5_200519B
	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 02:16 PM	ICP-MS5_200520B
2005111-05C	H-29	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:44 PM	TITRATOR_200514B
	H-29	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 02:39 PM	IC2_200514A
	H-29	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:31 PM	UV/VIS_2_200514B
2005111-06A	H-26	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-26	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:12 PM	UV/VIS_2_200518B
2005111-06B	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 02:18 PM	ICP-MS5_200520B
	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 12:03 PM	ICP-MS5_200519B
2005111-06C	H-26	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:49 PM	TITRATOR_200514B
	H-26	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 02:55 PM	IC2_200514A
	H-26	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:31 PM	UV/VIS_2_200514B
2005111-07A	H-33	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/26/20	UV/VIS_2_200526A
	H-33	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:13 PM	UV/VIS_2_200518B
2005111-07B	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 12:06 PM	ICP-MS5_200519B
	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	10	05/20/20 02:20 PM	ICP-MS5_200520B
2005111-07C	H-33	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:55 PM	TITRATOR_200514B
	H-33	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 03:11 PM	IC2_200514A
	H-33	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:31 PM	UV/VIS_2_200514B

DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-31
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-01
Project No:	19134019-2000	**Collection Date:**	05/13/20 10:10 AM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	39.1	1.50	5.00		mg/L	50	05/20/20 01:19 PM
Magnesium	170	5.00	15.0		mg/L	50	05/20/20 01:19 PM
Potassium	6.26	0.100	0.300		mg/L	1	05/19/20 12:46 PM
Sodium	682	5.00	15.0		mg/L	50	05/20/20 01:19 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 01:51 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	22.3	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:26 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:26 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:26 PM
Alkalinity, Total (As CaCO3)	22.3	20.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:26 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	39.4	5.00	10.0	N	mg/L	100	05/18/20 02:30 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0350	0.0300	0.100	J	mg/L	1	05/14/20 02:29 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-32
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-02
Project No:	19134019-2000	**Collection Date:**	05/13/20 11:00 AM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	1.84	0.0300	0.100		mg/L	1	05/19/20 11:55 AM
Magnesium	17.8	0.100	0.300		mg/L	1	05/19/20 11:55 AM
Potassium	2.54	0.100	0.300		mg/L	1	05/19/20 11:55 AM
Sodium	153	1.00	3.00		mg/L	10	05/20/20 01:42 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 03:27 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/14/20 01:29 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/14/20 01:29 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.52	1	05/14/20 01:29 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 4.52	1	05/14/20 01:29 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.800	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	1.07	0.250	0.500	N	mg/L	5	05/18/20 02:30 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0670	0.0300	0.100	J	mg/L	1	05/14/20 02:30 PM

Qualifiers:

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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-27
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-03
Project No:	19134019-2000	**Collection Date:**	05/13/20 11:50 AM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.0913	0.0300	0.100	J	mg/L	1	05/19/20 11:57 AM
Magnesium	28.4	1.00	3.00		mg/L	10	05/20/20 01:44 PM
Potassium	80.7	1.00	3.00		mg/L	10	05/20/20 01:44 PM
Sodium	105	1.00	3.00		mg/L	10	05/20/20 01:44 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	0.639	0.100	0.500		mg/L	1	05/14/20 02:07 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	166	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:38 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:38 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:38 PM
Alkalinity, Total (As CaCO3)	166	20.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:38 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.0913	0.0500	0.100	JN	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:10 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0520	0.0300	0.100	J	mg/L	1	05/14/20 02:30 PM

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C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-28
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-04
Project No:	19134019-2000	**Collection Date:**	05/13/20 12:40 PM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.346	0.0300	0.100		mg/L	1	05/19/20 11:59 AM
Magnesium	58.5	1.00	3.00		mg/L	10	05/20/20 01:46 PM
Potassium	1.45	0.100	0.300		mg/L	1	05/19/20 11:59 AM
Sodium	175	1.00	3.00		mg/L	10	05/20/20 01:46 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 02:23 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	05/14/20 01:41 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	05/14/20 01:41 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.49	1	05/14/20 01:41 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 4.49	1	05/14/20 01:41 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.346	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:11 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	0.0490	0.0300	0.100	J	mg/L	1	05/14/20 02:30 PM

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S - Spike Recovery outside control limits
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RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
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DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-29
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-05
Project No:	19134019-2000	**Collection Date:**	05/13/20 01:30 PM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.270	0.0300	0.100		mg/L	1	05/19/20 12:01 PM
Magnesium	71.0	1.00	3.00		mg/L	10	05/20/20 02:16 PM
Potassium	1.82	0.100	0.300		mg/L	1	05/19/20 12:01 PM
Sodium	165	1.00	3.00		mg/L	10	05/20/20 02:16 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 02:39 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:44 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:44 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:44 PM
Alkalinity, Total (As CaCO3)	<20.0	20.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:44 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.211	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	0.0589	0.0500	0.100	JN	mg/L	1	05/18/20 02:12 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/14/20 02:31 PM

Qualifiers:

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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
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DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-26
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-06
Project No:	19134019-2000	**Collection Date:**	05/13/20 03:35 PM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	1.57	0.0300	0.100		mg/L	1	05/19/20 12:03 PM
Magnesium	17.2	0.100	0.300		mg/L	1	05/19/20 12:03 PM
Potassium	6.87	0.100	0.300		mg/L	1	05/19/20 12:03 PM
Sodium	27.1	1.00	3.00		mg/L	10	05/20/20 02:18 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 02:55 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	29.9	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:49 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:49 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:49 PM
Alkalinity, Total (As CaCO3)	29.9	20.0	20.0		mg/L @ pH 4.51	1	05/14/20 01:49 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	1.57	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:12 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/14/20 02:31 PM

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DHL Analytical, Inc.

Date: *26-May-20*

CLIENT:	Golder	**Client Sample ID:**	H-33
Project:	Luminant-MLSES-MNA	**Lab ID:**	2005111-07
Project No:	19134019-2000	**Collection Date:**	05/13/20 04:30 PM
Lab Order:	2005111	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Iron	0.353	0.0300	0.100		mg/L	1	05/19/20 12:06 PM
Magnesium	11.1	0.100	0.300		mg/L	1	05/19/20 12:06 PM
Potassium	11.7	0.100	0.300		mg/L	1	05/19/20 12:06 PM
Sodium	77.0	1.00	3.00		mg/L	10	05/20/20 02:20 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Nitrate-N	0.215	0.100	0.500	J	mg/L	1	05/14/20 03:11 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	59.3	10.0	20.0		mg/L @ pH 4.5	1	05/14/20 01:55 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/14/20 01:55 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.5	1	05/14/20 01:55 PM
Alkalinity, Total (As CaCO3)	59.3	20.0	20.0		mg/L @ pH 4.5	1	05/14/20 01:55 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **AO**
Iron, Ferric	0.353	0.0500	0.100	N	mg/L	1	05/26/20
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:13 PM
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/14/20 02:31 PM

Qualifiers:

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S - Spike Recovery outside control limits
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CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200408C

Sample ID: **DCS2-95814** Batch ID: **95814** TestNo: **SW6020B** Units: **mg/L**
SampType: **DCS2** Run ID: **ICP-MS5_200408C** Analysis Date: **4/8/2020 11:19:00 AM** Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0591	0.100	0.0500	0	118	70	130	0	0	
Magnesium	0.298	0.300	0.300	0	99.3	70	130	0	0	
Potassium	0.285	0.300	0.300	0	95.1	70	130	0	0	
Sodium	0.295	0.300	0.300	0	98.4	70	130	0	0	

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: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200519B**

The QC data in batch 96359 applies to the following samples: 2005111-01B, 2005111-02B, 2005111-03B, 2005111-04B, 2005111-05B, 2005111-06B, 2005111-07B

Sample ID: **MB-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:37:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	<0.0300	0.100								
Magnesium	<0.100	0.300								
Potassium	<0.100	0.300								
Sodium	<0.100	0.300								

Sample ID: **LCS-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:40:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.24	0.100	5.00	0	105	80	120			
Magnesium	5.15	0.300	5.00	0	103	80	120			
Potassium	5.14	0.300	5.00	0	103	80	120			
Sodium	5.06	0.300	5.00	0	101	80	120			

Sample ID: **LCSD-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:42:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.26	0.100	5.00	0	105	80	120	0.447	15	
Magnesium	5.14	0.300	5.00	0	103	80	120	0.149	15	
Potassium	5.17	0.300	5.00	0	103	80	120	0.538	15	
Sodium	5.07	0.300	5.00	0	101	80	120	0.105	15	

Sample ID: **2005111-01B SD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:53:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	6.35	1.50	0	6.26				1.44	20	

Sample ID: **2005111-01B PDS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:20:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	10.9	0.300	5.00	6.26	93.7	75	125			

Sample ID: **2005111-01B MS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:22:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **2005111-01B MS**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 1:22:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	43.4	0.100	5.00	38.9	90.4	75	125			
Magnesium	173	0.300	5.00	167	111	75	125			
Potassium	11.4	0.300	5.00	6.26	102	75	125			
Sodium	664	0.300	5.00	656	169	75	125			S

Sample ID: **2005111-01B MSD**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 1:24:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	43.4	0.100	5.00	38.9	90.2	75	125	0.021	15	
Magnesium	171	0.300	5.00	167	83.6	75	125	0.788	15	
Potassium	11.3	0.300	5.00	6.26	101	75	125	0.335	15	
Sodium	663	0.300	5.00	656	142	75	125	0.206	15	S

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **ICV-200519**	Batch ID: **R110549**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 10:48:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.57	0.100	2.50	0	103	90	110			
Magnesium	2.47	0.300	2.50	0	98.6	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Sodium	2.49	0.300	2.50	0	99.4	90	110			

Sample ID: **LCVL-200519**	Batch ID: **R110549**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 11:00:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.101	0.100	0.100	0	101	80	120			
Magnesium	0.101	0.300	0.100	0	101	80	120			
Potassium	0.102	0.300	0.100	0	102	80	120			
Sodium	0.103	0.300	0.100	0	103	80	120			

Sample ID: **CCV2-200519**	Batch ID: **R110549**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 12:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.14	0.100	5.00	0	103	90	110			
Magnesium	5.09	0.300	5.00	0	102	90	110			
Potassium	5.11	0.300	5.00	0	102	90	110			
Sodium	5.02	0.300	5.00	0	100	90	110			

Sample ID: **CCV3-200519**	Batch ID: **R110549**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200519B**	Analysis Date: **5/19/2020 1:44:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.17	0.100	5.00	0	103	90	110			
Magnesium	5.17	0.300	5.00	0	103	90	110			
Potassium	5.10	0.300	5.00	0	102	90	110			
Sodium	5.13	0.300	5.00	0	103	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200520B**

The QC data in batch 96359 applies to the following samples: 2005111-01B, 2005111-02B, 2005111-03B, 2005111-04B, 2005111-05B, 2005111-06B, 2005111-07B

Sample ID: **2005111-01B SD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 1:26:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	39.2	25.0	0	39.1				0.310	20	
Magnesium	169	75.0	0	170				0.507	20	
Sodium	661	75.0	0	682				3.22	20	

Sample ID: **2005111-01B PDS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 1:53:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	300	5.00	250	39.1	104	75	125			
Magnesium	420	15.0	250	170	100	75	125			
Sodium	949	15.0	250	682	107	75	125			

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: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **ICV-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 10:52:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	2.54	0.100	2.50	0	102	90	110			
Magnesium	2.47	0.300	2.50	0	98.6	90	110			
Potassium	2.51	0.300	2.50	0	101	90	110			
Sodium	2.50	0.300	2.50	0	99.9	90	110			

Sample ID: **LCVL-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 11:04:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.0988	0.100	0.100	0	98.8	80	120			
Magnesium	0.0961	0.300	0.100	0	96.1	80	120			
Potassium	0.103	0.300	0.100	0	103	80	120			
Sodium	0.100	0.300	0.100	0	100	80	120			

Sample ID: **CCV2-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 12:52:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.06	0.100	5.00	0	101	90	110			
Magnesium	5.00	0.300	5.00	0	99.9	90	110			
Potassium	4.96	0.300	5.00	0	99.2	90	110			
Sodium	4.98	0.300	5.00	0	99.5	90	110			

Sample ID: **CCV3-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:09:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	5.09	0.100	5.00	0	102	90	110			
Magnesium	5.09	0.300	5.00	0	102	90	110			
Potassium	5.00	0.300	5.00	0	100	90	110			
Sodium	5.01	0.300	5.00	0	100	90	110			

Sample ID: **CCV4-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	5.03	0.300	5.00	0	101	90	110			
Sodium	4.96	0.300	5.00	0	99.2	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200421A

Sample ID: **DCS2-96036** Batch ID: **96036** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200421A** Analysis Date: **4/21/2020 11:47:08 AM** Prep Date: **4/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	0.246	0.0500	0.2500	0	98.5	70	130	0	0	

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: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200514A

The QC data in batch 96350 applies to the following samples: 2005111-01C, 2005111-02C, 2005111-03C, 2005111-04C, 2005111-05C, 2005111-06C, 2005111-07C

Sample ID: **MB-96350**	Batch ID: **96350**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 12:07:19 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	<0.100	0.500								

Sample ID: **LCS-96350**	Batch ID: **96350**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 12:23:19 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	5.07	0.500	5.000	0	101	90	110			

Sample ID: **LCSD-96350**	Batch ID: **96350**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 12:39:19 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	5.05	0.500	5.000	0	101	90	110	0.311	20	

Sample ID: **2005110-01CMS**	Batch ID: **96350**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 5:42:45 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	4.31	0.500	4.516	0	95.4	90	110			

Sample ID: **2005110-01CMSD**	Batch ID: **96350**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 5:58:45 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	4.31	0.500	4.516	0	95.4	90	110	0.076	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200514A

Sample ID: **ICV-200514**	Batch ID: **R110500**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 11:35:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	13.2	0.500	12.50	0	106	90	110			

Sample ID: **CCV1-200514**	Batch ID: **R110500**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 7:02:46 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrate-N	5.09	0.500	5.000	0	102	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200514B

The QC data in batch 96346 applies to the following samples: 2005111-01C, 2005111-02C, 2005111-03C, 2005111-04C, 2005111-05C, 2005111-06C, 2005111-07C

Sample ID: **MB-96346** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.23**
SampType: **MBLK** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:22:00 AM** Prep Date: **5/14/2020**

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-96346** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.22**
SampType: **LCS** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:26:00 AM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	53.2	20.0	50.00	0	106	74	129			

Sample ID: **2005076-01C-DUP** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:46:00 AM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	130	20.0	0	133.8				3.11	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)	130	20.0	0	133.8				3.11	20	

Sample ID: **2005110-01C-DUP** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.5**
SampType: **DUP** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 1:18:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	32.0	20.0	0	32.90				2.77	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)	32.0	20.0	0	32.90				2.77	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200514B

Sample ID: **ICV-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.36**
SampType: **ICV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 11:20:00 AM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	31.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	67.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.4	20.0	100.0	0	99.4	98	102			

Sample ID: **CCV1-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.33**
SampType: **CCV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 1:10:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	39.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	60.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.9	20.0	100.0	0	99.9	90	110			

Sample ID: **CCV2-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.32**
SampType: **CCV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 2:01:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	42.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	58.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	90	110			

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: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200323B**

Sample ID: **DCS-95613** Batch ID: **95613** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **DCS** Run ID: **UV/VIS_2_200323B** Analysis Date: **3/23/2020 1:30:00 PM** Prep Date: **3/23/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0580	0.100	0.05000	0	116	65	135	0	0	N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200507C**

Sample ID: **DCS-96253** Batch ID: **96253** TestNo: **M4500-P E** Units: **mg/L**
SampType: **DCS** Run ID: **UV/VIS_2_200507C** Analysis Date: **5/7/2020 2:22:00 PM** Prep Date: **5/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.0480	0.100	0.05000	0	96.0	50	200	0	0	

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: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200514B

The QC data in batch 96353 applies to the following samples: 2005111-01C, 2005111-02C, 2005111-03C, 2005111-04C, 2005111-05C, 2005111-06C, 2005111-07C

Sample ID: **MB-96353** Batch ID: **96353** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MBLK** Run ID: **UV/VIS_2_200514B** Analysis Date: **5/14/2020 2:26:00 PM** Prep Date: **5/14/2020**

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

Sample ID: **LCS-96353** Batch ID: **96353** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCS** Run ID: **UV/VIS_2_200514B** Analysis Date: **5/14/2020 2:26:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.496	0.100	0.5000	0	99.2	80	120			

Sample ID: **LCSD-96353** Batch ID: **96353** TestNo: **M4500-P E** Units: **mg/L**
SampType: **LCSD** Run ID: **UV/VIS_2_200514B** Analysis Date: **5/14/2020 2:27:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.495	0.100	0.5000	0	99.0	80	120	0.202	15	

Sample ID: **2005110-01CMS** Batch ID: **96353** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MS** Run ID: **UV/VIS_2_200514B** Analysis Date: **5/14/2020 2:28:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.474	0.100	0.5000	0	94.8	80	120			

Sample ID: **2005110-01CMSD** Batch ID: **96353** TestNo: **M4500-P E** Units: **mg/L**
SampType: **MSD** Run ID: **UV/VIS_2_200514B** Analysis Date: **5/14/2020 2:28:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.482	0.100	0.5000	0	96.4	80	120	1.67	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200514B

Sample ID: **ICV-200514**	Batch ID: **R110494**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:25:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.197	0.100	0.2000	0	98.5	85	115			

Sample ID: **CCV1-200514**	Batch ID: **R110494**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.510	0.100	0.5000	0	102	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200518B

The QC data in batch 96388 applies to the following samples: 2005111-01A, 2005111-02A, 2005111-03A, 2005111-04A, 2005111-05A, 2005111-06A, 2005111-07A

Sample ID: **MB-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:03:00 PM**	Prep Date: **5/18/2020**

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

Sample ID: **LCS-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:04:00 PM**	Prep Date: **5/18/2020**

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

Sample ID: **LCSD-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:05:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.108	0.100	0.1000	0	108	85	115	0.343	15	N

Sample ID: **2005111-03AMS**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:10:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0981	0.100	0.1000	0	98.1	85	115			N

Sample ID: **2005111-03AMSD**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:11:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0969	0.100	0.1000	0	96.9	85	115	1.30	15	N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200518B

Sample ID: **ICV-200518**	Batch ID: **R110544**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0977	0.100	0.1000	0	97.7	85	115			N

Sample ID: **CCV1-200518**	Batch ID: **R110544**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:14:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.205	0.100	0.2000	0	102	85	115			N

Sample ID: **CCV2-200518**	Batch ID: **R110544**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:31:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.199	0.100	0.2000	0	99.7	85	115			N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005111
Project: Luminant-MLSES-MNA

MQL SUMMARY REPORT

TestNo: E300	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Nitrate-N	0.100	0.500

TestNo: SW6020B	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Iron	0.0300	0.100
Magnesium	0.100	0.300
Potassium	0.100	0.300
Sodium	0.100	0.300

TestNo: M2320 B	**MDL**	**MQL**
Analyte	**ıg/L @ pH 4.2**	**g/L @ pH 4.2**
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

TestNo: M3500-Fe D	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Iron, Ferrous	0.0500	0.100

TestNo: M4500-P E	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Phosphorus, Total Orthophosphate (	0.0300	0.100

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

June 12, 2020

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

Order No.: 2005112

RE: Luminant-MLSES-CCR

Dear Will Vienne:

DHL Analytical, Inc. received 7 sample(s) on 5/14/2020 for the analyses presented in the following report.

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

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

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-20-25

Table of Contents

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

№ 68278
CHAIN-OF-CUSTODY

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

DATE: 5-13-20 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 2005112
PROJECT LOCATION OR NAME: LUMINANT - MLSES - CCR
CLENT PROJECT #: 19122262 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

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

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
H-31	01	5-13-20	1010	W	P	4		X		X		X	
H-32	02	"	1100	W	P	4		X		X		X	
H-27	03	"	1150	W	P	4		X		X		X	
H-28	04	"	1240	W	P	4		X		X		X	
H-29	05	"	1330	W	P	4		X		X		X	
H-26	06	"	1535	W	P	4		X		X		X	
H-33	07	"	1630	W	P	4		X		X		X	

RELINQUISHED BY: (Signature) DATE/TIME 5-13-20 1800 RECEIVED BY: (Signature) FedEX
RELINQUISHED BY: (Signature) FedEX DATE/TIME 5-14-2020 0905 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: 3.1, 2.3, 4.1 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

3.1 678

CUSTODY SEAL

DATE 5-13-20

SIGNATURE

DHL ANALYTICAL

ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON

2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 13MAY20
ACTWGT: 53.80 LB
CAD: 6994166/SSFE2110
DIMS: 23x13x14 IN

BILL THIRD PARTY

TO 19117675
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

2 of 3
MPS# 0263 3928 2992 8317
Mstr# 3928 2992 8306

0201

A8 BSMA

THU - 14 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

2.3

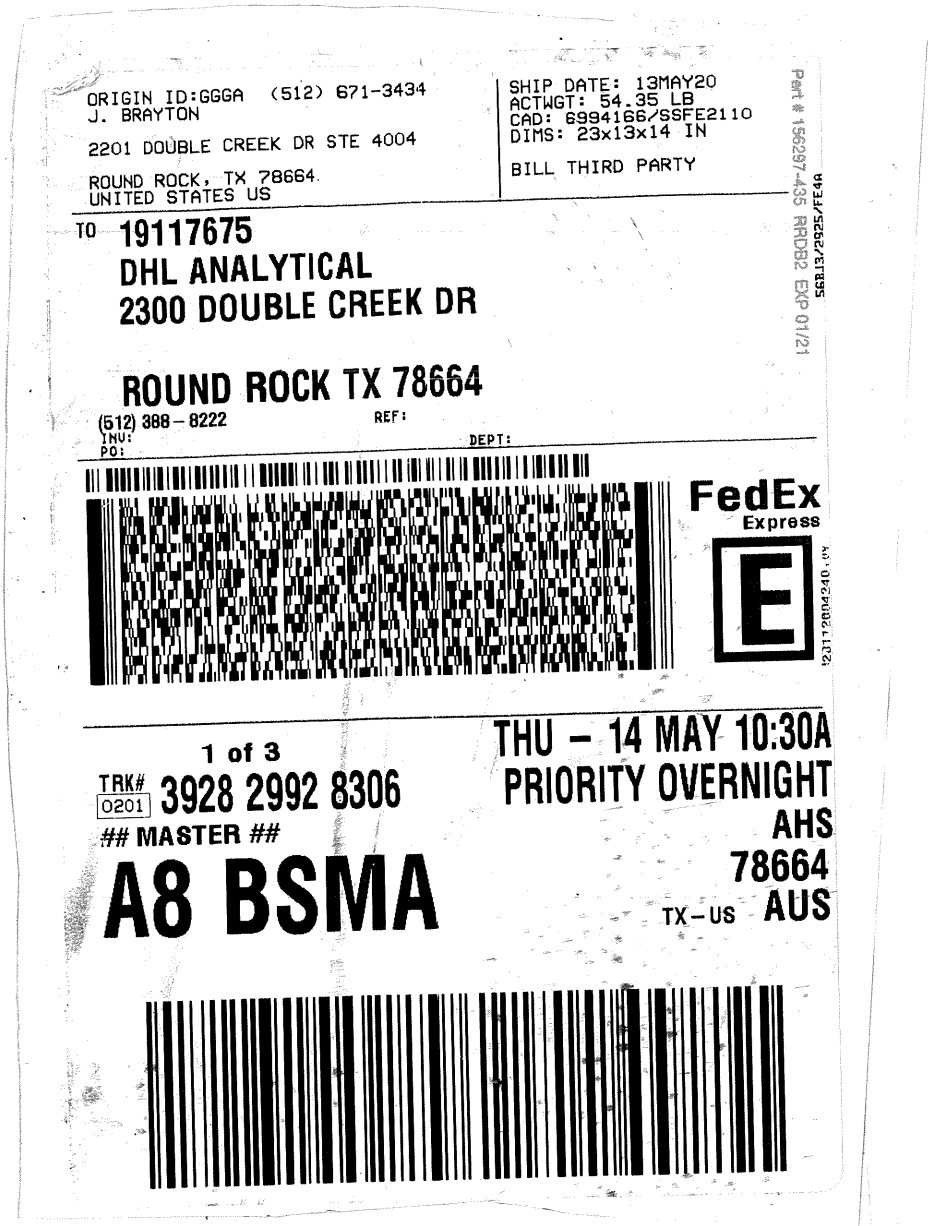
2.6

CUSTODY SEAL

DATE 5.13.20

SIGNATURE

DHL ANALYTICAL



ORIGIN ID:GGGA (512) 671-3434
J. BRAYTON
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US

SHIP DATE: 13MAY20
ACTWGT: 54.35 LB
CAD: 6994166/SSFE2110
DIMS: 23x13x14 IN
BILL THIRD PARTY

Part # 156297-435 RRDB2 EXP 01/21
SSB:13/2825/FE4A

TO 19117675
DHL ANALYTICAL
2300 DOUBLE CREEK DR

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

FedEx Express

1 of 3
TRK# 0201 3928 2992 8306
MASTER
A8 BSMA

THU - 14 MAY 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

4.1

215

CUSTODY SEAL

DATE 5-13-20

SIGNATURE

DHL ANALYTICAL

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder** Date Received: **5/14/2020**

Work Order Number **2005112** Received by: **JH**

Checklist completed by: _____ 5/14/2020 Reviewed by _____ 5/14/2020
Signature | Date | Initials | Date

Carrier name: FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**3.1** °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? No		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

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

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Luminant-MLSES-CCR	**LRC Date:** 6/12/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005112
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			X		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	X				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		3) Were calculations checked by a peer or supervisor?	X				
		4) Were all analyte identifications checked by a peer or supervisor?	X				
		5) Were sample detection limits reported for all analytes not detected?	X				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			X		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			X		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			X		
		9) If required for the project, TICs reported?			X		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			X		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	X				
		2) Were blanks analyzed at the appropriate frequency?	X				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		4) Were blank concentrations < MDL?	X				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			X		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	X				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		3) Were LCSs analyzed at the required frequency?	X				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		6) Was the LCSD RPD within QC limits (if applicable)?	X				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	X				
		2) Were MS/MSD analyzed at the appropriate frequency?	X				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	X				
		2) Were analytical duplicates analyzed at the appropriate frequency?	X				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	X				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	X				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Luminant-MLSES-CCR	**LRC Date:** 6/12/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005112
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?		X			**S2-04**
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			**S9-09**
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).
3 NA = Not applicable.
4 NR = Not Reviewed.
5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 25-28 2019. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

06/12/20

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *12-Jun-20*

CLIENT: Golder
Project: Luminant-MLSES-CCR
Lab Order: 2005112

CASE NARRATIVE

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

Method SW6020B - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M2540C - TDS Analysis

Exception Report R1-01

The samples were received and log-in performed on 5/14/20. A total of 7 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 5/21/20 the matrix spike and matrix spike duplicate recoveries were above control limits for Boron. 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 this analyte. No further corrective actions were taken.

Exception Report S2-04

For Metals analysis performed on 5/21/20 Boron was detected below the reporting limit in CCB1-200521. This was due to carryover from the previous samples. The associated samples were detected greater than 10 times the amount in the CCB. No further corrective actions were taken.

Exception Report S9-01

For Metals analysis performed on 5/21/20 the RPD for the serial dilution was above control limits for Boron. This is flagged accordingly in the QC summary report. The PDS was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT: Golder
Project: Luminant-MLSES-CCR
Lab Order: 2005112

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005112-01	H-31		05/13/20 10:10 AM	5/14/2020
2005112-02	H-32		05/13/20 11:00 AM	5/14/2020
2005112-03	H-27		05/13/20 11:50 AM	5/14/2020
2005112-04	H-28		05/13/20 12:40 PM	5/14/2020
2005112-05	H-29		05/13/20 01:30 PM	5/14/2020
2005112-06	H-26		05/13/20 03:35 PM	5/14/2020
2005112-07	H-33		05/13/20 04:30 PM	5/14/2020

Lab Order: 2005112
Client: Golder
Project: Luminant-MLSES-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005112-01A	H-31	05/13/20 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-31	05/13/20 10:10 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-31	05/13/20 10:10 AM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-01B	H-31	05/13/20 10:10 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-31	05/13/20 10:10 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-31	05/13/20 10:10 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-31	05/13/20 10:10 AM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-02A	H-32	05/13/20 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-32	05/13/20 11:00 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-32	05/13/20 11:00 AM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-02B	H-32	05/13/20 11:00 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-32	05/13/20 11:00 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-32	05/13/20 11:00 AM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-03A	H-27	05/13/20 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-27	05/13/20 11:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-27	05/13/20 11:50 AM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-03B	H-27	05/13/20 11:50 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-27	05/13/20 11:50 AM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-27	05/13/20 11:50 AM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-04A	H-28	05/13/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-28	05/13/20 12:40 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-28	05/13/20 12:40 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-04B	H-28	05/13/20 12:40 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-28	05/13/20 12:40 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-28	05/13/20 12:40 PM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-05A	H-29	05/13/20 01:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-29	05/13/20 01:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-29	05/13/20 01:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414

Lab Order: 2005112
Client: Golder
Project: Luminant-MLSES-CCR

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005112-05B	H-29	05/13/20 01:30 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-29	05/13/20 01:30 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-29	05/13/20 01:30 PM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-06A	H-26	05/13/20 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-26	05/13/20 03:35 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-26	05/13/20 03:35 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-06B	H-26	05/13/20 03:35 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-26	05/13/20 03:35 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-26	05/13/20 03:35 PM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403
2005112-07A	H-33	05/13/20 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-33	05/13/20 04:30 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/19/20 08:03 AM	96393
	H-33	05/13/20 04:30 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005112-07B	H-33	05/13/20 04:30 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-33	05/13/20 04:30 PM	Aqueous	E300	Anion Preparation	05/15/20 10:09 AM	96363
	H-33	05/13/20 04:30 PM	Aqueous	M2540C	TDS Preparation	05/19/20 09:13 AM	96403

Lab Order: 2005112
Client: Golder
Project: Luminant-MLSES-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005112-01A	H-31	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:22 PM	CETAC2_HG_200519B
	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:02 PM	ICP-MS5_200520B
	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	100	05/21/20 11:55 AM	ICP-MS5_200521A
2005112-01B	H-31	Aqueous	E300	Anions by IC method - Water	96363	100	05/15/20 03:44 PM	IC2_200515A
	H-31	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 04:32 PM	IC2_200515A
	H-31	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 07:44 PM	IC2_200515A
	H-31	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-02A	H-32	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:25 PM	CETAC2_HG_200519B
	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	10	05/21/20 11:57 AM	ICP-MS5_200521A
	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:04 PM	ICP-MS5_200520B
2005112-02B	H-32	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 04:48 PM	IC2_200515A
	H-32	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 08:00 PM	IC2_200515A
	H-32	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-03A	H-27	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:27 PM	CETAC2_HG_200519B
	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:06 PM	ICP-MS5_200520B
	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	5	05/21/20 11:59 AM	ICP-MS5_200521A
2005112-03B	H-27	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 05:04 PM	IC2_200515A
	H-27	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 08:16 PM	IC2_200515A
	H-27	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-04A	H-28	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:29 PM	CETAC2_HG_200519B
	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	20	05/21/20 11:51 AM	ICP-MS5_200521A
	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 02:53 PM	ICP-MS5_200520B
2005112-04B	H-28	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 05:20 PM	IC2_200515A
	H-28	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 08:32 PM	IC2_200515A
	H-28	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-05A	H-29	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:31 PM	CETAC2_HG_200519B

Lab Order: 2005112
Client: Golder
Project: Luminant-MLSES-CCR

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005112-05A	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:09 PM	ICP-MS5_200520B
	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	20	05/21/20 12:02 PM	ICP-MS5_200521A
2005112-05B	H-29	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 05:36 PM	IC2_200515A
	H-29	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 08:48 PM	IC2_200515A
	H-29	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-06A	H-26	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:34 PM	CETAC2_HG_200519B
	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:11 PM	ICP-MS5_200520B
	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	5	05/21/20 12:04 PM	ICP-MS5_200521A
2005112-06B	H-26	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 05:52 PM	IC2_200515A
	H-26	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 09:04 PM	IC2_200515A
	H-26	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E
2005112-07A	H-33	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:36 PM	CETAC2_HG_200519B
	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/20/20 03:13 PM	ICP-MS5_200520B
	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96393	1	05/21/20 01:39 PM	ICP-MS5_200521A
2005112-07B	H-33	Aqueous	E300	Anions by IC method - Water	96363	10	05/15/20 06:08 PM	IC2_200515A
	H-33	Aqueous	E300	Anions by IC method - Water	96363	1	05/15/20 09:20 PM	IC2_200515A
	H-33	Aqueous	M2540C	Total Dissolved Solids	96403	1	05/19/20 04:40 PM	WC_200519E

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-31
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-01
Project No:	19122262-C2020	**Collection Date:**	05/13/20 10:10 AM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:02 PM
Arsenic	0.0110	0.00200	0.00500		mg/L	1	05/20/20 03:02 PM
Barium	0.0159	0.00300	0.0100		mg/L	1	05/20/20 03:02 PM
Beryllium	0.0331	0.000300	0.00100		mg/L	1	05/20/20 03:02 PM
Boron	22.9	1.00	3.00		mg/L	100	05/21/20 11:55 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:02 PM
Calcium	235	10.0	30.0		mg/L	100	05/21/20 11:55 AM
Chromium	0.00367	0.00200	0.00500	J	mg/L	1	05/20/20 03:02 PM
Cobalt	0.449	0.00300	0.00500		mg/L	1	05/20/20 03:02 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:02 PM
Lithium	0.249	0.00500	0.0100		mg/L	1	05/20/20 03:02 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:02 PM
Selenium	0.0792	0.00200	0.00500		mg/L	1	05/20/20 03:02 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:02 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:22 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	223	3.00	10.0		mg/L	10	05/15/20 04:32 PM
Fluoride	0.231	0.100	0.400	J	mg/L	1	05/15/20 07:44 PM
Sulfate	2340	100	300		mg/L	100	05/15/20 03:44 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	4150	50.0	50.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-32
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-02
Project No:	19122262-C2020	**Collection Date:**	05/13/20 11:00 AM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:04 PM
Arsenic	0.00214	0.00200	0.00500	J	mg/L	1	05/20/20 03:04 PM
Barium	0.0166	0.00300	0.0100		mg/L	1	05/20/20 03:04 PM
Beryllium	0.00725	0.000300	0.00100		mg/L	1	05/20/20 03:04 PM
Boron	2.15	0.100	0.300		mg/L	10	05/21/20 11:57 AM
Cadmium	0.000389	0.000300	0.00100	J	mg/L	1	05/20/20 03:04 PM
Calcium	43.3	1.00	3.00		mg/L	10	05/21/20 11:57 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:04 PM
Cobalt	0.195	0.00300	0.00500		mg/L	1	05/20/20 03:04 PM
Lead	0.000743	0.000300	0.00100	J	mg/L	1	05/20/20 03:04 PM
Lithium	0.0978	0.00500	0.0100		mg/L	1	05/20/20 03:04 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:04 PM
Selenium	0.00401	0.00200	0.00500	J	mg/L	1	05/20/20 03:04 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:04 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:25 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	124	3.00	10.0		mg/L	10	05/15/20 04:48 PM
Fluoride	0.641	0.100	0.400		mg/L	1	05/15/20 08:00 PM
Sulfate	343	10.0	30.0		mg/L	10	05/15/20 04:48 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	791	10.0	10.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-27
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-03
Project No:	19122262-C2020	**Collection Date:**	05/13/20 11:50 AM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:06 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:06 PM
Barium	0.0668	0.00300	0.0100		mg/L	1	05/20/20 03:06 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:06 PM
Boron	0.583	0.0500	0.150		mg/L	5	05/21/20 11:59 AM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:06 PM
Calcium	53.1	0.500	1.50		mg/L	5	05/21/20 11:59 AM
Chromium	0.0133	0.00200	0.00500		mg/L	1	05/20/20 03:06 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/20/20 03:06 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:06 PM
Lithium	0.170	0.00500	0.0100		mg/L	1	05/20/20 03:06 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:06 PM
Selenium	0.00671	0.00200	0.00500		mg/L	1	05/20/20 03:06 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:06 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:27 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	93.0	3.00	10.0		mg/L	10	05/15/20 05:04 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/20 08:16 PM
Sulfate	274	10.0	30.0		mg/L	10	05/15/20 05:04 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	786	10.0	10.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-28
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-04
Project No:	19122262-C2020	**Collection Date:**	05/13/20 12:40 PM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 02:53 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 02:53 PM
Barium	0.0149	0.00300	0.0100		mg/L	1	05/20/20 02:53 PM
Beryllium	0.00252	0.000300	0.00100		mg/L	1	05/20/20 02:53 PM
Boron	7.03	0.200	0.600		mg/L	20	05/21/20 11:51 AM
Cadmium	0.00126	0.000300	0.00100		mg/L	1	05/20/20 02:53 PM
Calcium	88.9	2.00	6.00		mg/L	20	05/21/20 11:51 AM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 02:53 PM
Cobalt	0.159	0.00300	0.00500		mg/L	1	05/20/20 02:53 PM
Lead	0.000751	0.000300	0.00100	J	mg/L	1	05/20/20 02:53 PM
Lithium	0.171	0.00500	0.0100		mg/L	1	05/20/20 02:53 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 02:53 PM
Selenium	0.00320	0.00200	0.00500	J	mg/L	1	05/20/20 02:53 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 02:53 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:29 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	86.7	3.00	10.0		mg/L	10	05/15/20 05:20 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/20 08:32 PM
Sulfate	676	10.0	30.0		mg/L	10	05/15/20 05:20 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1220	10.0	10.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-29
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-05
Project No:	19122262-C2020	**Collection Date:**	05/13/20 01:30 PM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:09 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:09 PM
Barium	0.0117	0.00300	0.0100		mg/L	1	05/20/20 03:09 PM
Beryllium	0.00130	0.000300	0.00100		mg/L	1	05/20/20 03:09 PM
Boron	6.98	0.200	0.600		mg/L	20	05/21/20 12:02 PM
Cadmium	0.00129	0.000300	0.00100		mg/L	1	05/20/20 03:09 PM
Calcium	84.9	2.00	6.00		mg/L	20	05/21/20 12:02 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:09 PM
Cobalt	0.142	0.00300	0.00500		mg/L	1	05/20/20 03:09 PM
Lead	0.000684	0.000300	0.00100	J	mg/L	1	05/20/20 03:09 PM
Lithium	0.134	0.00500	0.0100		mg/L	1	05/20/20 03:09 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:09 PM
Selenium	0.00281	0.00200	0.00500	J	mg/L	1	05/20/20 03:09 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:09 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:31 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	70.7	3.00	10.0		mg/L	10	05/15/20 05:36 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/20 08:48 PM
Sulfate	769	10.0	30.0		mg/L	10	05/15/20 05:36 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1340	50.0	50.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-26
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-06
Project No:	19122262-C2020	**Collection Date:**	05/13/20 03:35 PM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:11 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:11 PM
Barium	0.129	0.00300	0.0100		mg/L	1	05/20/20 03:11 PM
Beryllium	0.00166	0.000300	0.00100		mg/L	1	05/20/20 03:11 PM
Boron	0.644	0.0500	0.150		mg/L	5	05/21/20 12:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:11 PM
Calcium	30.4	0.500	1.50		mg/L	5	05/21/20 12:04 PM
Chromium	0.00314	0.00200	0.00500	J	mg/L	1	05/20/20 03:11 PM
Cobalt	0.0241	0.00300	0.00500		mg/L	1	05/20/20 03:11 PM
Lead	0.000798	0.000300	0.00100	J	mg/L	1	05/20/20 03:11 PM
Lithium	0.0218	0.00500	0.0100		mg/L	1	05/20/20 03:11 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:11 PM
Selenium	0.0147	0.00200	0.00500		mg/L	1	05/20/20 03:11 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:11 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:34 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	71.0	3.00	10.0		mg/L	10	05/15/20 05:52 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/20 09:04 PM
Sulfate	58.4	1.00	3.00		mg/L	1	05/15/20 09:04 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	280	10.0	10.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	H-33
Project:	Luminant-MLSES-CCR	**Lab ID:**	2005112-07
Project No:	19122262-C2020	**Collection Date:**	05/13/20 04:30 PM
Lab Order:	2005112	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/20/20 03:13 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:13 PM
Barium	0.0784	0.00300	0.0100		mg/L	1	05/20/20 03:13 PM
Beryllium	0.000530	0.000300	0.00100	J	mg/L	1	05/20/20 03:13 PM
Boron	0.103	0.0100	0.0300		mg/L	1	05/21/20 01:39 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/20/20 03:13 PM
Calcium	24.0	0.100	0.300		mg/L	1	05/20/20 03:13 PM
Chromium	0.00755	0.00200	0.00500		mg/L	1	05/20/20 03:13 PM
Cobalt	0.0312	0.00300	0.00500		mg/L	1	05/20/20 03:13 PM
Lead	0.00191	0.000300	0.00100		mg/L	1	05/20/20 03:13 PM
Lithium	0.173	0.00500	0.0100		mg/L	1	05/20/20 03:13 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/20/20 03:13 PM
Selenium	0.00243	0.00200	0.00500	J	mg/L	1	05/20/20 03:13 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/20/20 03:13 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:36 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	84.3	3.00	10.0		mg/L	10	05/15/20 06:08 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/15/20 09:20 PM
Sulfate	113	1.00	3.00		mg/L	1	05/15/20 09:20 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	439	10.0	10.0		mg/L	1	05/19/20 04:40 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200304C

Sample ID: **DCS-95289**	Batch ID: **95289**	TestNo: **SW7470A**	Units: **mg/L**		
SampType: **DCS**	Run ID: **CETAC2_HG_200304C**	Analysis Date: **3/4/2020 12:11:09 PM**	Prep Date: **3/4/2020**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.000175	0.000200	0.000200	0	87.5	82	119	0	0	

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: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200519B

The QC data in batch 96414 applies to the following samples: 2005112-01A, 2005112-02A, 2005112-03A, 2005112-04A, 2005112-05A, 2005112-06A, 2005112-07A

Sample ID: **MB-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MBLK**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:11:32 PM**	Prep Date: **5/19/2020**

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

Sample ID: **LCS-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:13:48 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	85	115			

Sample ID: **LCSD-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:16:04 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00205	0.000200	0.00200	0	103	85	115	0.487	15	

Sample ID: **2005114-01A MS**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:40:59 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00985	0.00100	0.0100	0	98.5	80	120			

Sample ID: **2005114-01A MSD**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MSD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:43:16 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00960	0.00100	0.0100	0	96.0	80	120	2.57	15	

Sample ID: **2005114-01A SD**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **SD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:45:32 PM**	Prep Date: **5/19/2020**

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

Sample ID: **2005114-01A PDS**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **PDS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:47:48 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0120	0.00100	0.0125	0	96.0	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200519B

Sample ID: **ICV-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 10:31:55 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00391	0.000200	0.00400	0	97.8	90	110			

Sample ID: **CCV5-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 1:29:56 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00213	0.000200	0.00200	0	106	90	110			

Sample ID: **CCV6-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:52:22 PM**	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			

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: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200408C

Sample ID: **DCS1-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:16:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.000932	0.00250	0.00100	0	93.2	70	130	0	0	
Beryllium	0.000472	0.00100	0.000500	0	94.4	70	130	0	0	
Cadmium	0.000492	0.00100	0.000500	0	98.4	70	130	0	0	
Lead	0.000496	0.00100	0.000500	0	99.2	70	130	0	0	
Thallium	0.000468	0.00150	0.000500	0	93.6	70	130	0	0	

Sample ID: **DCS2-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:19:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.310	0.300	0.300	0	103	70	130	0	0	

Sample ID: **DCS3-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:21:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00466	0.00500	0.00500	0	93.2	70	130	0	0	
Barium	0.00478	0.0100	0.00500	0	95.6	70	130	0	0	
Chromium	0.00600	0.00500	0.00500	0	120	70	130	0	0	
Cobalt	0.00473	0.00500	0.00500	0	94.6	70	130	0	0	
Lithium	0.00473	0.0100	0.00500	0	94.6	70	130	0	0	
Molybdenum	0.00466	0.00500	0.00500	0	93.2	70	130	0	0	
Selenium	0.00517	0.00500	0.00500	0	103	70	130	0	0	

Sample ID: **DCS4-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:28:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0286	0.0300	0.0300	0	95.2	70	130	0	0	

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: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200520B**

The QC data in batch 96393 applies to the following samples: 2005112-01A, 2005112-02A, 2005112-03A, 2005112-04A, 2005112-05A, 2005112-06A, 2005112-07A

Sample ID: **MB-96393** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:44:00 PM** Prep Date: **5/19/2020**

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								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID: **LCS-96393** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:46:00 PM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	80	120			
Arsenic	0.203	0.00500	0.200	0	102	80	120			
Barium	0.203	0.0100	0.200	0	102	80	120			
Beryllium	0.204	0.00100	0.200	0	102	80	120			
Cadmium	0.204	0.00100	0.200	0	102	80	120			
Calcium	5.10	0.300	5.00	0	102	80	120			
Chromium	0.199	0.00500	0.200	0	99.5	80	120			
Cobalt	0.202	0.00500	0.200	0	101	80	120			
Lead	0.198	0.00100	0.200	0	99.0	80	120			
Lithium	0.213	0.0100	0.200	0	106	80	120			
Molybdenum	0.201	0.00500	0.200	0	101	80	120			
Selenium	0.216	0.00500	0.200	0	108	80	120			
Thallium	0.198	0.00150	0.200	0	98.9	80	120			

Sample ID: **LCSD-96393** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:49:00 PM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.206	0.00250	0.200	0	103	80	120	0.664	15	
Arsenic	0.204	0.00500	0.200	0	102	80	120	0.300	15	
Barium	0.205	0.0100	0.200	0	103	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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **LCSD-96393** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:49:00 PM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.204	0.00100	0.200	0	102	80	120	0.169	15	
Cadmium	0.206	0.00100	0.200	0	103	80	120	0.649	15	
Calcium	5.22	0.300	5.00	0	104	80	120	2.22	15	
Chromium	0.202	0.00500	0.200	0	101	80	120	1.50	15	
Cobalt	0.202	0.00500	0.200	0	101	80	120	0.110	15	
Lead	0.200	0.00100	0.200	0	99.9	80	120	0.974	15	
Lithium	0.214	0.0100	0.200	0	107	80	120	0.361	15	
Molybdenum	0.200	0.00500	0.200	0	100	80	120	0.264	15	
Selenium	0.218	0.00500	0.200	0	109	80	120	0.773	15	
Thallium	0.200	0.00150	0.200	0	99.8	80	120	0.899	15	

Sample ID: **2005112-04A SD** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 3:00:00 PM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	20	
Arsenic	<0.0100	0.0250	0	0				0	20	
Barium	<0.0150	0.0500	0	0.0149				0	20	
Beryllium	0.00263	0.00500	0	0.00252				4.07	20	
Cadmium	<0.00150	0.00500	0	0.00126				0	20	
Chromium	<0.0100	0.0250	0	0				0	20	
Cobalt	0.164	0.0250	0	0.159				2.82	20	
Lead	<0.00150	0.00500	0	0.000751				0	20	
Lithium	0.164	0.0500	0	0.171				3.92	20	
Molybdenum	<0.0100	0.0250	0	0				0	20	
Selenium	<0.0100	0.0250	0	0.00320				0	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2005112-04A PDS** Batch ID: **96393** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 3:26:00 PM** Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.205	0.00250	0.200	0	103	75	125			
Arsenic	0.194	0.00500	0.200	0	97.1	75	125			
Barium	0.219	0.0100	0.200	0.0149	102	75	125			
Beryllium	0.198	0.00100	0.200	0.00252	97.7	75	125			
Cadmium	0.203	0.00100	0.200	0.00126	101	75	125			
Chromium	0.202	0.00500	0.200	0	101	75	125			
Cobalt	0.344	0.00500	0.200	0.159	92.3	75	125			
Lead	0.203	0.00100	0.200	0.000751	101	75	125			
Lithium	0.361	0.0100	0.200	0.171	95.2	75	125			

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: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **2005112-04A PDS**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 3:26:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.197	0.00500	0.200	0	98.5	75	125			
Selenium	0.204	0.00500	0.200	0.00320	100	75	125			
Thallium	0.201	0.00150	0.200	0	101	75	125			

Sample ID: **2005112-04A MS**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 3:28:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	75	125			
Arsenic	0.196	0.00500	0.200	0	98.0	75	125			
Barium	0.217	0.0100	0.200	0.0149	101	75	125			
Beryllium	0.200	0.00100	0.200	0.00252	98.9	75	125			
Cadmium	0.202	0.00100	0.200	0.00126	100	75	125			
Calcium	102	0.300	5.00	95.7	120	75	125			
Chromium	0.194	0.00500	0.200	0	97.0	75	125			
Cobalt	0.351	0.00500	0.200	0.159	96.0	75	125			
Lead	0.200	0.00100	0.200	0.000751	99.4	75	125			
Lithium	0.380	0.0100	0.200	0.171	104	75	125			
Molybdenum	0.202	0.00500	0.200	0	101	75	125			
Selenium	0.201	0.00500	0.200	0.00320	99.1	75	125			
Thallium	0.200	0.00150	0.200	0	100	75	125			

Sample ID: **2005112-04A MSD**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 3:31:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	75	125	0.563	15	
Arsenic	0.196	0.00500	0.200	0	98.1	75	125	0.036	15	
Barium	0.214	0.0100	0.200	0.0149	99.4	75	125	1.39	15	
Beryllium	0.197	0.00100	0.200	0.00252	97.2	75	125	1.67	15	
Cadmium	0.198	0.00100	0.200	0.00126	98.5	75	125	1.73	15	
Calcium	102	0.300	5.00	95.7	122	75	125	0.071	15	
Chromium	0.193	0.00500	0.200	0	96.5	75	125	0.449	15	
Cobalt	0.351	0.00500	0.200	0.159	96.2	75	125	0.064	15	
Lead	0.198	0.00100	0.200	0.000751	98.4	75	125	1.01	15	
Lithium	0.365	0.0100	0.200	0.171	96.9	75	125	4.00	15	
Molybdenum	0.199	0.00500	0.200	0	99.7	75	125	1.09	15	
Selenium	0.203	0.00500	0.200	0.00320	99.8	75	125	0.689	15	
Thallium	0.198	0.00150	0.200	0	99.0	75	125	1.19	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **ICV-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 10:52:00 AM** 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	0.100	0.00500	0.100	0	100	90	110			
Barium	0.101	0.0100	0.100	0	101	90	110			
Beryllium	0.0975	0.00100	0.100	0	97.5	90	110			
Cadmium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.60	0.300	2.50	0	104	90	110			
Chromium	0.102	0.00500	0.100	0	102	90	110			
Cobalt	0.102	0.00500	0.100	0	102	90	110			
Lead	0.0987	0.00100	0.100	0	98.7	90	110			
Lithium	0.0991	0.0100	0.100	0	99.1	90	110			
Molybdenum	0.0965	0.00500	0.100	0	96.5	90	110			
Selenium	0.104	0.00500	0.100	0	104	90	110			
Thallium	0.0979	0.00150	0.100	0	97.9	90	110			

Sample ID: **LCVL-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 11:04:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00201	0.00250	0.00200	0	101	80	120			
Arsenic	0.00521	0.00500	0.00500	0	104	80	120			
Barium	0.00504	0.0100	0.00500	0	101	80	120			
Beryllium	0.00104	0.00100	0.00100	0	104	80	120			
Cadmium	0.00101	0.00100	0.00100	0	101	80	120			
Calcium	0.106	0.300	0.100	0	106	80	120			
Chromium	0.00495	0.00500	0.00500	0	99.0	80	120			
Cobalt	0.00513	0.00500	0.00500	0	103	80	120			
Lead	0.000985	0.00100	0.00100	0	98.5	80	120			
Lithium	0.00988	0.0100	0.0100	0	98.8	80	120			
Molybdenum	0.00512	0.00500	0.00500	0	102	80	120			
Selenium	0.00489	0.00500	0.00500	0	97.8	80	120			
Thallium	0.000993	0.00150	0.00100	0	99.3	80	120			

Sample ID: **CCV4-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.197	0.00250	0.200	0	98.7	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.200	0.0100	0.200	0	99.9	90	110			
Beryllium	0.200	0.00100	0.200	0	100	90	110			
Cadmium	0.205	0.00100	0.200	0	102	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **CCV4-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:38:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.00	0.300	5.00	0	100	90	110			
Chromium	0.198	0.00500	0.200	0	99.0	90	110			
Cobalt	0.202	0.00500	0.200	0	101	90	110			
Lead	0.194	0.00100	0.200	0	97.1	90	110			
Lithium	0.207	0.0100	0.200	0	103	90	110			
Molybdenum	0.199	0.00500	0.200	0	99.3	90	110			
Selenium	0.218	0.00500	0.200	0	109	90	110			
Thallium	0.195	0.00150	0.200	0	97.4	90	110			

Sample ID: **CCV5-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 4:16:00 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	0.202	0.00500	0.200	0	101	90	110			
Barium	0.198	0.0100	0.200	0	99.1	90	110			
Beryllium	0.200	0.00100	0.200	0	100	90	110			
Cadmium	0.202	0.00100	0.200	0	101	90	110			
Calcium	5.05	0.300	5.00	0	101	90	110			
Chromium	0.198	0.00500	0.200	0	98.8	90	110			
Cobalt	0.201	0.00500	0.200	0	100	90	110			
Lead	0.193	0.00100	0.200	0	96.6	90	110			
Lithium	0.209	0.0100	0.200	0	105	90	110			
Molybdenum	0.198	0.00500	0.200	0	98.8	90	110			
Selenium	0.211	0.00500	0.200	0	106	90	110			
Thallium	0.194	0.00150	0.200	0	96.9	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200521A

The QC data in batch 96393 applies to the following samples: 2005112-01A, 2005112-02A, 2005112-03A, 2005112-04A, 2005112-05A, 2005112-06A, 2005112-07A

Sample ID: **2005112-04A SD**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 11:53:00 AM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	10.0	3.00	0	7.04				35.1	20	R
Calcium	86.8	30.0	0	88.9				2.45	20	

Sample ID: **2005112-04A PDS**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 12:15:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	11.0	0.600	4.00	7.03	99.9	75	125			
Calcium	189	6.00	100	88.9	100	75	125			

Sample ID: **MB-96393**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:30:00 PM**	Prep Date: **5/19/2020**

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

Sample ID: **LCS-96393**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:33:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.192	0.0300	0.200	0	95.9	80	120			

Sample ID: **LCSD-96393**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:35:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.207	0.0300	0.200	0	103	80	120	7.65	15	

Sample ID: **2005112-04A MS**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:46:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	7.37	0.600	0.200	7.03	167	75	125			S

Sample ID: **2005112-04A MSD**	Batch ID: **96393**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:48:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	7.82	0.600	0.200	7.03	391	75	125	5.91	15	S

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200521A

Sample ID: **ICV-200521**	Batch ID: **R110586**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 11:34:00 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	2.42	0.300	2.50	0	97.0	90	110			

Sample ID: **LCVL-200521**	Batch ID: **R110586**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 11:41:00 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0236	0.0300	0.0200	0	118	80	120			
Calcium	0.100	0.300	0.100	0	100	80	120			

Sample ID: **CCV1-200521**	Batch ID: **R110586**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 12:26:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.198	0.0300	0.200	0	99.1	90	110			
Calcium	4.87	0.300	5.00	0	97.3	90	110			

Sample ID: **CCV2-200521**	Batch ID: **R110586**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:00:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.195	0.0300	0.200	0	97.3	90	110			

Sample ID: **CCV3-200521**	Batch ID: **R110586**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_200521A**	Analysis Date: **5/21/2020 1:59:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.3	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200421A

Sample ID: **DCS2-96036** Batch ID: **96036** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200421A** Analysis Date: **4/21/2020 11:47:08 AM** Prep Date: **4/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.420	1.00	0.5000	0	84.1	70	130	0	0	
Fluoride	0.154	0.400	0.2000	0	77.1	70	130	0	0	
Sulfate	1.43	3.00	1.500	0	95.3	70	130	0	0	

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: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200515A

The QC data in batch 96363 applies to the following samples: 2005112-01B, 2005112-02B, 2005112-03B, 2005112-04B, 2005112-05B, 2005112-06B, 2005112-07B

Sample ID: **MB-96363**	Batch ID: **96363**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 11:51:21 AM**	Prep Date: **5/15/2020**

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

Sample ID: **LCS-96363**	Batch ID: **96363**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 12:07:21 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	3.77	0.400	4.000	0	94.2	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

Sample ID: **LCSD-96363**	Batch ID: **96363**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 12:23:21 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.117	20	
Fluoride	3.76	0.400	4.000	0	94.0	90	110	0.191	20	
Sulfate	30.4	3.00	30.00	0	101	90	110	0.096	20	

Sample ID: **2005112-01BMS**	Batch ID: **96363**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 4:00:25 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2220	100	2000	206.2	101	90	110			
Fluoride	2010	40.0	2000	0	100	90	110			
Sulfate	4270	300	2000	2343	96.2	90	110			

Sample ID: **2005112-01BMSD**	Batch ID: **96363**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 4:16:25 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	2230	100	2000	206.2	101	90	110	0.373	20	
Fluoride	2020	40.0	2000	0	101	90	110	0.508	20	
Sulfate	4280	300	2000	2343	96.8	90	110	0.260	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200515A

Sample ID: **ICV-200515**	Batch ID: **R110519**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 11:19:21 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.2	1.00	25.00	0	105	90	110			
Fluoride	10.0	0.400	10.00	0	100	90	110			
Sulfate	79.1	3.00	75.00	0	105	90	110			

Sample ID: **CCV1-200515**	Batch ID: **R110519**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 7:12:25 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	3.90	0.400	4.000	0	97.6	90	110			
Sulfate	30.5	3.00	30.00	0	102	90	110			

Sample ID: **CCV2-200515**	Batch ID: **R110519**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200515A**	Analysis Date: **5/15/2020 10:40:25 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	3.89	0.400	4.000	0	97.3	90	110			
Sulfate	30.6	3.00	30.00	0	102	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

ANALYTICAL QC SUMMARY REPORT

RunID: WC_200519E

The QC data in batch 96403 applies to the following samples: 2005112-01B, 2005112-02B, 2005112-03B, 2005112-04B, 2005112-05B, 2005112-06B, 2005112-07B

Sample ID: **MB-96403**	Batch ID: **96403**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_200519E**	Analysis Date: **5/19/2020 4:40:00 PM**	Prep Date: **5/19/2020**

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-96403**	Batch ID: **96403**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_200519E**	Analysis Date: **5/19/2020 4:40:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	751	10.0	745.6	0	101	90	113			

Sample ID: **2005112-01B-DUP**	Batch ID: **96403**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200519E**	Analysis Date: **5/19/2020 4:40:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	4150	50.0	0	4145				0	5	

Sample ID: **2005112-05B-DUP**	Batch ID: **96403**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200519E**	Analysis Date: **5/19/2020 4:40:00 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1340	50.0	0	1340				0.374	5	

Qualifiers:

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

DHL Analytical, Inc.

Date: *12-Jun-20*

CLIENT: Golder
Work Order: 2005112
Project: Luminant-MLSES-CCR

MQL SUMMARY REPORT

TestNo: E300	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Sulfate	1.00	3.00

TestNo: SW6020B	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Antimony	0.000800	0.00250
Arsenic	0.00200	0.00500
Barium	0.00300	0.0100
Beryllium	0.000300	0.00100
Boron	0.0100	0.0300
Cadmium	0.000300	0.00100
Calcium	0.100	0.300
Chromium	0.00200	0.00500
Cobalt	0.00300	0.00500
Lead	0.000300	0.00100
Lithium	0.00500	0.0100
Molybdenum	0.00200	0.00500
Selenium	0.00200	0.00500
Thallium	0.000500	0.00150

TestNo: SW7470A	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Mercury	0.0000800	0.000200

TestNo: M2540C	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 12, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1219694
Samples Received:	05/18/2020
Project Number:	2005112
Description:	

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

Entire Report Reviewed By:

Donna Eidson
Project Manager

H-31 L1219694-01 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 10:10	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

H-32 L1219694-02 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 11:00	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

H-27 L1219694-03 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 11:50	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

H-28 L1219694-04 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 12:40	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

H-29 L1219694-05 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 13:30	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

H-26 L1219694-06 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/13/20 13:35	05/18/20 09:45	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

	Collected by	Collected date/time	Received date/time
H-33 L1219694-07 Non-Potable Water		05/13/20 14:30	05/18/20 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1486283	1	06/04/20 09:38	06/05/20 15:28	RGT	Mt. Juliet, TN

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

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	1.70		0.537	0.869	05/27/2020 15:20	WG1478122
(T) Barium	*112*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*104*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.78		0.738	1.2	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0808		0.201	0.332	06/05/2020 15:28	WG1486283
(T) Barium-133	*102*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.15		0.568	0.978	05/27/2020 15:20	WG1478122
(T) Barium	*104*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*101*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.15		0.714	1.28	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	-0.0142		0.146	0.304	06/05/2020 15:28	WG1486283
(T) Barium-133	*101*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.0371		0.540	0.9	05/27/2020 15:20	WG1478122
(T) Barium	*106*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*104*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.166		0.744	1.19	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.166		0.204	0.285	06/05/2020 15:28	WG1486283
(T) Barium-133	*96.4*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.984		0.615	0.961	05/27/2020 15:20	WG1478122
(T) Barium	*129*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*95.0*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.13		0.771	1.16	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.151		0.156	0.199	06/05/2020 15:28	WG1486283
(T) Barium-133	*97.4*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.545		0.628	1.04	05/27/2020 15:20	WG1478122
(T) Barium	*121*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*97.0*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.791		0.875	1.37	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.246		0.247	0.326	06/05/2020 15:28	WG1486283
(T) Barium-133	*96.2*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.585		0.502	0.862	05/27/2020 15:20	WG1478122
(T) Barium	*106*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*103*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.880		0.730	1.11	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.295		0.228	0.243	06/05/2020 15:28	WG1486283
(T) Barium-133	*96.5*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	1.90		0.571	0.856	05/27/2020 15:20	WG1478122
(T) Barium	*102*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*95.1*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	2.29		0.863	1.21	06/05/2020 15:28	WG1486283

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.395		0.292	0.356	06/05/2020 15:28	WG1486283
(T) Barium-133	*100*			*30.0-143*	*06/05/2020 15:28*	WG1486283

Method Blank (MB)

(MB) R3532575-1 05/27/20 10:15

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	-0.0177		0.386
(T) Barium	*99.9*		
(T) Yttrium	*114*		

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3532575-5 05/27/20 10:15

Analyte	Original Result	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228		1.33	1	32.4	0.463		20	3
(T) Barium		*106*						
(T) Yttrium		*104*						

Laboratory Control Sample (LCS)

(LCS) R3532575-2 05/27/20 10:15

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.43	109	80.0-120	
(T) Barium			*105*		
(T) Yttrium			*104*		

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3532575-3 05/27/20 10:15 • (MSD) R3532575-4 05/27/20 10:15

Analyte	Spike Amount pCi/l	Original Result	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	10.0		11.8	12.3	109	113	1	70.0-130			3.90		20
(T) Barium					*115*	*104*							
(T) Yttrium					*102*	*110*							

Method Blank (MB)

(MB) R3537637-1 06/05/20 15:28

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-226	0.0208		0.0501
(T) Barium-133	*96.5*		

L1220442-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1220442-01 06/05/20 15:28 • (DUP) R3537637-5 06/05/20 15:28

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-226	0.0484	-0.120	1	200	0.894		20	3
(T) Barium-133	*95.7*	*106*						

Laboratory Control Sample (LCS)

(LCS) R3537637-2 06/05/20 15:28

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-226	5.02	5.31	106	80.0-120	
(T) Barium-133			*103*		

L1220442-13 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1220442-13 06/05/20 15:28 • (MS) R3537637-3 06/05/20 15:28 • (MSD) R3537637-4 06/05/20 15:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-226	20.1	0.0976	20.9	20.9	103	103	1	75.0-125			0.192		20
(T) Barium-133		*101*			*102*	*107*							

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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

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.

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.

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

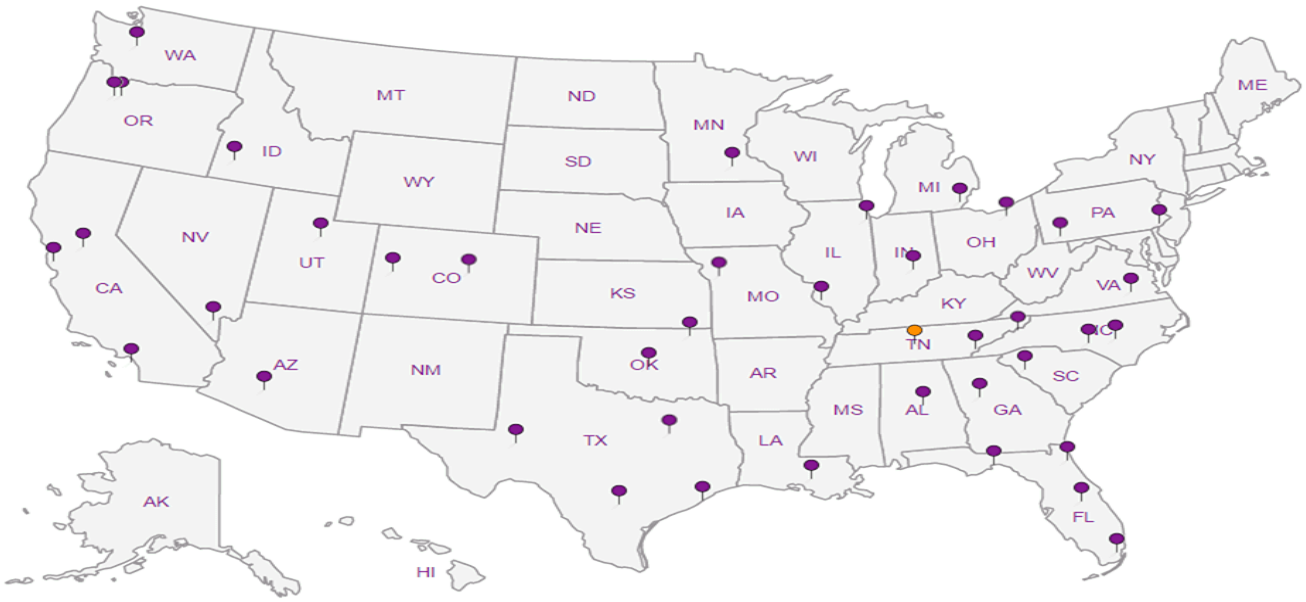
Third Party Federal Accreditations

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

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.



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

CHAIN-OF-CUSTODY RECORD

G110

Work Order: 2005112

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

12196 94

14-May-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228	Ra-226				
					E904.0	M7500 Ra B M				
H-31	Aqueous	01C	05/13/20 10:10 AM	1LHDPEHNO3	1					01
H-31	Aqueous	01D	05/13/20 10:10 AM	1LHDPEHNO3		1				01
H-32	Aqueous	02C	05/13/20 11:00 AM	1LHDPEHNO3	1					02
H-32	Aqueous	02D	05/13/20 11:00 AM	1LHDPEHNO3		1				02
H-27	Aqueous	03C	05/13/20 11:50 AM	1LHDPEHNO3	1					03
H-27	Aqueous	03D	05/13/20 11:50 AM	1LHDPEHNO3		1				03
H-28	Aqueous	04C	05/13/20 12:40 PM	1LHDPEHNO3	1					04
H-28	Aqueous	04D	05/13/20 12:40 PM	1LHDPEHNO3		1				04
H-29	Aqueous	05C	05/13/20 01:30 PM	1LHDPEHNO3	1					05
H-29	Aqueous	05D	05/13/20 01:30 PM	1LHDPEHNO3		1				05
H-26	Aqueous	06C	05/13/20 03:35 PM	1LHDPEHNO3	1					06
H-26	Aqueous	06D	05/13/20 03:35 PM	1LHDPEHNO3		1				06
H-33	Aqueous	07C	05/13/20 04:30 PM	1LHDPEHNO3	1					07
H-33	Aqueous	07D	05/13/20 04:30 PM	1LHDPEHNO3		1				07

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
Relinquished by:	Ea	5/14/20 1700	**Received by:**	Carol Kemp	5/18/20 8:45
Relinquished by:			**Received by:**		

Amb

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHLRRTX		12/9694
Cooler Received/Opened On: 5/18/20 Temperature:	Amb	
Received By: Carol Kemp		
Signature: Carol Kemp		

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?		✓	

June 10, 2020

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

Order No.: 2005110

RE: Luminant-MLSES CCR&MNA

Dear Will Vienne:

DHL Analytical, Inc. received 2 sample(s) on 5/14/2020 for the analyses presented in the following report.

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

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

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-20-25

Table of Contents

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

№ 68279

CHAIN-OF-CUSTODY

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

DATE: 5-13-20 PAGE 1 OF 1
PO #: DHL WORK ORDER #: 2005110
PROJECT LOCATION OR NAME: LUMINANT - MLSES CCR & MNA
CLENT PROJECT #: 19122262 COLLECTOR:

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

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

ANALYSES: BTEX ❑ MTBE ❑ [METHOD 8021] | TPH 1005 ❑ TPH 1006 ❑ HOLD 1006 ❑ | GRO [METHOD 8015] ❑ DRO [METHOD 8105] ❑ | VOC 8260 ❑ VOC 624 ❑ VOC 8260/5035 ❑ | SVOC 8270 ❑ PAH 8270 ❑ HOLD PAH ❑ SVOC 625 ❑ | 8270 PEST ❑ 625 PEST/PCB ❑ 608 PCB ❑ 608 PCB ❑ | 8270 O-P PEST ❑ 8082 PCB ❑ 8270 PCB ❑ | 8321 HERB ❑ T PHOS, AMMONIA ❑ | METALS 6020 ❑ METALS 200.8 ❑ DISS. METALS ❑ | RCRA ❑ TX11 ❑ | PH ❑ HEX CHROM ❑ ALKALINITY X ❑ | CHLORIDE ❑ ANIONS ❑ COD ❑ | TCLP-SVOC ❑ VOC ❑ PEST ❑ HERB ❑ | TCLP-METALS ❑ RCRA 8 ❑ TX-11 ❑ Pb ❑ | RCI ❑ FLASHPOINT ❑ DGAS ❑ | TDS ❑ TSS ❑ % MOISTURE ❑ CYANIDE ❑ | APPENDIX III & IV NO3, PO4, Na, Mg, K Ferrous Fe Ferric Fe | FIELD NOTES

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO_3	H_2SO_4 ❑ NaOH ❑	ICE	UNPRESERVED	RCRA	PH	TCLP-METALS	APPENDIX III & IV	FIELD NOTES
LAKE SAMPLE	01	5-13-20	1400	W	P	9		X		X		X		X	X	
POND SAMPLE	02	5-13-20	1425	W	P	9		X		X		X		X	X	

RELINQUISHED BY: (Signature) DATE/TIME 5-13-20 1800 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 5/14/20 0905 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: 3.1/2.3/4.4 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

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder**

Date Received: **5/14/2020**

Work Order Number **2005110**

Received by: **EL**

Checklist completed by: _____ (Signature) 5/14/2020 (Date)

Reviewed by _____ (Initials) 5/14/2020 (Date)

Carrier name: FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**3.1** °C
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

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

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Luminant-MLSES CCR&MNA	**LRC Date:** 6/10/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005110
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			X		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	X				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		3) Were calculations checked by a peer or supervisor?	X				
		4) Were all analyte identifications checked by a peer or supervisor?	X				
		5) Were sample detection limits reported for all analytes not detected?	X				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			X		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			X		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			X		
		9) If required for the project, TICs reported?			X		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			X		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	X				
		2) Were blanks analyzed at the appropriate frequency?	X				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		4) Were blank concentrations < MDL?	X				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			X		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	X				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		3) Were LCSs analyzed at the required frequency?	X				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		6) Was the LCSD RPD within QC limits (if applicable)?	X				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	X				
		2) Were MS/MSD analyzed at the appropriate frequency?	X				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	X				
		2) Were analytical duplicates analyzed at the appropriate frequency?	X				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	X				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	X				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Luminant-MLSES CCR&MNA	**LRC Date:** 6/10/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2005110
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			**S9-01**
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).
3 NA = Not applicable.
4 NR = Not Reviewed.
5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 25-28 2019. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

06/11/20

Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *10-Jun-20*

CLIENT: Golder
Project: Luminant-MLSES CCR&MNA
Lab Order: 2005110

CASE NARRATIVE

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

Method SW6020B - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions Analysis
Method M2320 B - Alkalinity Analysis
M3500-Fe D - Ferrous Iron Analysis (this parameter is not NELAP certified)
M3500-Fe D - Ferric Iron (calculation) (this calculation is not NELAP certified)
Method M4500-P E - Orthophosphate Analysis
Method M2540C - TDS Analysis

Exception Report R1-01

The samples were received and log-in performed on 5/14/20. A total of 2 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Metals analysis performed on 5/19/20 and 5/20/20 the matrix spike and matrix spike duplicate recoveries were above control limits for Boron 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.

Exception Report S9-01

For Metals analysis performed on 5/19/20 the PDS recovery was out of control limits for Calcium. This is flagged accordingly in the QC summary report. The serial dilution was within control limits for this analyte. No further corrective actions were taken.

DHL Analytical, Inc.

Date: *10-Jun-20*

CLIENT: Golder
Project: Luminant-MLSES CCR&MNA
Lab Order: 2005110

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2005110-01	Lake Sample		05/13/20 02:00 PM	5/14/2020
2005110-02	Pond Sample		05/13/20 02:25 PM	5/14/2020

Lab Order: 2005110
Client: Golder
Project: Luminant-MLSES CCR&MNA

PREP DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Test Number	Test Name	Prep Date	Batch ID
2005110-01A	Lake Sample	05/13/20 02:00 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005110-01B	Lake Sample	05/13/20 02:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	Lake Sample	05/13/20 02:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	Lake Sample	05/13/20 02:00 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005110-01C	Lake Sample	05/13/20 02:00 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	Lake Sample	05/13/20 02:00 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	Lake Sample	05/13/20 02:00 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
	Lake Sample	05/13/20 02:00 PM	Aqueous	M2540C	TDS Preparation	05/14/20 01:43 PM	96355
2005110-02A	Pond Sample	05/13/20 02:25 PM	Aqueous	M3500-Fe	Ferrous Iron Prep Water	05/18/20 09:50 AM	96388
2005110-02B	Pond Sample	05/13/20 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	Pond Sample	05/13/20 02:25 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	05/15/20 08:56 AM	96359
	Pond Sample	05/13/20 02:25 PM	Aqueous	SW7470A	Mercury Aq Prep	05/19/20 12:26 PM	96414
2005110-02C	Pond Sample	05/13/20 02:25 PM	Aqueous	M2320 B	Alkalinity Preparation	05/14/20 09:44 AM	96346
	Pond Sample	05/13/20 02:25 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	Pond Sample	05/13/20 02:25 PM	Aqueous	E300	Anion Preparation	05/14/20 10:14 AM	96350
	Pond Sample	05/13/20 02:25 PM	Aqueous	M4500-P E	Orthophosphate Prep	05/14/20 10:50 AM	96353
	Pond Sample	05/13/20 02:25 PM	Aqueous	M2540C	TDS Preparation	05/14/20 01:43 PM	96355

Lab Order: 2005110
Client: Golder
Project: Luminant-MLSES CCR&MNA

ANALYTICAL DATES REPORT

Sample ID	Client Sample ID	Matrix	Test Number	Test Name	Batch ID	Dilution	Analysis Date	Run ID
2005110-01A	Lake Sample	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/18/20 10:00 AM	UV/VIS_2_200518C
	Lake Sample	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:07 PM	UV/VIS_2_200518B
2005110-01B	Lake Sample	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:18 PM	CETAC2_HG_200519B
	Lake Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 01:11 PM	ICP-MS5_200519B
	Lake Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/20/20 12:23 PM	ICP-MS5_200520B
2005110-01C	Lake Sample	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:14 PM	TITRATOR_200514B
	Lake Sample	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 01:19 PM	IC2_200514A
	Lake Sample	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:27 PM	UV/VIS_2_200514B
	Lake Sample	Aqueous	M2540C	Total Dissolved Solids	96355	1	05/14/20 04:15 PM	WC_200514A
2005110-02A	Pond Sample	Aqueous	M3500-Fe D	Ferric Iron (Calculated)	96388	1	05/18/20 10:00 AM	UV/VIS_2_200518C
	Pond Sample	Aqueous	M3500-Fe D	Ferrous Iron	96388	1	05/18/20 02:08 PM	UV/VIS_2_200518B
2005110-02B	Pond Sample	Aqueous	SW7470A	Mercury Total: Aqueous	96414	1	05/19/20 03:20 PM	CETAC2_HG_200519B
	Pond Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	1	05/19/20 01:13 PM	ICP-MS5_200519B
	Pond Sample	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	96359	50	05/20/20 12:25 PM	ICP-MS5_200520B
2005110-02C	Pond Sample	Aqueous	M2320 B	Alkalinity	96346	1	05/14/20 01:21 PM	TITRATOR_200514B
	Pond Sample	Aqueous	E300	Anions by IC method - Water	96350	1	05/14/20 01:35 PM	IC2_200514A
	Pond Sample	Aqueous	E300	Anions by IC method - Water	96350	50	05/14/20 05:26 PM	IC2_200514A
	Pond Sample	Aqueous	M4500-P E	Orthophosphate	96353	1	05/14/20 02:29 PM	UV/VIS_2_200514B
	Pond Sample	Aqueous	M2540C	Total Dissolved Solids	96355	1	05/14/20 04:15 PM	WC_200514A

DHL Analytical, Inc.

Date: *10-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Lake Sample
Project:	Luminant-MLSES CCR&MNA	**Lab ID:**	2005110-01
Project No:	19122262-C2020	**Collection Date:**	05/13/20 02:00 PM
Lab Order:	2005110	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	05/19/20 01:11 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	05/19/20 01:11 PM
Barium	0.0594	0.00300	0.0100		mg/L	1	05/19/20 01:11 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:11 PM
Boron	0.0971	0.0100	0.0300		mg/L	1	05/20/20 12:23 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:11 PM
Calcium	15.8	0.100	0.300		mg/L	1	05/19/20 01:11 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	05/19/20 01:11 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/19/20 01:11 PM
Iron	0.131	0.0300	0.100		mg/L	1	05/19/20 01:11 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:11 PM
Lithium	<0.00500	0.00500	0.0100		mg/L	1	05/19/20 01:11 PM
Magnesium	6.55	0.100	0.300		mg/L	1	05/19/20 01:11 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	05/19/20 01:11 PM
Potassium	2.88	0.100	0.300		mg/L	1	05/19/20 01:11 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	05/19/20 01:11 PM
Sodium	13.2	0.100	0.300		mg/L	1	05/19/20 01:11 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	05/19/20 01:11 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:18 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	14.7	0.300	1.00		mg/L	1	05/14/20 01:19 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	05/14/20 01:19 PM
Nitrate-N	<0.100	0.100	0.500		mg/L	1	05/14/20 01:19 PM
Sulfate	40.6	1.00	3.00		mg/L	1	05/14/20 01:19 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	32.9	10.0	20.0		mg/L @ pH 4.48	1	05/14/20 01:14 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.48	1	05/14/20 01:14 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.48	1	05/14/20 01:14 PM
Alkalinity, Total (As CaCO3)	32.9	20.0	20.0		mg/L @ pH 4.48	1	05/14/20 01:14 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	0.131	0.0500	0.100	N	mg/L	1	05/18/20 10:00 AM
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:07 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *10-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Lake Sample
Project:	Luminant-MLSES CCR&MNA	**Lab ID:**	2005110-01
Project No:	19122262-C2020	**Collection Date:**	05/13/20 02:00 PM
Lab Order:	2005110	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/14/20 02:27 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	140	10.0	10.0		mg/L	1	05/14/20 04:15 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *10-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Pond Sample
Project:	Luminant-MLSES CCR&MNA	**Lab ID:**	2005110-02
Project No:	19122262-C2020	**Collection Date:**	05/13/20 02:25 PM
Lab Order:	2005110	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **RO**
Antimony	0.00210	0.000800	0.00250	J	mg/L	1	05/19/20 01:13 PM
Arsenic	0.00372	0.00200	0.00500	J	mg/L	1	05/19/20 01:13 PM
Barium	0.0899	0.00300	0.0100		mg/L	1	05/19/20 01:13 PM
Beryllium	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:13 PM
Boron	24.1	0.500	1.50		mg/L	50	05/20/20 12:25 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:13 PM
Calcium	459	5.00	15.0		mg/L	50	05/20/20 12:25 PM
Chromium	0.00333	0.00200	0.00500	J	mg/L	1	05/19/20 01:13 PM
Cobalt	<0.00300	0.00300	0.00500		mg/L	1	05/19/20 01:13 PM
Iron	<0.0300	0.0300	0.100		mg/L	1	05/19/20 01:13 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	05/19/20 01:13 PM
Lithium	0.124	0.00500	0.0100		mg/L	1	05/19/20 01:13 PM
Magnesium	560	5.00	15.0		mg/L	50	05/20/20 12:25 PM
Molybdenum	0.0469	0.00200	0.00500		mg/L	1	05/19/20 01:13 PM
Potassium	36.3	5.00	15.0		mg/L	50	05/20/20 12:25 PM
Selenium	1.23	0.00200	0.00500		mg/L	1	05/19/20 01:13 PM
Sodium	280	5.00	15.0		mg/L	50	05/20/20 12:25 PM
Thallium	0.000585	0.000500	0.00150	J	mg/L	1	05/19/20 01:13 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **BM**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	05/19/20 03:20 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **SNM**
Chloride	526	15.0	50.0		mg/L	50	05/14/20 05:26 PM
Fluoride	19.1	0.100	0.400		mg/L	1	05/14/20 01:35 PM
Nitrate-N	20.2	0.100	0.500		mg/L	1	05/14/20 01:35 PM
Sulfate	3040	50.0	150		mg/L	50	05/14/20 05:26 PM
ALKALINITY		**M2320 B**					Analyst: **BTJ**
Alkalinity, Bicarbonate (As CaCO3)	77.3	10.0	20.0		mg/L @ pH 4.39	1	05/14/20 01:21 PM
Alkalinity, Carbonate (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.39	1	05/14/20 01:21 PM
Alkalinity, Hydroxide (As CaCO3)	<10.0	10.0	20.0		mg/L @ pH 4.39	1	05/14/20 01:21 PM
Alkalinity, Total (As CaCO3)	77.3	20.0	20.0		mg/L @ pH 4.39	1	05/14/20 01:21 PM
FERRIC IRON (CALCULATED)		**M3500-FE D**					Analyst: **CAC**
Iron, Ferric	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 10:00 AM
FERROUS IRON		**M3500-FE D**					Analyst: **BTJ**
Iron, Ferrous	<0.0500	0.0500	0.100	N	mg/L	1	05/18/20 02:08 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *10-Jun-20*

CLIENT:	Golder	**Client Sample ID:**	Pond Sample
Project:	Luminant-MLSES CCR&MNA	**Lab ID:**	2005110-02
Project No:	19122262-C2020	**Collection Date:**	05/13/20 02:25 PM
Lab Order:	2005110	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
ORTHOPHOSPHATE		**M4500-P E**					Analyst: **BTJ**
Phosphorus, Total Orthophosphate (As P)	<0.0300	0.0300	0.100		mg/L	1	05/14/20 02:29 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	5540	50.0	50.0		mg/L	1	05/14/20 04:15 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200304C

Sample ID: **DCS-95289** Batch ID: **95289** TestNo: **SW7470A** Units: **mg/L**
SampType: **DCS** Run ID: **CETAC2_HG_200304C** Analysis Date: **3/4/2020 12:11:09 PM** Prep Date: **3/4/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.000175	0.000200	0.000200	0	87.5	82	119	0	0	

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200519B

The QC data in batch 96414 applies to the following samples: 2005110-01B, 2005110-02B

Sample ID: **MB-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MBLK**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:11:32 PM**	Prep Date: **5/19/2020**

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

Sample ID: **LCS-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:13:48 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00206	0.000200	0.00200	0	103	85	115			

Sample ID: **LCSD-96414**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **LCSD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:16:04 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00205	0.000200	0.00200	0	103	85	115	0.487	15	

Sample ID: **2005114-01A MS**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:40:59 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00985	0.00100	0.0100	0	98.5	80	120			

Sample ID: **2005114-01A MSD**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **MSD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:43:16 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00960	0.00100	0.0100	0	96.0	80	120	2.57	15	

Sample ID: **2005114-01A SD**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **SD**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:45:32 PM**	Prep Date: **5/19/2020**

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

Sample ID: **2005114-01A PDS**	Batch ID: **96414**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **PDS**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:47:48 PM**	Prep Date: **5/19/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0120	0.00100	0.0125	0	96.0	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200519B

Sample ID: **ICV-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 10:31:55 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00391	0.000200	0.00400	0	97.8	90	110			

Sample ID: **CCV5-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 1:29:56 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00213	0.000200	0.00200	0	106	90	110			

Sample ID: **CCV6-200519**	Batch ID: **R110550**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_200519B**	Analysis Date: **5/19/2020 3:52:22 PM**	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			

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200408C

Sample ID: **DCS1-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:16:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.000932	0.00250	0.00100	0	93.2	70	130	0	0	
Beryllium	0.000472	0.00100	0.000500	0	94.4	70	130	0	0	
Cadmium	0.000492	0.00100	0.000500	0	98.4	70	130	0	0	
Lead	0.000496	0.00100	0.000500	0	99.2	70	130	0	0	
Thallium	0.000468	0.00150	0.000500	0	93.6	70	130	0	0	

Sample ID: **DCS2-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:19:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.310	0.300	0.300	0	103	70	130	0	0	
Iron	0.0591	0.100	0.0500	0	118	70	130	0	0	
Magnesium	0.298	0.300	0.300	0	99.3	70	130	0	0	
Potassium	0.285	0.300	0.300	0	95.1	70	130	0	0	
Sodium	0.295	0.300	0.300	0	98.4	70	130	0	0	

Sample ID: **DCS3-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:21:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00466	0.00500	0.00500	0	93.2	70	130	0	0	
Barium	0.00478	0.0100	0.00500	0	95.6	70	130	0	0	
Chromium	0.00600	0.00500	0.00500	0	120	70	130	0	0	
Cobalt	0.00473	0.00500	0.00500	0	94.6	70	130	0	0	
Lithium	0.00473	0.0100	0.00500	0	94.6	70	130	0	0	
Molybdenum	0.00466	0.00500	0.00500	0	93.2	70	130	0	0	
Selenium	0.00517	0.00500	0.00500	0	103	70	130	0	0	

Sample ID: **DCS4-95814**	Batch ID: **95814**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS5_200408C**	Analysis Date: **4/8/2020 11:28:00 AM**	Prep Date: **4/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0286	0.0300	0.0300	0	95.2	70	130	0	0	

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200519B**

The QC data in batch 96359 applies to the following samples: 2005110-01B, 2005110-02B

Sample ID: **MB-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:37:00 PM** Prep Date: **5/15/2020**

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-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:40:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	80	120			
Arsenic	0.208	0.00500	0.200	0	104	80	120			
Barium	0.202	0.0100	0.200	0	101	80	120			
Beryllium	0.201	0.00100	0.200	0	100	80	120			
Cadmium	0.206	0.00100	0.200	0	103	80	120			
Calcium	5.42	0.300	5.00	0	108	80	120			
Chromium	0.200	0.00500	0.200	0	100	80	120			
Cobalt	0.205	0.00500	0.200	0	102	80	120			
Iron	5.24	0.100	5.00	0	105	80	120			
Lead	0.201	0.00100	0.200	0	100	80	120			
Lithium	0.204	0.0100	0.200	0	102	80	120			
Magnesium	5.15	0.300	5.00	0	103	80	120			
Molybdenum	0.205	0.00500	0.200	0	102	80	120			
Potassium	5.14	0.300	5.00	0	103	80	120			
Selenium	0.213	0.00500	0.200	0	107	80	120			
Sodium	5.06	0.300	5.00	0	101	80	120			
Thallium	0.200	0.00150	0.200	0	99.9	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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **LCSD-96359** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:42:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	80	120	0.135	15	
Arsenic	0.207	0.00500	0.200	0	103	80	120	0.366	15	
Barium	0.206	0.0100	0.200	0	103	80	120	1.84	15	
Beryllium	0.202	0.00100	0.200	0	101	80	120	0.541	15	
Cadmium	0.209	0.00100	0.200	0	104	80	120	1.41	15	
Calcium	5.32	0.300	5.00	0	106	80	120	2.00	15	
Chromium	0.201	0.00500	0.200	0	100	80	120	0.209	15	
Cobalt	0.206	0.00500	0.200	0	103	80	120	0.548	15	
Iron	5.26	0.100	5.00	0	105	80	120	0.447	15	
Lead	0.199	0.00100	0.200	0	99.6	80	120	0.766	15	
Lithium	0.201	0.0100	0.200	0	100	80	120	1.71	15	
Magnesium	5.14	0.300	5.00	0	103	80	120	0.149	15	
Molybdenum	0.205	0.00500	0.200	0	103	80	120	0.262	15	
Potassium	5.17	0.300	5.00	0	103	80	120	0.538	15	
Selenium	0.212	0.00500	0.200	0	106	80	120	0.751	15	
Sodium	5.07	0.300	5.00	0	101	80	120	0.105	15	
Thallium	0.198	0.00150	0.200	0	99.2	80	120	0.704	15	

Sample ID: **2005111-01B SD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:53:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	20	
Arsenic	<0.0100	0.0250	0	0.00893				0	20	
Barium	0.0171	0.0500	0	0.0170				0.492	20	
Beryllium	0.0169	0.00500	0	0.0164				3.12	20	
Cadmium	<0.00150	0.00500	0	0				0	20	
Calcium	260	1.50	0	257				0.815	20	
Chromium	<0.0100	0.0250	0	0.00205				0	20	
Cobalt	0.449	0.0250	0	0.439				2.12	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	0.248	0.0500	0	0.249				0.282	20	
Molybdenum	<0.0100	0.0250	0	0				0	20	
Potassium	6.35	1.50	0	6.26				1.44	20	
Selenium	0.0328	0.0250	0	0.0299				9.36	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2005111-01B PDS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:20:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **2005111-01B PDS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:20:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.204	0.00250	0.200	0	102	75	125			
Arsenic	0.200	0.00500	0.200	0.00893	95.3	75	125			
Barium	0.225	0.0100	0.200	0.0170	104	75	125			
Beryllium	0.203	0.00100	0.200	0.0164	93.4	75	125			
Cadmium	0.195	0.00100	0.200	0	97.5	75	125			
Calcium	248	0.300	5.00	257	-182	75	125			S
Chromium	0.202	0.00500	0.200	0.00205	99.7	75	125			
Cobalt	0.606	0.00500	0.200	0.439	83.3	75	125			
Lead	0.203	0.00100	0.200	0	102	75	125			
Lithium	0.417	0.0100	0.200	0.249	84.4	75	125			
Molybdenum	0.205	0.00500	0.200	0	103	75	125			
Potassium	10.9	0.300	5.00	6.26	93.7	75	125			
Selenium	0.217	0.00500	0.200	0.0299	93.6	75	125			
Thallium	0.201	0.00150	0.200	0	101	75	125			

Sample ID: **2005111-01B MS** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:22:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	75	125			
Arsenic	0.203	0.00500	0.200	0.00893	97.3	75	125			
Barium	0.223	0.0100	0.200	0.0170	103	75	125			
Beryllium	0.206	0.00100	0.200	0.0164	94.7	75	125			
Cadmium	0.194	0.00100	0.200	0	96.8	75	125			
Calcium	263	0.300	5.00	257	118	75	125			
Chromium	0.194	0.00500	0.200	0.00205	96.1	75	125			
Cobalt	0.633	0.00500	0.200	0.439	96.8	75	125			
Iron	43.4	0.100	5.00	38.9	90.4	75	125			
Lead	0.198	0.00100	0.200	0	99.1	75	125			
Lithium	0.430	0.0100	0.200	0.249	90.6	75	125			
Magnesium	173	0.300	5.00	167	111	75	125			
Molybdenum	0.211	0.00500	0.200	0	106	75	125			
Potassium	11.4	0.300	5.00	6.26	102	75	125			
Selenium	0.225	0.00500	0.200	0.0299	97.4	75	125			
Sodium	664	0.300	5.00	656	169	75	125			S
Thallium	0.199	0.00150	0.200	0	99.4	75	125			

Sample ID: **2005111-01B MSD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:24:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **2005111-01B MSD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:24:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	75	125	0.929	15	
Arsenic	0.203	0.00500	0.200	0.00893	97.0	75	125	0.261	15	
Barium	0.219	0.0100	0.200	0.0170	101	75	125	2.08	15	
Beryllium	0.206	0.00100	0.200	0.0164	95.0	75	125	0.323	15	
Cadmium	0.193	0.00100	0.200	0	96.5	75	125	0.269	15	
Calcium	262	0.300	5.00	257	92.8	75	125	0.471	15	
Chromium	0.193	0.00500	0.200	0.00205	95.7	75	125	0.411	15	
Cobalt	0.632	0.00500	0.200	0.439	96.4	75	125	0.138	15	
Iron	43.4	0.100	5.00	38.9	90.2	75	125	0.021	15	
Lead	0.200	0.00100	0.200	0	100	75	125	1.06	15	
Lithium	0.437	0.0100	0.200	0.249	94.3	75	125	1.66	15	
Magnesium	171	0.300	5.00	167	83.6	75	125	0.788	15	
Molybdenum	0.208	0.00500	0.200	0	104	75	125	1.36	15	
Potassium	11.3	0.300	5.00	6.26	101	75	125	0.335	15	
Selenium	0.227	0.00500	0.200	0.0299	98.3	75	125	0.785	15	
Sodium	663	0.300	5.00	656	142	75	125	0.206	15	S
Thallium	0.201	0.00150	0.200	0	100	75	125	0.951	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **ICV-200519** Batch ID: **R110549** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 10:48:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.101	0.00250	0.100	0	101	90	110			
Arsenic	0.0990	0.00500	0.100	0	99.0	90	110			
Barium	0.102	0.0100	0.100	0	102	90	110			
Beryllium	0.0981	0.00100	0.100	0	98.1	90	110			
Cadmium	0.102	0.00100	0.100	0	102	90	110			
Calcium	2.60	0.300	2.50	0	104	90	110			
Chromium	0.101	0.00500	0.100	0	101	90	110			
Cobalt	0.100	0.00500	0.100	0	100	90	110			
Iron	2.57	0.100	2.50	0	103	90	110			
Lead	0.0993	0.00100	0.100	0	99.3	90	110			
Lithium	0.0998	0.0100	0.100	0	99.8	90	110			
Magnesium	2.47	0.300	2.50	0	98.6	90	110			
Molybdenum	0.0975	0.00500	0.100	0	97.5	90	110			
Potassium	2.52	0.300	2.50	0	101	90	110			
Selenium	0.103	0.00500	0.100	0	103	90	110			
Sodium	2.49	0.300	2.50	0	99.4	90	110			
Thallium	0.0973	0.00150	0.100	0	97.3	90	110			

Sample ID: **LCVL-200519** Batch ID: **R110549** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 11:00:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00203	0.00250	0.00200	0	102	80	120			
Arsenic	0.00510	0.00500	0.00500	0	102	80	120			
Barium	0.00527	0.0100	0.00500	0	105	80	120			
Beryllium	0.00109	0.00100	0.00100	0	109	80	120			
Cadmium	0.00102	0.00100	0.00100	0	102	80	120			
Calcium	0.115	0.300	0.100	0	115	80	120			
Chromium	0.00502	0.00500	0.00500	0	100	80	120			
Cobalt	0.00510	0.00500	0.00500	0	102	80	120			
Iron	0.101	0.100	0.100	0	101	80	120			
Lead	0.00103	0.00100	0.00100	0	103	80	120			
Lithium	0.0100	0.0100	0.0100	0	100	80	120			
Magnesium	0.101	0.300	0.100	0	101	80	120			
Molybdenum	0.00524	0.00500	0.00500	0	105	80	120			
Potassium	0.102	0.300	0.100	0	102	80	120			
Selenium	0.00565	0.00500	0.00500	0	113	80	120			
Sodium	0.103	0.300	0.100	0	103	80	120			
Thallium	0.000986	0.00150	0.00100	0	98.6	80	120			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200519B

Sample ID: **CCV2-200519** Batch ID: **R110549** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 12:26:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	101	90	110			
Arsenic	0.207	0.00500	0.200	0	103	90	110			
Barium	0.200	0.0100	0.200	0	99.8	90	110			
Beryllium	0.202	0.00100	0.200	0	101	90	110			
Cadmium	0.204	0.00100	0.200	0	102	90	110			
Calcium	5.20	0.300	5.00	0	104	90	110			
Chromium	0.198	0.00500	0.200	0	99.1	90	110			
Cobalt	0.204	0.00500	0.200	0	102	90	110			
Iron	5.14	0.100	5.00	0	103	90	110			
Lead	0.197	0.00100	0.200	0	98.3	90	110			
Lithium	0.206	0.0100	0.200	0	103	90	110			
Magnesium	5.09	0.300	5.00	0	102	90	110			
Molybdenum	0.204	0.00500	0.200	0	102	90	110			
Potassium	5.11	0.300	5.00	0	102	90	110			
Selenium	0.214	0.00500	0.200	0	107	90	110			
Sodium	5.02	0.300	5.00	0	100	90	110			
Thallium	0.196	0.00150	0.200	0	97.8	90	110			

Sample ID: **CCV3-200519** Batch ID: **R110549** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200519B** Analysis Date: **5/19/2020 1:44:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.8	90	110			
Arsenic	0.206	0.00500	0.200	0	103	90	110			
Barium	0.201	0.0100	0.200	0	101	90	110			
Beryllium	0.202	0.00100	0.200	0	101	90	110			
Cadmium	0.206	0.00100	0.200	0	103	90	110			
Calcium	5.19	0.300	5.00	0	104	90	110			
Chromium	0.199	0.00500	0.200	0	99.3	90	110			
Cobalt	0.206	0.00500	0.200	0	103	90	110			
Iron	5.17	0.100	5.00	0	103	90	110			
Lead	0.196	0.00100	0.200	0	98.0	90	110			
Lithium	0.206	0.0100	0.200	0	103	90	110			
Magnesium	5.17	0.300	5.00	0	103	90	110			
Molybdenum	0.205	0.00500	0.200	0	103	90	110			
Potassium	5.10	0.300	5.00	0	102	90	110			
Selenium	0.215	0.00500	0.200	0	107	90	110			
Sodium	5.13	0.300	5.00	0	103	90	110			
Thallium	0.196	0.00150	0.200	0	97.8	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200520B**

The QC data in batch 96359 applies to the following samples: 2005110-01B, 2005110-02B

Sample ID: **MB-96359**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MBLK**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:10:00 PM**	Prep Date: **5/15/2020**

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

Sample ID: **LCS-96359**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCS**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:13:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.193	0.0300	0.200	0	96.4	80	120			

Sample ID: **LCSD-96359**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:15:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.208	0.0300	0.200	0	104	80	120	7.81	15	

Sample ID: **2005111-01B SD**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:26:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	20.5	7.50	0	19.0				7.43	20	
Iron	39.2	25.0	0	39.1				0.310	20	
Magnesium	169	75.0	0	170				0.507	20	
Sodium	661	75.0	0	682				3.22	20	

Sample ID: **2005111-01B PDS**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:53:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	28.5	1.50	10.0	19.0	95.5	75	125			
Iron	300	5.00	250	39.1	104	75	125			
Magnesium	420	15.0	250	170	100	75	125			
Sodium	949	15.0	250	682	107	75	125			

Sample ID: **2005111-01B MS**	Batch ID: **96359**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_200520B**	Analysis Date: **5/20/2020 1:55:00 PM**	Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	21.0	1.50	0.200	19.0	1020	75	125			S

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **2005111-01B MSD** Batch ID: **96359** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 1:57:00 PM** Prep Date: **5/15/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	21.3	1.50	0.200	19.0	1160	75	125	1.40	15	S

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200520B

Sample ID: **ICV-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **ICV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 10:52:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0987	0.0300	0.100	0	98.7	90	110			
Calcium	2.60	0.300	2.50	0	104	90	110			
Iron	2.54	0.100	2.50	0	102	90	110			
Magnesium	2.47	0.300	2.50	0	98.6	90	110			
Potassium	2.51	0.300	2.50	0	101	90	110			
Sodium	2.50	0.300	2.50	0	99.9	90	110			

Sample ID: **LCVL-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCVL** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 11:04:00 AM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0216	0.0300	0.0200	0	108	80	120			
Calcium	0.106	0.300	0.100	0	106	80	120			
Iron	0.0988	0.100	0.100	0	98.8	80	120			
Magnesium	0.0961	0.300	0.100	0	96.1	80	120			
Potassium	0.103	0.300	0.100	0	103	80	120			
Sodium	0.100	0.300	0.100	0	100	80	120			

Sample ID: **CCV1-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 12:00:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.200	0.0300	0.200	0	100	90	110			
Calcium	4.94	0.300	5.00	0	98.9	90	110			
Magnesium	5.05	0.300	5.00	0	101	90	110			
Potassium	5.01	0.300	5.00	0	100	90	110			
Sodium	5.01	0.300	5.00	0	100	90	110			

Sample ID: **CCV2-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 12:52:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.195	0.0300	0.200	0	97.3	90	110			
Calcium	4.98	0.300	5.00	0	99.7	90	110			
Iron	5.06	0.100	5.00	0	101	90	110			
Magnesium	5.00	0.300	5.00	0	99.9	90	110			
Potassium	4.96	0.300	5.00	0	99.2	90	110			
Sodium	4.98	0.300	5.00	0	99.5	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **ICP-MS5_200520B**

Sample ID: **CCV3-200520** Batch ID: **R110581** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_200520B** Analysis Date: **5/20/2020 2:09:00 PM** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.198	0.0300	0.200	0	98.9	90	110			
Iron	5.09	0.100	5.00	0	102	90	110			
Magnesium	5.09	0.300	5.00	0	102	90	110			
Potassium	5.00	0.300	5.00	0	100	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200421A

Sample ID: **DCS2-96036** Batch ID: **96036** TestNo: **E300** Units: **mg/L**
SampType: **DCS2** Run ID: **IC2_200421A** Analysis Date: **4/21/2020 11:47:08 AM** Prep Date: **4/21/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.420	1.00	0.5000	0	84.1	70	130	0	0	
Fluoride	0.154	0.400	0.2000	0	77.1	70	130	0	0	
Nitrate-N	0.246	0.0500	0.2500	0	98.5	70	130	0	0	
Sulfate	1.43	3.00	1.500	0	95.3	70	130	0	0	

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200514A

The QC data in batch 96350 applies to the following samples: 2005110-01C, 2005110-02C

Sample ID: **MB-96350** Batch ID: **96350** TestNo: **E300** Units: **mg/L**
SampType: **MBLK** Run ID: **IC2_200514A** Analysis Date: **5/14/2020 12:07:19 PM** Prep Date: **5/14/2020**

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-96350** Batch ID: **96350** TestNo: **E300** Units: **mg/L**
SampType: **LCS** Run ID: **IC2_200514A** Analysis Date: **5/14/2020 12:23:19 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110			
Fluoride	3.76	0.400	4.000	0	94.1	90	110			
Nitrate-N	5.07	0.500	5.000	0	101	90	110			
Sulfate	30.3	3.00	30.00	0	101	90	110			

Sample ID: **LCSD-96350** Batch ID: **96350** TestNo: **E300** Units: **mg/L**
SampType: **LCSD** Run ID: **IC2_200514A** Analysis Date: **5/14/2020 12:39:19 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.2	1.00	10.00	0	102	90	110	0.428	20	
Fluoride	3.75	0.400	4.000	0	93.8	90	110	0.299	20	
Nitrate-N	5.05	0.500	5.000	0	101	90	110	0.311	20	
Sulfate	30.2	3.00	30.00	0	101	90	110	0.325	20	

Sample ID: **2005110-01CMS** Batch ID: **96350** TestNo: **E300** Units: **mg/L**
SampType: **MS** Run ID: **IC2_200514A** Analysis Date: **5/14/2020 5:42:45 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	33.8	1.00	20.00	14.65	95.6	90	110			
Fluoride	20.2	0.400	20.00	0	101	90	110			
Nitrate-N	4.31	0.500	4.516	0	95.4	90	110			
Sulfate	59.4	3.00	20.00	40.61	94.0	90	110			

Sample ID: **2005110-01CMSD** Batch ID: **96350** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_200514A** Analysis Date: **5/14/2020 5:58:45 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	33.8	1.00	20.00	14.65	95.7	90	110	0.067	20	
Fluoride	20.2	0.400	20.00	0	101	90	110	0.018	20	
Nitrate-N	4.31	0.500	4.516	0	95.4	90	110	0.076	20	
Sulfate	59.3	3.00	20.00	40.61	93.5	90	110	0.148	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200514A

Sample ID: **ICV-200514**	Batch ID: **R110500**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 11:35:19 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	26.3	1.00	25.00	0	105	90	110			
Fluoride	9.97	0.400	10.00	0	99.7	90	110			
Nitrate-N	13.2	0.500	12.50	0	106	90	110			
Sulfate	78.9	3.00	75.00	0	105	90	110			

Sample ID: **CCV1-200514**	Batch ID: **R110500**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_200514A**	Analysis Date: **5/14/2020 7:02:46 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	10.3	1.00	10.00	0	103	90	110			
Fluoride	3.91	0.400	4.000	0	97.8	90	110			
Nitrate-N	5.09	0.500	5.000	0	102	90	110			
Sulfate	30.8	3.00	30.00	0	103	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **TITRATOR_200514B**

The QC data in batch 96346 applies to the following samples: 2005110-01C, 2005110-02C

Sample ID: **MB-96346** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.23**
SampType: **MBLK** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:22:00 AM** Prep Date: **5/14/2020**

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-96346** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.22**
SampType: **LCS** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:26:00 AM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	53.2	20.0	50.00	0	106	74	129			

Sample ID: **2005076-01C-DUP** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.53**
SampType: **DUP** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 11:46:00 AM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	130	20.0	0	133.8				3.11	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)	130	20.0	0	133.8				3.11	20	

Sample ID: **2005110-01C-DUP** Batch ID: **96346** TestNo: **M2320 B** Units: **mg/L @ pH 4.5**
SampType: **DUP** Run ID: **TITRATOR_200514B** Analysis Date: **5/14/2020 1:18:00 PM** Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	32.0	20.0	0	32.90				2.77	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)	32.0	20.0	0	32.90				2.77	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: TITRATOR_200514B

Sample ID: **ICV-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.36**
SampType: **ICV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 11:20:00 AM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	31.5	20.0	0							
Alkalinity, Carbonate (As CaCO3)	67.8	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.4	20.0	100.0	0	99.4	98	102			

Sample ID: **CCV1-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.33**
SampType: **CCV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 1:10:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	39.8	20.0	0							
Alkalinity, Carbonate (As CaCO3)	60.2	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	99.9	20.0	100.0	0	99.9	90	110			

Sample ID: **CCV2-200514**	Batch ID: **R110504**	TestNo: **M2320 B**	Units: **mg/L @ pH 4.32**
SampType: **CCV**	Run ID: **TITRATOR_200514B**	Analysis Date: **5/14/2020 2:01:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	42.2	20.0	0							
Alkalinity, Carbonate (As CaCO3)	58.1	20.0	0							
Alkalinity, Hydroxide (As CaCO3)	<10.0	20.0	0							
Alkalinity, Total (As CaCO3)	100	20.0	100.0	0	100	90	110			

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200323B

Sample ID: **DCS-95613** Batch ID: **95613** TestNo: **M3500-Fe D** Units: **mg/L**
SampType: **DCS** Run ID: **UV/VIS_2_200323B** Analysis Date: **3/23/2020 1:30:00 PM** Prep Date: **3/23/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0580	0.100	0.05000	0	116	65	135	0	0	N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200507C**

Sample ID: **DCS-96253** Batch ID: **96253** TestNo: **M4500-P E** Units: **mg/L**
SampType: **DCS** Run ID: **UV/VIS_2_200507C** Analysis Date: **5/7/2020 2:22:00 PM** Prep Date: **5/7/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.0480	0.100	0.05000	0	96.0	50	200	0	0	

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: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200514B**

The QC data in batch 96353 applies to the following samples: 2005110-01C, 2005110-02C

Sample ID: **MB-96353**	Batch ID: **96353**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:26:00 PM**	Prep Date: **5/14/2020**

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

Sample ID: **LCS-96353**	Batch ID: **96353**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:26:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.496	0.100	0.5000	0	99.2	80	120			

Sample ID: **LCSD-96353**	Batch ID: **96353**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:27:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.495	0.100	0.5000	0	99.0	80	120	0.202	15	

Sample ID: **2005110-01CMS**	Batch ID: **96353**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:28:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.474	0.100	0.5000	0	94.8	80	120			

Sample ID: **2005110-01CMSD**	Batch ID: **96353**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:28:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.482	0.100	0.5000	0	96.4	80	120	1.67	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200514B

Sample ID: **ICV-200514**	Batch ID: **R110494**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:25:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.197	0.100	0.2000	0	98.5	85	115			

Sample ID: **CCV1-200514**	Batch ID: **R110494**	TestNo: **M4500-P E**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200514B**	Analysis Date: **5/14/2020 2:32:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Phosphorus, Total Orthophosphate (As	0.510	0.100	0.5000	0	102	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: **UV/VIS_2_200518B**

The QC data in batch 96388 applies to the following samples: 2005110-01A, 2005110-02A

Sample ID: **MB-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MBLK**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:03:00 PM**	Prep Date: **5/18/2020**

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

Sample ID: **LCS-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCS**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:04:00 PM**	Prep Date: **5/18/2020**

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

Sample ID: **LCSD-96388**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **LCSD**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:05:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.108	0.100	0.1000	0	108	85	115	0.343	15	N

Sample ID: **2005111-03AMS**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MS**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:10:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0981	0.100	0.1000	0	98.1	85	115			N

Sample ID: **2005111-03AMSD**	Batch ID: **96388**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **MSD**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:11:00 PM**	Prep Date: **5/18/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0969	0.100	0.1000	0	96.9	85	115	1.30	15	N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: UV/VIS_2_200518B

Sample ID: **ICV-200518**	Batch ID: **R110544**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **ICV**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:01:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.0977	0.100	0.1000	0	97.7	85	115			N

Sample ID: **CCV1-200518**	Batch ID: **R110544**	TestNo: **M3500-Fe D**	Units: **mg/L**
SampType: **CCV**	Run ID: **UV/VIS_2_200518B**	Analysis Date: **5/18/2020 2:14:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron, Ferrous	0.205	0.100	0.2000	0	102	85	115			N

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

ANALYTICAL QC SUMMARY REPORT

RunID: WC_200514A

The QC data in batch 96355 applies to the following samples: 2005110-01C, 2005110-02C

Sample ID: **MB-96355**	Batch ID: **96355**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_200514A**	Analysis Date: **5/14/2020 4:15:00 PM**	Prep Date: **5/14/2020**

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-96355**	Batch ID: **96355**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_200514A**	Analysis Date: **5/14/2020 4:15:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	755	10.0	745.6	0	101	90	113			

Sample ID: **2005082-09B-DUP**	Batch ID: **96355**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200514A**	Analysis Date: **5/14/2020 4:15:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2400	50.0	0	2410				0.416	5	

Sample ID: **2005082-10B-DUP**	Batch ID: **96355**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_200514A**	Analysis Date: **5/14/2020 4:15:00 PM**	Prep Date: **5/14/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1290	50.0	0	1340				3.80	5	

Qualifiers:

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

CLIENT: Golder
Work Order: 2005110
Project: Luminant-MLSES CCR&MNA

MQL SUMMARY REPORT

TestNo: E300	MDL	MQL
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Nitrate-N	0.100	0.500
Sulfate	1.00	3.00

TestNo: SW6020B	MDL	MQL
Analyte	**mg/L**	**mg/L**
Antimony	0.000800	0.00250
Arsenic	0.00200	0.00500
Barium	0.00300	0.0100
Beryllium	0.000300	0.00100
Boron	0.0100	0.0300
Cadmium	0.000300	0.00100
Calcium	0.100	0.300
Chromium	0.00200	0.00500
Cobalt	0.00300	0.00500
Iron	0.0300	0.100
Lead	0.000300	0.00100
Lithium	0.00500	0.0100
Magnesium	0.100	0.300
Molybdenum	0.00200	0.00500
Potassium	0.100	0.300
Selenium	0.00200	0.00500
Sodium	0.100	0.300
Thallium	0.000500	0.00150

TestNo: M2320 B	MDL	MQL
Analyte	**ıg/L @ pH 4.2**	**g/L @ pH 4.2**
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

TestNo: M3500-Fe D	MDL	MQL
Analyte	**mg/L**	**mg/L**
Iron, Ferrous	0.0500	0.100

TestNo: SW7470A	MDL	MQL
Analyte	**mg/L**	**mg/L**
Mercury	0.0000800	0.000200

TestNo: M4500-P E	MDL	MQL
Analyte	**mg/L**	**mg/L**
Phosphorus, Total Orthophosphate	0.0300	0.100

TestNo: M2540C	MDL	MQL
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

June 10, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1219693
Samples Received:	05/18/2020
Project Number:	2005110
Description:	

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

Entire Report Reviewed By:

Donna Eidson
Project Manager

LAKE SAMPLE L1219693-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/13/20 14:00	05/18/20 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1484198	1	06/01/20 10:19	06/03/20 10:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1484198	1	06/01/20 10:19	06/03/20 10:28	RGT	Mt. Juliet, TN

POND SAMPLE L1219693-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	05/13/20 14:25	05/18/20 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1478122	1	05/19/20 12:05	05/27/20 15:20	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1484198	1	06/01/20 10:19	06/03/20 10:28	RGT	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1484198	1	06/01/20 10:19	06/03/20 10:28	RGT	Mt. Juliet, TN

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

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	-0.573		0.471	0.737	05/27/2020 15:20	WG1478122
(T) Barium	*108*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*101*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.191		0.719	1.09	06/03/2020 10:28	WG1484198

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.191		0.248	0.353	06/03/2020 10:28	WG1484198
(T) Barium-133	*106*			*30.0-143*	*06/03/2020 10:28*	WG1484198

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.251		0.568	0.907	05/27/2020 15:20	WG1478122
(T) Barium	*105*			*62.0-143*	*05/27/2020 15:20*	WG1478122
(T) Yttrium	*102*			*79.0-136*	*05/27/2020 15:20*	WG1478122

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	0.337		0.717	1.15	06/03/2020 10:28	WG1484198

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.0861		0.149	0.243	06/03/2020 10:28	WG1484198
(T) Barium-133	*106*			*30.0-143*	*06/03/2020 10:28*	WG1484198

Method Blank (MB)

(MB) R3532575-1 05/27/20 10:15

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-228	-0.0177		0.386
(T) Barium	*99.9*		
(T) Yttrium	*114*		

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3532575-5 05/27/20 10:15

Analyte	Original Result	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228		1.33	1	32.4	0.463		20	3
(T) Barium		*106*						
(T) Yttrium		*104*						

Laboratory Control Sample (LCS)

(LCS) R3532575-2 05/27/20 10:15

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.43	109	80.0-120	
(T) Barium			*105*		
(T) Yttrium			*104*		

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3532575-3 05/27/20 10:15 • (MSD) R3532575-4 05/27/20 10:15

Analyte	Spike Amount pCi/l	Original Result	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	10.0		11.8	12.3	109	113	1	70.0-130			3.90		20
(T) Barium					*115*	*104*							
(T) Yttrium					*102*	*110*							

Method Blank (MB)

(MB) R3535623-1 06/02/20 16:27

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	0.000		0.0602
(T) Barium-133	*98.3*		

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3535623-5 06/02/20 16:27

Analyte	Original Result	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226		0.0737	1	50.8	0.193		20	3
(T) Barium-133		*99.1*						

Laboratory Control Sample (LCS)

(LCS) R3535623-2 06/02/20 16:27

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.53	110	80.0-120	
(T) Barium-133			*101*		

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3535623-3 06/02/20 16:27 • (MSD) R3535623-4 06/02/20 16:27

Analyte	Spike Amount pCi/l	Original Result	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		18.6	19.5	91.0	95.4	1	75.0-125			4.73		20
(T) Barium-133					*97.5*	*102*							

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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

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.

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.

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

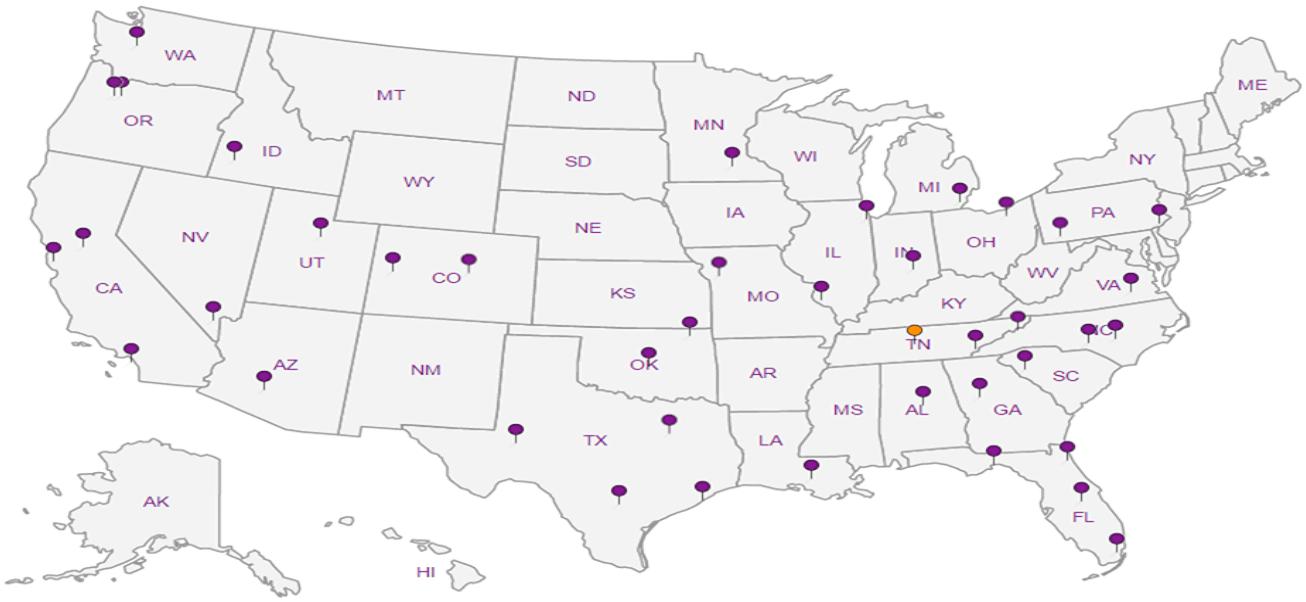
Third Party Federal Accreditations

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

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.



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

CHAIN-OF-CUSTODY RECORD

G111

Work Order: 2005110

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

1219693

14-May-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					22 Ra-228 E904.0	22 Ra-226 M7500 Ra B M				
Lake Sample	Aqueous	01D	05/13/20 02:00 PM	1LHDPEHNO3		1				01
Lake Sample	Aqueous	01E	05/13/20 02:00 PM	1LHDPEHNO3	1					01
Pond Sample	Aqueous	02D	05/13/20 02:25 PM	1LHDPEHNO3		1				02
Pond Sample	Aqueous	02E	05/13/20 02:25 PM	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
Relinquished by:	[signature]	5/14/20 1700	**Received by:**	Carol Kemp	5/15/20 9:45
Relinquished by:			**Received by:**		

Amb

Pace Analytical National Center for Testing & Innovation
Cooler Receipt Form

Client: DHL FedEx	12196931	
Cooler Received/Opened On: 5 / 18 / 20 Temperature:	Amb	
Received By: Carol Kemp		
Signature: Carol Kemp		

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?		✓	

November 06, 2020

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

Order No.: 2010054

RE: Luminant-MLSES Ash Ponds

Dear Will Vienne:

DHL Analytical, Inc. received 8 sample(s) on 10/8/2020 for the analyses presented in the following report.

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

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

Sincerely,

John DuPont
General Manager

This report was performed under the accreditation of the State of Texas Laboratory Certification Number: T104704211-20-25

Table of Contents

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*

nelap ACCREDITING AUTHORITY — DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

№ 69783

CHAIN-OF-CUSTODY

CLIENT: GOLDER
ADDRESS: 2201 DOUBLE CREEK DR #4004 - ROUND ROCK, TX 78664
PHONE: 512-671-3434 FAX/E-MAIL:
DATA REPORTED TO: WILL VIENNE
ADDITIONAL REPORT COPIES TO:

DATE: 10-7-20 PAGE 1 OF 1
PO #: 1912-2262 DHL WORK ORDER #: 2010054
PROJECT LOCATION OR NAME: LUMINANT - MESES ASH PONDS
CLENT PROJECT #: 19122262 - C2020 COLLECTOR: J. BRAYTON

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

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

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

Field Sample I.D.	DHL Lab #	Date	Time	Matrix	Container Type	# of Containers	HCl	HNO3	H2SO4 ❑ NaOH ❑	ICE	UNPRESERVED	APPENDIX III & IV	FIELD NOTES
H-28	01	10-6-20	0950	W	P	4		X		X	X	X	(A) NO: Sb, Hg, Mo, Tl on any samples
H-29	02	↓	1040	W	P	4		X		X	X	X	
H-31	03	↓	1125	W	P	4		X		X	X	X	
H-32	04	↓	1220	W	P	4		X		X	X	X	
H-33	05	↓	1315	W	P	4		X		X	X	X	
DUP-01	06	↓	1315	W	P	4		X		X	X	X	
H-26	07	↓	1405	W	P	4		X		X	X	X	
H-27	08	↓	1500	W	P	4		X		X	X	X	

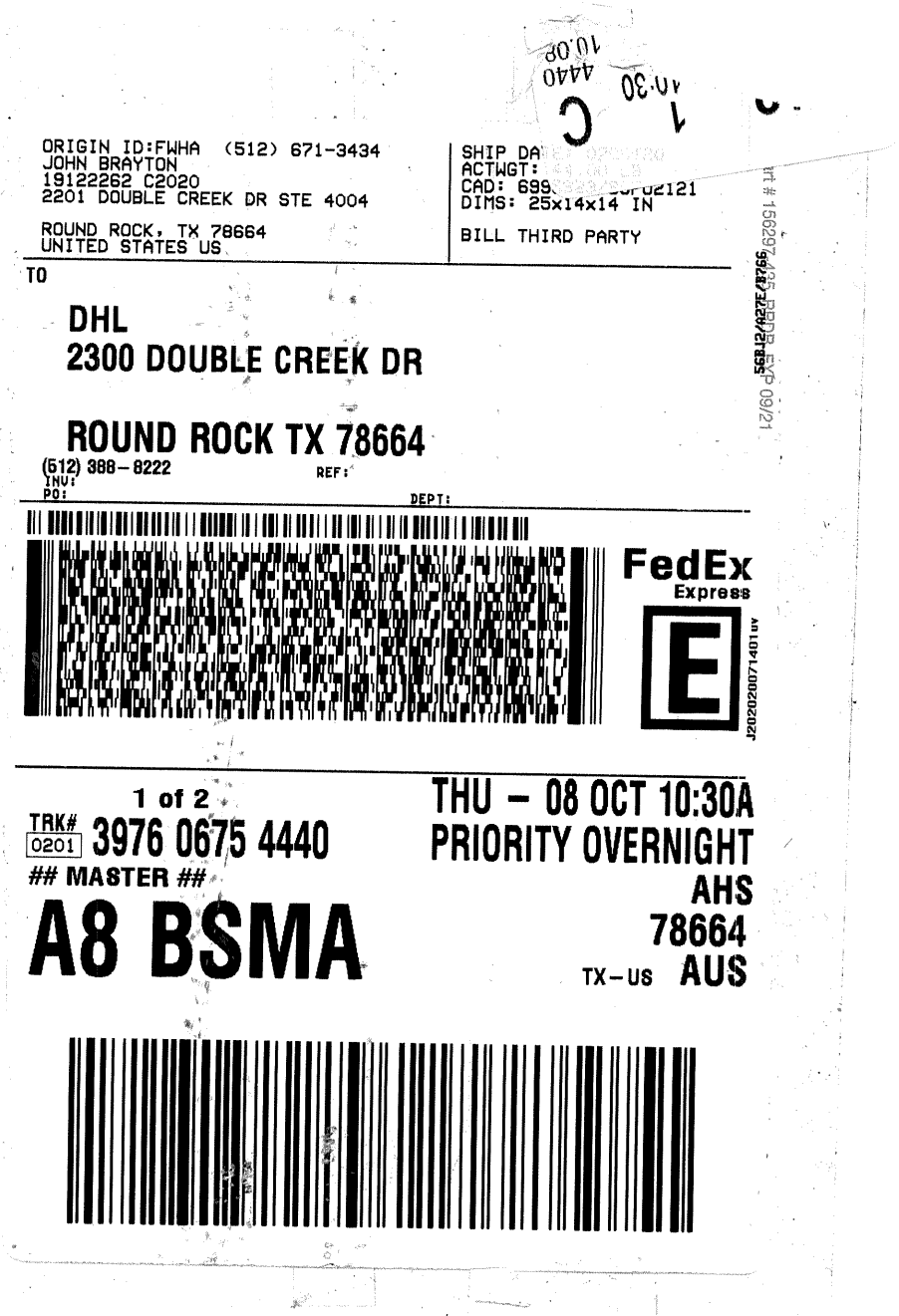
RELINQUISHED BY: (Signature) [signature] DATE/TIME 10-7-20 1630 RECEIVED BY: (Signature) FedEx
RELINQUISHED BY: (Signature) FedEx DATE/TIME 10/8/20 0902 RECEIVED BY: (Signature) [signature]
RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

❑ *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: 0.4°/0.3° THERM #: 78
CUSTODY SEALS: ❑ BROKEN ❑ INTACT ☑ NOT USED
CARRIER: ❑ LONE STAR ☒ FEDEX ❑ UPS ❑ OTHER
❑ COURIER DELIVERY
❑ HAND DELIVERED

DHL COC Rev 1 | FEB 2010



ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON
19122262 C2020
2201 DOUBLE CREEK DR STE 4004

ROUND ROCK, TX 78664
UNITED STATES US

SHIP DA
ACTWGT:
CAD: 699
DIMS: 25x14x14 IN

BILL THIRD PARTY

TO

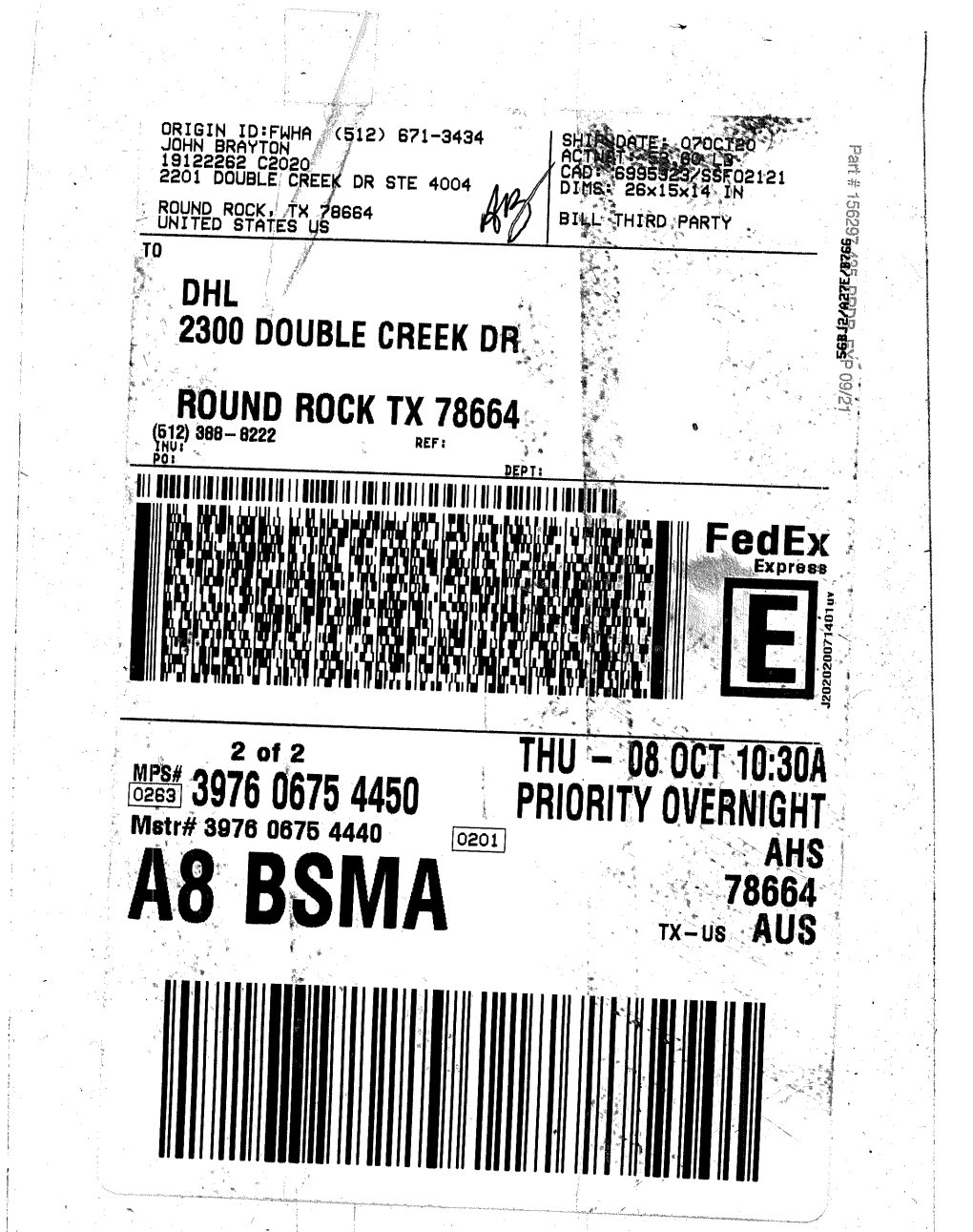
DHL
2300 DOUBLE CREEK DR

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

FedEx
Express

1 of 2
TRK# 0201 3976 0675 4440
MASTER
A8 BSMA

THU - 08 OCT 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS


ORIGIN ID:FWHA (512) 671-3434
JOHN BRAYTON
19122262 C2020
2201 DOUBLE CREEK DR STE 4004
ROUND ROCK, TX 78664
UNITED STATES US
SHIP DATE: 07OCT20
ACTWGT: 58.80 LB
CAD: 6995923/SSFO2121
DIMS: 26x15x14 IN
BILL THIRD PARTY
TO
DHL
2300 DOUBLE CREEK DR
ROUND ROCK TX 78664
(512) 388-8222
INV:
PO:
REF:
DEPT:
FedEx
Express
2 of 2
MPS# 0263 3976 0675 4450
Mstr# 3976 0675 4440
0201
A8 BSMA
THU - 08 OCT 10:30A
PRIORITY OVERNIGHT
AHS
78664
TX-US AUS

DHL Analytical, Inc.

Sample Receipt Checklist

Client Name **Golder**

Date Received: **10/8/2020**

Work Order Number **2010054**

Received by: **RA**

Checklist completed by: _____ 10/8/2020
Signature | Date

Reviewed by DL 10/8/2020
Initials | Date

Carrier name: FedEx 1day

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	**0.4** °C
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH<2 acceptable upon receipt?	Yes ☑	No ☐	NA ☐ LOT # 13171
	Adjusted? no		Checked by EL
Water - ph>9 (S) or ph>10 (CN) acceptable upon receipt?	Yes ☐	No ☐	NA ☑ LOT #
	Adjusted? _____		Checked by _____

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

Client contacted: _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action: _____

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist: Reportable Data

Project Name: Luminant-MLSES Ash Ponds	**LRC Date:** 11/6/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2010054
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-Custody (C-O-C)					
R1	OI	**1)** Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	**X**				**R1-01**
		2) Were all departures from standard conditions described in an exception report?			**X**		
R2	OI	**Sample and Quality Control (QC) Identification**					
		1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	**X**				
		2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	**X**				
R3	OI	**Test Reports**					
		1) Were all samples prepared and analyzed within holding times?	**X**				
		2) Other than those results < MQL, were all other raw values bracketed by calibration standards?	**X**				
		3) Were calculations checked by a peer or supervisor?	**X**				
		4) Were all analyte identifications checked by a peer or supervisor?	**X**				
		5) Were sample detection limits reported for all analytes not detected?	**X**				
		6) Were all results for soil and sediment samples reported on a dry weight basis?			**X**		
		7) Were % moisture (or solids) reported for all soil and sediment samples?			**X**		
		8) Were bulk soils/solids samples for volatile analysis extracted with methanol per EPA Method 5035?			**X**		
		9) If required for the project, TICs reported?			**X**		
R4	O	**Surrogate Recovery Data**					
		1) Were surrogates added prior to extraction?			**X**		
		2) Were surrogate percent recoveries in all samples within the laboratory QC limits?			**X**		
R5	OI	**Test Reports/Summary Forms for Blank Samples**					
		1) Were appropriate type(s) of blanks analyzed?	**X**				
		2) Were blanks analyzed at the appropriate frequency?	**X**				
		3) Where method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	**X**				
		4) Were blank concentrations < MDL?	**X**				
		5) For analyte(s) detected in a blank sample, was the concentration, unadjusted for sample specific factors, in all associated field samples, **greater** than 10 times the concentration in the blank sample?			**X**		
R6	OI	**Laboratory Control Samples (LCS):**					
		1) Were all COCs included in the LCS?	**X**				
		2) Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	**X**				
		3) Were LCSs analyzed at the required frequency?	**X**				
		4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	**X**				
		5) Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	**X**				
		6) Was the LCSD RPD within QC limits (if applicable)?	**X**				
R7	OI	**Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Data**					
		1) Were the project/method specified analytes included in the MS and MSD?	**X**				
		2) Were MS/MSD analyzed at the appropriate frequency?	**X**				
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		**X**			**R7-03**
		4) Were MS/MSD RPDs within laboratory QC limits?	**X**				
R8	OI	**Analytical Duplicate Data**					
		1) Were appropriate analytical duplicates analyzed for each matrix?	**X**				
		2) Were analytical duplicates analyzed at the appropriate frequency?	**X**				
		3) Were RPDs or relative standard deviations within the laboratory QC limits?	**X**				
R9	OI	**Method Quantitation Limits (MQLs):**					
		1) Are the MQLs for each method analyte included in the laboratory data package?	**X**				
		2) Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	**X**				
		3) Are unadjusted MQLs and DCSs included in the laboratory data package?	**X**				
R10	OI	**Other Problems/Anomalies**					
		1) Are all known problems/anomalies/special conditions noted in this LRC and ER?	**X**				**R10-01**
		2) Was applicable and available technology used to lower the SDL to minimize the matrix interference affects on the sample results?	**X**				
		3) Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	**X**				

Laboratory Name: DHL Analytical, Inc.

Laboratory Review Checklist (continued): Supporting Data

Project Name: Luminant-MLSES Ash Ponds	**LRC Date:** 11/6/20
Reviewer Name: Carlos Castro	**Laboratory Work Order:** 2010054
Prep Batch Number(s): See Prep Dates Report	**Run Batch:** See Analytical Dates Report

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
S1	OI	**Initial Calibration (ICAL)**					
		1) Were response factors and/or relative response factors for each analyte within QC limits?	X				
		2) Were percent RSDs or correlation coefficient criteria met?	X				
		3) Was the number of standards recommended in the method used for all analytes?	X				
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		5) Are ICAL data available for all instruments used?	X				
		6) Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	**Initial and Continuing calibration Verification (ICCV and CCV) and Continuing Calibration blank (CCB):**					
		1) Was the CCV analyzed at the method-required frequency?	X				
		2) Were percent differences for each analyte within the method-required QC limits?	X				
		3) Was the ICAL curve verified for each analyte?	X				
		4) Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	**Mass Spectral Tuning:**					
		1) Was the appropriate compound for the method used for tuning?	X				
		2) Were ion abundance data within the method-required QC limits?	X				
S4	O	**Internal Standards (IS):**					
		1) Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	**Raw Data (NELAC Section 5.5.10)**					
		1) Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		2) Were data associated with manual integrations flagged on the raw data?	X				
S6	O	**Dual Column Confirmation**					
		1) Did dual column confirmation results meet the method-required QC?			X		
S7	O	**Tentatively Identified Compounds (TICs):**					
		1) If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	**Interference Check Sample (ICS) Results:**					
		1) Were percent recoveries within method QC limits?	X				
S9	I	**Serial Dilutions, Post Digestion Spikes, and Method of Standard Additions**					
		1) Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
S10	OI	**Method Detection Limit (MDL) Studies**					
		1) Was a MDL study performed for each reported analyte?	X				
		2) Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	**Proficiency Test Reports:**					
		1) Was the lab's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	**Standards Documentation**					
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	**Compound/Analyte Identification Procedures**					
		1) Are the procedures for compound/analyte identification documented?	X				
S14	OI	**Demonstration of Analyst Competency (DOC)**					
		1) Was DOC conducted consistent with NELAC Chapter 5 – Appendix C?	X				
		2) Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	**Verification/Validation Documentation for Methods** (NELAC Chapter 5)					
		1) Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	**Laboratory Standard Operating Procedures (SOPs):**					
		1) Are laboratory SOPs current and on file for each method performed?	X				

1 Items identified by the letter "R" should be included in the laboratory data package submitted to the TCEQ in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2 O = organic analyses; I = inorganic analyses (and general chemistry, when applicable).
3 NA = Not applicable.
4 NR = Not Reviewed.
5 ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

Laboratory Data Package Signature Page – RG-366/TRRP-13

This data package consists of:

This signature page, the laboratory review checklist, and the following reportable data:

R1 Field chain-of-custody documentation;
R2 Sample identification cross-reference;
R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items consistent with NELAC Chapter 5,
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
R5 Test reports/summary forms for blank samples;
R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) The amount of analyte measured in the duplicate,
  b) The calculated RPD, and
  c) The laboratory's QC limits for analytical duplicates.
R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix;
R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in the Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory is not accredited under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature below, I affirm to the best of my knowledge that all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information or data affecting the quality of the data has been knowingly withheld.

This laboratory was last inspected by TCEQ on February 25-28 2019. Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name: John DuPont
Official Title: General Manager

Signature

11/06/20
Date

Name: Dr. Derhsing Luu
Official Title: Technical Director

DHL Analytical, Inc. **Date:** *06-Nov-20*

CLIENT: Golder
Project: Luminant-MLSES Ash Ponds
Lab Order: 2010054

CASE NARRATIVE

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

Method SW6020B - Metals Analysis
Method SW7470A - Mercury Analysis
Method E300 - Anions 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.

Exception Report R1-01

The samples were received and log-in performed on 10/8/20. A total of 8 samples were received. The samples arrived in good condition and were properly packaged.

Exception Report R7-03

For Anions analysis performed on 10/12/20 (batch 98167) the matrix spike and matrix spike duplicate recoveries (2010043-01 MS/MSD) were slightly below control limits for Sulfate. These are flagged accordingly in the QC summary report. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

For Metals analysis performed on 10/13/20 the matrix spike recovery was slightly above control limits for Boron. This is flagged accordingly. The sample selected for the matrix spike and matrix spike duplicate was not from this work order. The LCS was within control limits for this analyte. No further corrective actions were taken.

Exception Report R10-01

For Anions analysis (batch 98187) an MS/MSD was not performed. An LCS/LCSD was performed instead.

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT: Golder
Project: Luminant-MLSES Ash Ponds
Lab Order: 2010054

Work Order Sample Summary

Lab Smp ID	Client Sample ID	Tag Number	Date Collected	Date Recved
2010054-01	H-28		10/06/20 09:50 AM	10/8/2020
2010054-02	H-29		10/06/20 10:40 AM	10/8/2020
2010054-03	H-31		10/06/20 11:25 AM	10/8/2020
2010054-04	H-32		10/06/20 12:20 PM	10/8/2020
2010054-05	H-33		10/06/20 01:15 PM	10/8/2020
2010054-06	Dup-01		10/06/20 01:15 PM	10/8/2020
2010054-07	H-26		10/06/20 02:05 PM	10/8/2020
2010054-08	H-27		10/06/20 03:00 PM	10/8/2020

Lab Order: 2010054
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
2010054-01A	H-28	10/06/20 09:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-28	10/06/20 09:50 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-28	10/06/20 09:50 AM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-01B	H-28	10/06/20 09:50 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-28	10/06/20 09:50 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-28	10/06/20 09:50 AM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-02A	H-29	10/06/20 10:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-29	10/06/20 10:40 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-29	10/06/20 10:40 AM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-02B	H-29	10/06/20 10:40 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-29	10/06/20 10:40 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-29	10/06/20 10:40 AM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-03A	H-31	10/06/20 11:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-31	10/06/20 11:25 AM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-31	10/06/20 11:25 AM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-03B	H-31	10/06/20 11:25 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-31	10/06/20 11:25 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-31	10/06/20 11:25 AM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-31	10/06/20 11:25 AM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-04A	H-32	10/06/20 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-32	10/06/20 12:20 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-32	10/06/20 12:20 PM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-04B	H-32	10/06/20 12:20 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-32	10/06/20 12:20 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-32	10/06/20 12:20 PM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-05A	H-33	10/06/20 01:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-33	10/06/20 01:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-33	10/06/20 01:15 PM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173

Lab Order: 2010054
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
2010054-05B	H-33	10/06/20 01:15 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-33	10/06/20 01:15 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-33	10/06/20 01:15 PM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-06A	Dup-01	10/06/20 01:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	Dup-01	10/06/20 01:15 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	Dup-01	10/06/20 01:15 PM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-06B	Dup-01	10/06/20 01:15 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	Dup-01	10/06/20 01:15 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	Dup-01	10/06/20 01:15 PM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-07A	H-26	10/06/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-26	10/06/20 02:05 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-26	10/06/20 02:05 PM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-07B	H-26	10/06/20 02:05 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-26	10/06/20 02:05 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-26	10/06/20 02:05 PM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156
2010054-08A	H-27	10/06/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-27	10/06/20 03:00 PM	Aqueous	SW3005A	Aq Prep Metals : ICP-MS	10/09/20 09:26 AM	98154
	H-27	10/06/20 03:00 PM	Aqueous	SW7470A	Mercury Aq Prep	10/12/20 12:04 PM	98173
2010054-08B	H-27	10/06/20 03:00 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98167
	H-27	10/06/20 03:00 PM	Aqueous	E300	Anion Preparation	10/12/20 09:16 AM	98187
	H-27	10/06/20 03:00 PM	Aqueous	M2540C	TDS Preparation	10/09/20 11:19 AM	98156

Lab Order: 2010054
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
2010054-01A	H-28	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 02:56 PM	CETAC2_HG_201014A
	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	20	10/13/20 01:02 PM	ICP-MS4_201013A
	H-28	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:05 PM	ICP-MS5_201012A
2010054-01B	H-28	Aqueous	E300	Anions by IC method - Water	98167	1	10/12/20 09:32 PM	IC2_201012A
	H-28	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 05:42 PM	IC2_201013A
	H-28	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-02A	H-29	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 02:58 PM	CETAC2_HG_201014A
	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	50	10/13/20 01:04 PM	ICP-MS4_201013A
	H-29	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:08 PM	ICP-MS5_201012A
2010054-02B	H-29	Aqueous	E300	Anions by IC method - Water	98167	1	10/12/20 09:48 PM	IC2_201012A
	H-29	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 05:58 PM	IC2_201013A
	H-29	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-03A	H-31	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:00 PM	CETAC2_HG_201014A
	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:10 PM	ICP-MS5_201012A
	H-31	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	50	10/13/20 01:06 PM	ICP-MS4_201013A
2010054-03B	H-31	Aqueous	E300	Anions by IC method - Water	98167	1	10/12/20 10:04 PM	IC2_201012A
	H-31	Aqueous	E300	Anions by IC method - Water	98187	100	10/13/20 07:34 PM	IC2_201013A
	H-31	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 07:50 PM	IC2_201013A
	H-31	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-04A	H-32	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:03 PM	CETAC2_HG_201014A
	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	10	10/13/20 01:08 PM	ICP-MS4_201013A
	H-32	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:12 PM	ICP-MS5_201012A
2010054-04B	H-32	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 06:14 PM	IC2_201013A
	H-32	Aqueous	E300	Anions by IC method - Water	98167	1	10/12/20 10:20 PM	IC2_201012A
	H-32	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-05A	H-33	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:05 PM	CETAC2_HG_201014A

Lab Order: 2010054
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
2010054-05A	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/13/20 01:23 PM	ICP-MS4_201013A
	H-33	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:14 PM	ICP-MS5_201012A
2010054-05B	H-33	Aqueous	E300	Anions by IC method - Water	98167	1	10/12/20 10:36 PM	IC2_201012A
	H-33	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 06:30 PM	IC2_201013A
	H-33	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-06A	Dup-01	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:07 PM	CETAC2_HG_201014A
	Dup-01	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/13/20 01:12 PM	ICP-MS4_201013A
	Dup-01	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:16 PM	ICP-MS5_201012A
2010054-06B	Dup-01	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 06:46 PM	IC2_201013A
	Dup-01	Aqueous	E300	Anions by IC method - Water	98167	1	10/13/20 12:12 AM	IC2_201012A
	Dup-01	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-07A	H-26	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:10 PM	CETAC2_HG_201014A
	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	2	10/13/20 01:17 PM	ICP-MS4_201013A
	H-26	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:19 PM	ICP-MS5_201012A
2010054-07B	H-26	Aqueous	E300	Anions by IC method - Water	98167	1	10/13/20 12:28 AM	IC2_201012A
	H-26	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 07:02 PM	IC2_201013A
	H-26	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A
2010054-08A	H-27	Aqueous	SW7470A	Mercury Total: Aqueous	98173	1	10/14/20 03:12 PM	CETAC2_HG_201014A
	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	2	10/13/20 01:19 PM	ICP-MS4_201013A
	H-27	Aqueous	SW6020B	Trace Metals: ICP-MS - Water	98154	1	10/12/20 12:21 PM	ICP-MS5_201012A
2010054-08B	H-27	Aqueous	E300	Anions by IC method - Water	98167	1	10/13/20 12:44 AM	IC2_201012A
	H-27	Aqueous	E300	Anions by IC method - Water	98187	10	10/13/20 07:18 PM	IC2_201013A
	H-27	Aqueous	M2540C	Total Dissolved Solids	98156	1	10/09/20 04:15 PM	WC_201009A

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-28
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-01
Project No:	19122262-C2020	**Collection Date:**	10/06/20 09:50 AM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:05 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:05 PM
Barium	0.0166	0.00300	0.0100		mg/L	1	10/12/20 12:05 PM
Beryllium	0.00563	0.000300	0.00100		mg/L	1	10/12/20 12:05 PM
Boron	5.14	0.200	0.600		mg/L	20	10/13/20 01:02 PM
Cadmium	0.000835	0.000300	0.00100	J	mg/L	1	10/12/20 12:05 PM
Calcium	70.8	2.00	6.00		mg/L	20	10/13/20 01:02 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:05 PM
Cobalt	0.145	0.00300	0.00500		mg/L	1	10/12/20 12:05 PM
Lead	0.00106	0.000300	0.00100		mg/L	1	10/12/20 12:05 PM
Lithium	0.173	0.00500	0.0100		mg/L	1	10/12/20 12:05 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:05 PM
Selenium	0.00468	0.00200	0.00500	J	mg/L	1	10/12/20 12:05 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:05 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 02:56 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	88.7	3.00	10.0		mg/L	10	10/13/20 05:42 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/12/20 09:32 PM
Sulfate	638	10.0	30.0		mg/L	10	10/13/20 05:42 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	1220	50.0	50.0		mg/L	1	10/09/20 04:15 PM

Qualifiers:

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DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-29
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-02
Project No:	19122262-C2020	**Collection Date:**	10/06/20 10:40 AM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:08 PM
Arsenic	0.00696	0.00200	0.00500		mg/L	1	10/12/20 12:08 PM
Barium	0.0165	0.00300	0.0100		mg/L	1	10/12/20 12:08 PM
Beryllium	0.0256	0.000300	0.00100		mg/L	1	10/12/20 12:08 PM
Boron	11.0	0.500	1.50		mg/L	50	10/13/20 01:04 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:08 PM
Calcium	156	5.00	15.0		mg/L	50	10/13/20 01:04 PM
Chromium	0.00205	0.00200	0.00500	J	mg/L	1	10/12/20 12:08 PM
Cobalt	0.377	0.00300	0.00500		mg/L	1	10/12/20 12:08 PM
Lead	0.000438	0.000300	0.00100	J	mg/L	1	10/12/20 12:08 PM
Lithium	0.164	0.00500	0.0100		mg/L	1	10/12/20 12:08 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:08 PM
Selenium	0.0513	0.00200	0.00500		mg/L	1	10/12/20 12:08 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:08 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 02:58 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	167	3.00	10.0		mg/L	10	10/13/20 05:58 PM
Fluoride	1.76	0.100	0.400		mg/L	1	10/12/20 09:48 PM
Sulfate	1400	10.0	30.0		mg/L	10	10/13/20 05:58 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2440	50.0	50.0		mg/L	1	10/09/20 04:15 PM

Qualifiers:

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B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-31
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-03
Project No:	19122262-C2020	**Collection Date:**	10/06/20 11:25 AM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:10 PM
Arsenic	0.00440	0.00200	0.00500	J	mg/L	1	10/12/20 12:10 PM
Barium	0.0345	0.00300	0.0100		mg/L	1	10/12/20 12:10 PM
Beryllium	0.00923	0.000300	0.00100		mg/L	1	10/12/20 12:10 PM
Boron	9.77	0.500	1.50		mg/L	50	10/13/20 01:06 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:10 PM
Calcium	148	5.00	15.0		mg/L	50	10/13/20 01:06 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:10 PM
Cobalt	0.208	0.00300	0.00500		mg/L	1	10/12/20 12:10 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:10 PM
Lithium	0.120	0.00500	0.0100		mg/L	1	10/12/20 12:10 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:10 PM
Selenium	0.0313	0.00200	0.00500		mg/L	1	10/12/20 12:10 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:10 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:00 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	110	3.00	10.0		mg/L	10	10/13/20 07:50 PM
Fluoride	0.494	0.100	0.400		mg/L	1	10/12/20 10:04 PM
Sulfate	1150	10.0	30.0		mg/L	10	10/13/20 07:50 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	2000	50.0	50.0		mg/L	1	10/09/20 04:15 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-32
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-04
Project No:	19122262-C2020	**Collection Date:**	10/06/20 12:20 PM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:12 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:12 PM
Barium	0.0160	0.00300	0.0100		mg/L	1	10/12/20 12:12 PM
Beryllium	0.00676	0.000300	0.00100		mg/L	1	10/12/20 12:12 PM
Boron	1.79	0.100	0.300		mg/L	10	10/13/20 01:08 PM
Cadmium	0.000380	0.000300	0.00100	J	mg/L	1	10/12/20 12:12 PM
Calcium	49.0	1.00	3.00		mg/L	10	10/13/20 01:08 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:12 PM
Cobalt	0.179	0.00300	0.00500		mg/L	1	10/12/20 12:12 PM
Lead	0.000633	0.000300	0.00100	J	mg/L	1	10/12/20 12:12 PM
Lithium	0.0946	0.00500	0.0100		mg/L	1	10/12/20 12:12 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:12 PM
Selenium	0.00378	0.00200	0.00500	J	mg/L	1	10/12/20 12:12 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:12 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:03 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	116	3.00	10.0		mg/L	10	10/13/20 06:14 PM
Fluoride	0.814	0.100	0.400		mg/L	1	10/12/20 10:20 PM
Sulfate	336	10.0	30.0		mg/L	10	10/13/20 06:14 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	777	10.0	10.0		mg/L	1	10/09/20 04:15 PM

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DF- Dilution Factor
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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-33
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-05
Project No:	19122262-C2020	**Collection Date:**	10/06/20 01:15 PM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:14 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:14 PM
Barium	0.0680	0.00300	0.0100		mg/L	1	10/12/20 12:14 PM
Beryllium	0.000721	0.000300	0.00100	J	mg/L	1	10/12/20 12:14 PM
Boron	0.0763	0.0100	0.0300		mg/L	1	10/13/20 01:23 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:14 PM
Calcium	19.7	0.100	0.300		mg/L	1	10/12/20 12:14 PM
Chromium	0.00317	0.00200	0.00500	J	mg/L	1	10/12/20 12:14 PM
Cobalt	0.0331	0.00300	0.00500		mg/L	1	10/12/20 12:14 PM
Lead	0.000358	0.000300	0.00100	J	mg/L	1	10/12/20 12:14 PM
Lithium	0.128	0.00500	0.0100		mg/L	1	10/12/20 12:14 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:14 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:14 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:14 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:05 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	83.0	3.00	10.0		mg/L	10	10/13/20 06:30 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/12/20 10:36 PM
Sulfate	108	1.00	3.00		mg/L	1	10/12/20 10:36 PM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	417	10.0	10.0		mg/L	1	10/09/20 04:15 PM

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DF- Dilution Factor
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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	Dup-01
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-06
Project No:	19122262-C2020	**Collection Date:**	10/06/20 01:15 PM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:16 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:16 PM
Barium	0.0682	0.00300	0.0100		mg/L	1	10/12/20 12:16 PM
Beryllium	0.000663	0.000300	0.00100	J	mg/L	1	10/12/20 12:16 PM
Boron	0.0870	0.0100	0.0300		mg/L	1	10/13/20 01:12 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:16 PM
Calcium	20.0	0.100	0.300		mg/L	1	10/12/20 12:16 PM
Chromium	0.00292	0.00200	0.00500	J	mg/L	1	10/12/20 12:16 PM
Cobalt	0.0332	0.00300	0.00500		mg/L	1	10/12/20 12:16 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:16 PM
Lithium	0.128	0.00500	0.0100		mg/L	1	10/12/20 12:16 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:16 PM
Selenium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:16 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:16 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:07 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	96.7	3.00	10.0		mg/L	10	10/13/20 06:46 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/13/20 12:12 AM
Sulfate	108	1.00	3.00		mg/L	1	10/13/20 12:12 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	428	10.0	10.0		mg/L	1	10/09/20 04:15 PM

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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-26
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-07
Project No:	19122262-C2020	**Collection Date:**	10/06/20 02:05 PM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:19 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:19 PM
Barium	0.0528	0.00300	0.0100		mg/L	1	10/12/20 12:19 PM
Beryllium	0.00168	0.000300	0.00100		mg/L	1	10/12/20 12:19 PM
Boron	0.473	0.0200	0.0600		mg/L	2	10/13/20 01:17 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:19 PM
Calcium	10.9	0.100	0.300		mg/L	1	10/12/20 12:19 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:19 PM
Cobalt	0.0231	0.00300	0.00500		mg/L	1	10/12/20 12:19 PM
Lead	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:19 PM
Lithium	0.0152	0.00500	0.0100		mg/L	1	10/12/20 12:19 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:19 PM
Selenium	0.00909	0.00200	0.00500		mg/L	1	10/12/20 12:19 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:19 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:10 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	68.2	3.00	10.0		mg/L	10	10/13/20 07:02 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/13/20 12:28 AM
Sulfate	52.0	1.00	3.00		mg/L	1	10/13/20 12:28 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	252	10.0	10.0		mg/L	1	10/09/20 04:15 PM

Qualifiers:

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J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
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S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical, Inc.

Date: *06-Nov-20*

CLIENT:	Golder	**Client Sample ID:**	H-27
Project:	Luminant-MLSES Ash Ponds	**Lab ID:**	2010054-08
Project No:	19122262-C2020	**Collection Date:**	10/06/20 03:00 PM
Lab Order:	2010054	**Matrix:**	AQUEOUS

Analyses	Result	SDL	RL	Qual	Units	DF	Date Analyzed
TRACE METALS: ICP-MS - WATER		**SW6020B**					Analyst: **SP**
Antimony	<0.000800	0.000800	0.00250		mg/L	1	10/12/20 12:21 PM
Arsenic	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:21 PM
Barium	0.0519	0.00300	0.0100		mg/L	1	10/12/20 12:21 PM
Beryllium	0.00167	0.000300	0.00100		mg/L	1	10/12/20 12:21 PM
Boron	0.465	0.0200	0.0600		mg/L	2	10/13/20 01:19 PM
Cadmium	<0.000300	0.000300	0.00100		mg/L	1	10/12/20 12:21 PM
Calcium	11.0	0.100	0.300		mg/L	1	10/12/20 12:21 PM
Chromium	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:21 PM
Cobalt	0.0233	0.00300	0.00500		mg/L	1	10/12/20 12:21 PM
Lead	0.000390	0.000300	0.00100	J	mg/L	1	10/12/20 12:21 PM
Lithium	0.0152	0.00500	0.0100		mg/L	1	10/12/20 12:21 PM
Molybdenum	<0.00200	0.00200	0.00500		mg/L	1	10/12/20 12:21 PM
Selenium	0.00961	0.00200	0.00500		mg/L	1	10/12/20 12:21 PM
Thallium	<0.000500	0.000500	0.00150		mg/L	1	10/12/20 12:21 PM
MERCURY TOTAL: AQUEOUS		**SW7470A**					Analyst: **JVR**
Mercury	<0.0000800	0.0000800	0.000200		mg/L	1	10/14/20 03:12 PM
ANIONS BY IC METHOD - WATER		**E300**					Analyst: **BM**
Chloride	68.0	3.00	10.0		mg/L	10	10/13/20 07:18 PM
Fluoride	<0.100	0.100	0.400		mg/L	1	10/13/20 12:44 AM
Sulfate	51.9	1.00	3.00		mg/L	1	10/13/20 12:44 AM
TOTAL DISSOLVED SOLIDS		**M2540C**					Analyst: **JS**
Total Dissolved Solids (Residue, Filterable)	253	10.0	10.0		mg/L	1	10/09/20 04:15 PM

Qualifiers:

ND - Not Detected at the SDL
J - Analyte detected between SDL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAP certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SDL - Sample Detection Limit
E - TPH pattern not Gas or Diesel Range Pattern

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_200826A

Sample ID: **DCS-97737**	Batch ID: **97737**	TestNo: **SW7470A**	Units: **mg/L**		
SampType: **DCS**	Run ID: **CETAC2_HG_200826A**	Analysis Date: **8/26/2020 2:34:35 PM**	Prep Date: **8/26/2020**		

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.000194	0.000200	0.000200	0	97.0	82	119	0	0	

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: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_201014A

The QC data in batch 98173 applies to the following samples: 2010054-01A, 2010054-02A, 2010054-03A, 2010054-04A, 2010054-05A, 2010054-06A, 2010054-07A, 2010054-08A

Sample ID: **MB-98173** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **MBLK** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:13:14 PM** Prep Date: **10/12/2020**

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

Sample ID: **LCS-98173** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCS** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:15:30 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00205	0.000200	0.00200	0	103	85	115			

Sample ID: **LCSD-98173** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **LCSD** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:17:46 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00203	0.000200	0.00200	0	102	85	115	0.980	15	

Sample ID: **2010043-03A MS** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **MS** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:26:50 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00209	0.000200	0.00200	0	104	80	120			

Sample ID: **2010043-03A MSD** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **MSD** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:29:06 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00209	0.000200	0.00200	0	104	80	120	0	15	

Sample ID: **2010043-03A SD** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **SD** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:31:22 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	<0.000400	0.00100	0	0				0	10	

Sample ID: **2010043-03A PDS** Batch ID: **98173** TestNo: **SW7470A** Units: **mg/L**
SampType: **PDS** Run ID: **CETAC2_HG_201014A** Analysis Date: **10/14/2020 2:33:38 PM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00251	0.000200	0.00250	0	100	85	115			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: CETAC2_HG_201014A

Sample ID: **ICV-201014**	Batch ID: **R112654**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **ICV**	Run ID: **CETAC2_HG_201014A**	Analysis Date: **10/14/2020 2:08:40 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00379	0.000200	0.00400	0	94.8	90	110			

Sample ID: **CCV1-201014**	Batch ID: **R112654**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_201014A**	Analysis Date: **10/14/2020 2:51:48 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00196	0.000200	0.00200	0	98.0	90	110			

Sample ID: **CCV2-201014**	Batch ID: **R112654**	TestNo: **SW7470A**	Units: **mg/L**
SampType: **CCV**	Run ID: **CETAC2_HG_201014A**	Analysis Date: **10/14/2020 3:25:57 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00198	0.000200	0.00200	0	99.0	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_200803A

Sample ID: **DCS2-97152**	Batch ID: **97152**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS4_200803A**	Analysis Date: **8/3/2020 12:37:00 PM**	Prep Date: **7/16/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.342	0.300	0.300	0	114	70	130	0	0	

Sample ID: **DCS4-97152**	Batch ID: **97152**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS4**	Run ID: **ICP-MS4_200803A**	Analysis Date: **8/3/2020 12:43:00 PM**	Prep Date: **7/16/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0277	0.0300	0.0300	0	92.4	70	130	0	0	

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: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_201013A

The QC data in batch 98154 applies to the following samples: 2010054-01A, 2010054-02A, 2010054-03A, 2010054-04A, 2010054-05A, 2010054-06A, 2010054-07A, 2010054-08A

Sample ID: **MB-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:16:00 P** Prep Date: **10/9/2020**

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

Sample ID: **LCS-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:18:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.199	0.0300	0.200	0	99.3	80	120			

Sample ID: **LCSD-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:20:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.197	0.0300	0.200	0	98.7	80	120	0.659	15	

Sample ID: **2010043-04A SD** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **SD** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:29:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.32	1.50	0	1.18				10.9	20	
Calcium	80.6	15.0	0	81.1				0.556	20	

Sample ID: **2010043-04A PDS** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **PDS** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:49:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	3.34	0.300	2.00	1.18	108	75	125			
Calcium	132	3.00	50.0	81.1	101	75	125			

Sample ID: **2010043-04A MS** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **MS** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:51:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.44	0.300	0.200	1.18	131	75	125			S

Sample ID: **2010043-04A MSD** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **MSD** Run ID: **ICP-MS4_201013A** Analysis Date: **10/13/2020 12:53:00 P** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	1.43	0.300	0.200	1.18	124	75	125	1.03	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS4_201013A

Sample ID: **ICV-201013**	Batch ID: **R112627**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS4_201013A**	Analysis Date: **10/13/2020 11:41:00 A**	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	2.52	0.300	2.50	0	101	90	110			

Sample ID: **LCVL-201013**	Batch ID: **R112627**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS4_201013A**	Analysis Date: **10/13/2020 12:10:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.0216	0.0300	0.0200	0	108	80	120			
Calcium	0.0955	0.300	0.100	0	95.5	80	120			

Sample ID: **CCV1-201013**	Batch ID: **R112627**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_201013A**	Analysis Date: **10/13/2020 12:55:00 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.214	0.0300	0.200	0	107	90	110			
Calcium	5.18	0.300	5.00	0	104	90	110			

Sample ID: **CCV2-201013**	Batch ID: **R112627**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS4_201013A**	Analysis Date: **10/13/2020 1:25:00 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Boron	0.202	0.0300	0.200	0	101	90	110			
Calcium	5.19	0.300	5.00	0	104	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_200717A

Sample ID: **DCS1-97152**	Batch ID: **97152**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS**	Run ID: **ICP-MS5_200717A**	Analysis Date: **7/17/2020 12:22:00 PM**	Prep Date: **7/16/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00106	0.00250	0.00100	0	106	70	130	0	0	
Beryllium	0.000512	0.00100	0.000500	0	102	70	130	0	0	
Cadmium	0.000506	0.00100	0.000500	0	101	70	130	0	0	
Lead	0.000499	0.00100	0.000500	0	99.8	70	130	0	0	
Thallium	0.000487	0.00150	0.000500	0	97.4	70	130	0	0	

Sample ID: **DCS2-97152**	Batch ID: **97152**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS2**	Run ID: **ICP-MS5_200717A**	Analysis Date: **7/17/2020 12:24:00 PM**	Prep Date: **7/16/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	0.316	0.300	0.300	0	105	70	130	0	0	

Sample ID: **DCS3-97152**	Batch ID: **97152**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **DCS3**	Run ID: **ICP-MS5_200717A**	Analysis Date: **7/17/2020 12:26:00 PM**	Prep Date: **7/16/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Arsenic	0.00466	0.00500	0.00500	0	93.2	70	130	0	0	
Barium	0.00484	0.0100	0.00500	0	96.8	70	130	0	0	
Chromium	0.00496	0.00500	0.00500	0	99.2	70	130	0	0	
Cobalt	0.00479	0.00500	0.00500	0	95.8	70	130	0	0	
Lithium	0.00505	0.0100	0.00500	0	101	70	130	0	0	
Molybdenum	0.00482	0.00500	0.00500	0	96.4	70	130	0	0	
Selenium	0.00485	0.00500	0.00500	0	97.0	70	130	0	0	

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: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201012A

The QC data in batch 98154 applies to the following samples: 2010054-01A, 2010054-02A, 2010054-03A, 2010054-04A, 2010054-05A, 2010054-06A, 2010054-07A, 2010054-08A

Sample ID: **MB-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **MBLK** Run ID: **ICP-MS5_201012A** Analysis Date: **10/12/2020 11:17:00 A** Prep Date: **10/9/2020**

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								
Lead	<0.000300	0.00100								
Lithium	<0.00500	0.0100								
Molybdenum	<0.00200	0.00500								
Selenium	<0.00200	0.00500								
Thallium	<0.000500	0.00150								

Sample ID: **LCS-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCS** Run ID: **ICP-MS5_201012A** Analysis Date: **10/12/2020 11:19:00 A** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.201	0.00250	0.200	0	100	80	120			
Arsenic	0.205	0.00500	0.200	0	103	80	120			
Barium	0.200	0.0100	0.200	0	100	80	120			
Beryllium	0.200	0.00100	0.200	0	99.9	80	120			
Cadmium	0.199	0.00100	0.200	0	99.4	80	120			
Calcium	5.06	0.300	5.00	0	101	80	120			
Chromium	0.202	0.00500	0.200	0	101	80	120			
Cobalt	0.203	0.00500	0.200	0	101	80	120			
Lead	0.195	0.00100	0.200	0	97.7	80	120			
Lithium	0.204	0.0100	0.200	0	102	80	120			
Molybdenum	0.198	0.00500	0.200	0	98.9	80	120			
Selenium	0.211	0.00500	0.200	0	105	80	120			
Thallium	0.195	0.00150	0.200	0	97.6	80	120			

Sample ID: **LCSD-98154** Batch ID: **98154** TestNo: **SW6020B** Units: **mg/L**
SampType: **LCSD** Run ID: **ICP-MS5_201012A** Analysis Date: **10/12/2020 11:21:00 A** Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	100	80	120	0.265	15	
Arsenic	0.201	0.00500	0.200	0	100	80	120	2.16	15	
Barium	0.202	0.0100	0.200	0	101	80	120	0.834	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201012A

Sample ID: **LCSD-98154**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCSD**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:21:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Beryllium	0.201	0.00100	0.200	0	100	80	120	0.590	15	
Cadmium	0.201	0.00100	0.200	0	100	80	120	1.09	15	
Calcium	5.04	0.300	5.00	0	101	80	120	0.254	15	
Chromium	0.200	0.00500	0.200	0	99.8	80	120	1.38	15	
Cobalt	0.199	0.00500	0.200	0	99.7	80	120	1.74	15	
Lead	0.193	0.00100	0.200	0	96.7	80	120	1.01	15	
Lithium	0.205	0.0100	0.200	0	102	80	120	0.285	15	
Molybdenum	0.199	0.00500	0.200	0	99.4	80	120	0.515	15	
Selenium	0.206	0.00500	0.200	0	103	80	120	2.04	15	
Thallium	0.193	0.00150	0.200	0	96.4	80	120	1.19	15	

Sample ID: **2010043-04A SD**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **SD**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:29:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	<0.00400	0.0125	0	0				0	20	
Arsenic	<0.0100	0.0250	0	0.00862				0	20	
Barium	0.0637	0.0500	0	0.0647				1.58	20	
Beryllium	<0.00150	0.00500	0	0				0	20	
Cadmium	<0.00150	0.00500	0	0				0	20	
Chromium	<0.0100	0.0250	0	0				0	20	
Cobalt	0.0162	0.0250	0	0.0162				0.197	20	
Lead	<0.00150	0.00500	0	0				0	20	
Lithium	<0.0250	0.0500	0	0.0106				0	20	
Molybdenum	0.0144	0.0250	0	0.0148				2.39	20	
Selenium	<0.0100	0.0250	0	0				0	20	
Thallium	<0.00250	0.00750	0	0				0	20	

Sample ID: **2010043-04A PDS**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:51:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	75	125			
Arsenic	0.197	0.00500	0.200	0.00862	94.3	75	125			
Barium	0.266	0.0100	0.200	0.0647	101	75	125			
Beryllium	0.194	0.00100	0.200	0	97.2	75	125			
Cadmium	0.200	0.00100	0.200	0	99.8	75	125			
Chromium	0.207	0.00500	0.200	0	104	75	125			
Cobalt	0.205	0.00500	0.200	0.0162	94.5	75	125			
Lead	0.200	0.00100	0.200	0	100	75	125			
Lithium	0.208	0.0100	0.200	0.0107	98.8	75	125			

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: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201012A

Sample ID: **2010043-04A PDS**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **PDS**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:51:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Molybdenum	0.206	0.00500	0.200	0.0148	95.6	75	125			
Selenium	0.189	0.00500	0.200	0	94.3	75	125			
Thallium	0.198	0.00150	0.200	0	99.1	75	125			

Sample ID: **2010043-04A MS**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MS**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:53:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	75	125			
Arsenic	0.203	0.00500	0.200	0.00862	97.4	75	125			
Barium	0.262	0.0100	0.200	0.0647	98.8	75	125			
Beryllium	0.194	0.00100	0.200	0	96.8	75	125			
Cadmium	0.195	0.00100	0.200	0	97.5	75	125			
Calcium	79.6	0.300	5.00	75.8	75.6	75	125			
Chromium	0.199	0.00500	0.200	0	99.3	75	125			
Cobalt	0.204	0.00500	0.200	0.0162	93.9	75	125			
Lead	0.193	0.00100	0.200	0	96.6	75	125			
Lithium	0.209	0.0100	0.200	0.0107	99.0	75	125			
Molybdenum	0.212	0.00500	0.200	0.0148	98.6	75	125			
Selenium	0.195	0.00500	0.200	0	97.3	75	125			
Thallium	0.194	0.00150	0.200	0	96.9	75	125			

Sample ID: **2010043-04A MSD**	Batch ID: **98154**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **MSD**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:55:00 A**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.202	0.00250	0.200	0	101	75	125	0.085	15	
Arsenic	0.202	0.00500	0.200	0.00862	96.6	75	125	0.809	15	
Barium	0.265	0.0100	0.200	0.0647	100	75	125	1.02	15	
Beryllium	0.195	0.00100	0.200	0	97.5	75	125	0.751	15	
Cadmium	0.197	0.00100	0.200	0	98.3	75	125	0.857	15	
Calcium	80.1	0.300	5.00	75.8	86.5	75	125	0.682	15	
Chromium	0.202	0.00500	0.200	0	101	75	125	1.62	15	
Cobalt	0.204	0.00500	0.200	0.0162	93.9	75	125	0.036	15	
Lead	0.197	0.00100	0.200	0	98.7	75	125	2.15	15	
Lithium	0.212	0.0100	0.200	0.0107	101	75	125	1.74	15	
Molybdenum	0.213	0.00500	0.200	0.0148	99.2	75	125	0.486	15	
Selenium	0.186	0.00500	0.200	0	93.0	75	125	4.55	15	
Thallium	0.197	0.00150	0.200	0	98.6	75	125	1.81	15	

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201012A

Sample ID: **ICV-201012**	Batch ID: **R112617**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **ICV**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 10:47:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.0993	0.00250	0.100	0	99.3	90	110			
Arsenic	0.0982	0.00500	0.100	0	98.2	90	110			
Barium	0.100	0.0100	0.100	0	100	90	110			
Beryllium	0.0968	0.00100	0.100	0	96.8	90	110			
Cadmium	0.0982	0.00100	0.100	0	98.2	90	110			
Calcium	2.53	0.300	2.50	0	101	90	110			
Chromium	0.101	0.00500	0.100	0	101	90	110			
Cobalt	0.0985	0.00500	0.100	0	98.5	90	110			
Lead	0.0967	0.00100	0.100	0	96.7	90	110			
Lithium	0.0973	0.0100	0.100	0	97.3	90	110			
Molybdenum	0.0925	0.00500	0.100	0	92.5	90	110			
Selenium	0.101	0.00500	0.100	0	101	90	110			
Thallium	0.0958	0.00150	0.100	0	95.8	90	110			

Sample ID: **LCVL-201012**	Batch ID: **R112617**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **LCVL**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:10:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.00203	0.00250	0.00200	0	102	80	120			
Arsenic	0.00509	0.00500	0.00500	0	102	80	120			
Barium	0.00529	0.0100	0.00500	0	106	80	120			
Beryllium	0.000986	0.00100	0.00100	0	98.6	80	120			
Cadmium	0.000920	0.00100	0.00100	0	92.0	80	120			
Calcium	0.0969	0.300	0.100	0	96.9	80	120			
Chromium	0.00504	0.00500	0.00500	0	101	80	120			
Cobalt	0.00504	0.00500	0.00500	0	101	80	120			
Lead	0.000908	0.00100	0.00100	0	90.8	80	120			
Lithium	0.00986	0.0100	0.0100	0	98.6	80	120			
Molybdenum	0.00493	0.00500	0.00500	0	98.6	80	120			
Selenium	0.00528	0.00500	0.00500	0	106	80	120			
Thallium	0.000970	0.00150	0.00100	0	97.0	80	120			

Sample ID: **CCV1-201012**	Batch ID: **R112617**	TestNo: **SW6020B**	Units: **mg/L**
SampType: **CCV**	Run ID: **ICP-MS5_201012A**	Analysis Date: **10/12/2020 11:58:00 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.200	0.00250	0.200	0	99.9	90	110			
Arsenic	0.204	0.00500	0.200	0	102	90	110			
Barium	0.199	0.0100	0.200	0	99.7	90	110			
Beryllium	0.197	0.00100	0.200	0	98.4	90	110			
Cadmium	0.201	0.00100	0.200	0	100	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: ICP-MS5_201012A

Sample ID: **CCV1-201012** Batch ID: **R112617** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_201012A** Analysis Date: **10/12/2020 11:58:00 A** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	5.08	0.300	5.00	0	102	90	110			
Chromium	0.201	0.00500	0.200	0	101	90	110			
Cobalt	0.203	0.00500	0.200	0	101	90	110			
Lead	0.194	0.00100	0.200	0	97.2	90	110			
Lithium	0.203	0.0100	0.200	0	101	90	110			
Molybdenum	0.197	0.00500	0.200	0	98.4	90	110			
Selenium	0.213	0.00500	0.200	0	106	90	110			
Thallium	0.194	0.00150	0.200	0	97.1	90	110			

Sample ID: **CCV2-201012** Batch ID: **R112617** TestNo: **SW6020B** Units: **mg/L**
SampType: **CCV** Run ID: **ICP-MS5_201012A** Analysis Date: **10/12/2020 12:23:00 P** Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Antimony	0.199	0.00250	0.200	0	99.6	90	110			
Arsenic	0.205	0.00500	0.200	0	102	90	110			
Barium	0.202	0.0100	0.200	0	101	90	110			
Beryllium	0.198	0.00100	0.200	0	98.9	90	110			
Cadmium	0.199	0.00100	0.200	0	99.7	90	110			
Calcium	5.07	0.300	5.00	0	101	90	110			
Chromium	0.201	0.00500	0.200	0	101	90	110			
Cobalt	0.204	0.00500	0.200	0	102	90	110			
Lead	0.193	0.00100	0.200	0	96.7	90	110			
Lithium	0.202	0.0100	0.200	0	101	90	110			
Molybdenum	0.197	0.00500	0.200	0	98.4	90	110			
Selenium	0.208	0.00500	0.200	0	104	90	110			
Thallium	0.193	0.00150	0.200	0	96.5	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_200923A

Sample ID: **DCS2-97986**	Batch ID: **97986**	TestNo: **E300**		Units: **mg/L**	
SampType: **DCS2**	Run ID: **IC2_200923A**	Analysis Date: **9/23/2020 11:59:34 AM**		Prep Date: **9/23/2020**	

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	0.529	1.00	0.5000	0	106	70	130	0	0	
Fluoride	0.219	0.400	0.2000	0	109	70	130	0	0	
Sulfate	1.52	3.00	1.500	0	101	70	130	0	0	

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: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201012A

The QC data in batch 98167 applies to the following samples: 2010054-01B, 2010054-02B, 2010054-03B, 2010054-04B, 2010054-05B, 2010054-06B, 2010054-07B, 2010054-08B

Sample ID: **MB-98167**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 10:46:02 A**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	<0.100	0.400								
Sulfate	<1.00	3.00								

Sample ID: **LCS-98167**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 11:02:02 A**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	3.72	0.400	4.000	0	93.1	90	110			
Sulfate	28.5	3.00	30.00	0	95.1	90	110			

Sample ID: **LCSD-98167**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 11:18:02 A**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.47	1.00	10.00	0	94.7	90	110	0.435	20	
Fluoride	3.77	0.400	4.000	0	94.3	90	110	1.30	20	
Sulfate	28.7	3.00	30.00	0	95.7	90	110	0.631	20	

Sample ID: **2010054-03BMS**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_201012A**	Analysis Date: **10/13/2020 1:00:24 AM**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1960	40.0	2000	0	97.8	90	110			
Sulfate	2930	300	2000	1061	93.7	90	110			

Sample ID: **2010054-03BMSD**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **MSD**	Run ID: **IC2_201012A**	Analysis Date: **10/13/2020 1:16:24 AM**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	1970	40.0	2000	0	98.3	90	110	0.521	20	
Sulfate	2930	300	2000	1061	93.4	90	110	0.218	20	

Sample ID: **2010043-01BMS**	Batch ID: **98167**	TestNo: **E300**	Units: **mg/L**
SampType: **MS**	Run ID: **IC2_201012A**	Analysis Date: **10/13/2020 1:32:24 AM**	Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	197	4.00	200.0	0	98.7	90	110			
Sulfate	332	30.0	200.0	154.6	88.7	90	110			S

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201012A

Sample ID: **2010043-01BMSD** Batch ID: **98167** TestNo: **E300** Units: **mg/L**
SampType: **MSD** Run ID: **IC2_201012A** Analysis Date: **10/13/2020 1:48:24 AM** Prep Date: **10/12/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	197	4.00	200.0	0	98.5	90	110	0.113	20	
Sulfate	332	30.0	200.0	154.6	88.5	90	110	0.135	20	S

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201012A

Sample ID: **ICV-201012**	Batch ID: **R112622**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 10:14:02 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	9.82	0.400	10.00	0	98.2	90	110			
Sulfate	74.4	3.00	75.00	0	99.1	90	110			

Sample ID: **CCV2-201012**	Batch ID: **R112622**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 7:40:24 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	3.79	0.400	4.000	0	94.9	90	110			
Sulfate	28.5	3.00	30.00	0	95.1	90	110			

Sample ID: **CCV3-201012**	Batch ID: **R112622**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201012A**	Analysis Date: **10/12/2020 11:40:24 P**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	3.79	0.400	4.000	0	94.8	90	110			
Sulfate	28.6	3.00	30.00	0	95.3	90	110			

Sample ID: **CCV4-201012**	Batch ID: **R112622**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201012A**	Analysis Date: **10/13/2020 2:52:24 AM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Fluoride	3.93	0.400	4.000	0	98.3	90	110			
Sulfate	28.6	3.00	30.00	0	95.3	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201013A

The QC data in batch 98187 applies to the following samples: 2010054-01B, 2010054-02B, 2010054-03B, 2010054-04B, 2010054-05B, 2010054-06B, 2010054-07B, 2010054-08B

Sample ID: **MB-98187**	Batch ID: **98187**	TestNo: **E300**	Units: **mg/L**
SampType: **MBLK**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 11:31:02 A**	Prep Date: **10/13/2020**

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-98187**	Batch ID: **98187**	TestNo: **E300**	Units: **mg/L**
SampType: **LCS**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 11:47:02 A**	Prep Date: **10/13/2020**

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	28.7	3.00	30.00	0	95.7	90	110			

Sample ID: **LCSD-98187**	Batch ID: **98187**	TestNo: **E300**	Units: **mg/L**
SampType: **LCSD**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 1:10:15 PM**	Prep Date: **10/13/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.65	1.00	10.00	0	96.5	90	110	0.402	20	
Sulfate	29.1	3.00	30.00	0	97.0	90	110	1.38	20	

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: IC2_201013A

Sample ID: **ICV-201013**	Batch ID: **R112633**	TestNo: **E300**	Units: **mg/L**
SampType: **ICV**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 10:59:03 A**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	24.6	1.00	25.00	0	98.3	90	110			
Sulfate	74.1	3.00	75.00	0	98.8	90	110			

Sample ID: **CCV1-201013**	Batch ID: **R112633**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 4:54:15 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	9.57	1.00	10.00	0	95.7	90	110			
Sulfate	28.7	3.00	30.00	0	95.6	90	110			

Sample ID: **CCV2-201013**	Batch ID: **R112633**	TestNo: **E300**	Units: **mg/L**
SampType: **CCV**	Run ID: **IC2_201013A**	Analysis Date: **10/13/2020 8:54:15 PM**	Prep Date:

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	95.8	10.0	100.0	0	95.8	90	110			
Sulfate	287	30.0	300.0	0	95.7	90	110			

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

ANALYTICAL QC SUMMARY REPORT

RunID: WC_201009A

The QC data in batch 98156 applies to the following samples: 2010054-01B, 2010054-02B, 2010054-03B, 2010054-04B, 2010054-05B, 2010054-06B, 2010054-07B, 2010054-08B

Sample ID: **MB-98156**	Batch ID: **98156**	TestNo: **M2540C**	Units: **mg/L**
SampType: **MBLK**	Run ID: **WC_201009A**	Analysis Date: **10/9/2020 4:15:00 PM**	Prep Date: **10/9/2020**

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-98156**	Batch ID: **98156**	TestNo: **M2540C**	Units: **mg/L**
SampType: **LCS**	Run ID: **WC_201009A**	Analysis Date: **10/9/2020 4:15:00 PM**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	751	10.0	745.6	0	101	90	113			

Sample ID: **2010054-02B-DUP**	Batch ID: **98156**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_201009A**	Analysis Date: **10/9/2020 4:15:00 PM**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	2430	50.0	0	2435				0.206	5	

Sample ID: **2010054-03B-DUP**	Batch ID: **98156**	TestNo: **M2540C**	Units: **mg/L**
SampType: **DUP**	Run ID: **WC_201009A**	Analysis Date: **10/9/2020 4:15:00 PM**	Prep Date: **10/9/2020**

Analyte	Result	RL	SPK value	Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids (Residue, Filtera	1980	50.0	0	2000				1.01	5	

Qualifiers:

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

CLIENT: Golder
Work Order: 2010054
Project: Luminant-MLSES Ash Ponds

MQL SUMMARY REPORT

TestNo: E300	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Chloride	0.300	1.00
Fluoride	0.100	0.400
Sulfate	1.00	3.00

TestNo: SW6020B	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Antimony	0.000800	0.00250
Arsenic	0.00200	0.00500
Barium	0.00300	0.0100
Beryllium	0.000300	0.00100
Boron	0.0100	0.0300
Cadmium	0.000300	0.00100
Calcium	0.100	0.300
Chromium	0.00200	0.00500
Cobalt	0.00300	0.00500
Lead	0.000300	0.00100
Lithium	0.00500	0.0100
Molybdenum	0.00200	0.00500
Selenium	0.00200	0.00500
Thallium	0.000500	0.00150

TestNo: SW7470A	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Mercury	0.0000800	0.000200

TestNo: M2540C	**MDL**	**MQL**
Analyte	**mg/L**	**mg/L**
Total Dissolved Solids (Residue, Filt	10.0	10.0

Qualifiers: MQL -Method Quantitation Limit as defined by TRRP
MDL -Method Detection Limit as defined by TRRP

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

November 06, 2020

DHL Analytical, Inc.

Sample Delivery Group:	L1272419
Samples Received:	10/12/2020
Project Number:	2010054
Description:	

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

Entire Report Reviewed By:

Donna Eidson
Project Manager

H-28 L1272419-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 09:50	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:24	RGT	Mt. Juliet, TN

H-29 L1272419-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 10:40	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:24	RGT	Mt. Juliet, TN

H-31 L1272419-03 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 11:25	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:24	RGT	Mt. Juliet, TN

H-32 L1272419-04 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 12:20	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:24	RGT	Mt. Juliet, TN

H-33 L1272419-05 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 13:15	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:09	RGT	Mt. Juliet, TN

DUP-01 L1272419-06 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 13:15	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:09	RGT	Mt. Juliet, TN

H-26 L1272419-07 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 14:05	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:09	RGT	Mt. Juliet, TN

H-27 L1272419-08 Non-Potable Water

Collected by	Collected date/time	Received date/time
	10/06/20 15:00	10/12/20 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904	WG1558903	1	10/15/20 13:49	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method Calculation	WG1563522	1	10/27/20 14:22	11/02/20 09:50	JMR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG1563522	1	10/27/20 14:22	10/28/20 14:09	RGT	Mt. Juliet, TN

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

Donna Eidson
Project Manager

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.293	U	0.434	0.818	11/02/2020 09:50	WG1558903
(T) Barium	*91.3*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*102*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.19		0.865	1.15	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.898		0.431	0.332	10/28/2020 14:24	WG1563522
(T) Barium-133	*82.8*			*30.0-143*	*10/28/2020 14:24*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.741	J	0.662	1.23	11/02/2020 09:50	WG1558903
(T) Barium	*90.5*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*102*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.769	J	0.869	1.62	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0273		0.207	0.391	10/28/2020 14:24	WG1563522
(T) Barium-133	*78.7*			*30.0-143*	*10/28/2020 14:24*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.992	J	0.656	1.21	11/02/2020 09:50	WG1558903
(T) Barium	*95.3*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*102*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.992	J	0.779	1.5	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.000		0.123	0.293	10/28/2020 14:24	WG1563522
(T) Barium-133	*93.2*			*30.0-143*	*10/28/2020 14:24*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.348	U	0.586	1.1	11/02/2020 09:50	WG1558903
(T) Barium	*88.8*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*107*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.417	U	0.741	1.38	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0686		0.155	0.284	10/28/2020 14:24	WG1563522
(T) Barium-133	*86.5*			*30.0-143*	*10/28/2020 14:24*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.737	J	0.553	1.03	11/02/2020 09:50	WG1558903
(T) Barium	*94.0*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*106*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.07	J	0.790	1.23	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.330		0.237	0.195	10/28/2020 14:09	WG1563522
(T) Barium-133	*83.9*			*30.0-143*	*10/28/2020 14:09*	WG1563522

Radiochemistry by Method 904

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-228	0.755	J	0.674	1.26	11/02/2020 09:50	WG1558903
(T) Barium	*84.8*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*108*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
Combined Radium	1.68		1.07	1.56	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result	Qualifier	Uncertainty	MDA	Analysis Date	Batch
	pCi/l		+ / -	pCi/l	date / time	
RADIUM-226	0.926		0.391	0.3	10/28/2020 14:09	WG1563522
(T) Barium-133	*92.5*			*30.0-143*	*10/28/2020 14:09*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	-0.303	U	0.518	0.997	11/02/2020 09:50	WG1558903
(T) Barium	*100*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*102*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	0.616	J	0.844	1.27	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.616		0.326	0.271	10/28/2020 14:09	WG1563522
(T) Barium-133	*88.3*			*30.0-143*	*10/28/2020 14:09*	WG1563522

Radiochemistry by Method 904

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.789	J	0.451	0.833	11/02/2020 09:50	WG1558903
(T) Barium	*100*			*62.0-143*	*11/02/2020 09:50*	WG1558903
(T) Yttrium	*105*			*79.0-136*	*11/02/2020 09:50*	WG1558903

Radiochemistry by Method Calculation

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
Combined Radium	1.20		0.754	1.16	11/02/2020 09:50	WG1563522

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.409		0.303	0.329	10/28/2020 14:09	WG1563522
(T) Barium-133	*87.9*			*30.0-143*	*10/28/2020 14:09*	WG1563522

Method Blank (MB)

(MB) R3590128-1 10/30/20 13:30

Analyte	MB Result	MB Qualifier	MB MDA
	pCi/l		pCi/l
Radium-228	0.381	J	0.486
(T) Barium	*83.8*		
(T) Yttrium	*107*		

L1271751-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1271751-01 10/30/20 13:30 • (DUP) R3590128-5 10/30/20 13:30

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP RER	DUP Qualifier	DUP RPD Limits	DUP RER Limit
	pCi/l	pCi/l		%			%	
Radium-228	0.709	-0.0846	1	200	0.770	U	20	3
(T) Barium	*81.7*	*82.6*						
(T) Yttrium	*105*	*109*						

Laboratory Control Sample (LCS)

(LCS) R3590128-2 10/30/20 13:30

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	pCi/l	pCi/l	%	%	
Radium-228	5.00	5.18	104	80.0-120	
(T) Barium			*81.9*		
(T) Yttrium			*100*		

L1271756-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1271756-01 11/02/20 09:50 • (MS) R3590128-3 10/30/20 13:30 • (MSD) R3590128-4 10/30/20 13:30

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	MS RER	RPD Limits
	pCi/l	pCi/l	pCi/l	pCi/l	%	%		%			%		%
Radium-228	10.0	0.756	11.8	11.0	110	103	1	70.0-130			6.23		20
(T) Barium		*99.4*			*88.2*	*89.5*							
(T) Yttrium		*99.4*			*112*	*113*							

Method Blank (MB)

(MB) R3588851-1 10/28/20 14:12

Analyte	MB Result pCi/l	MB Qualifier	MB MDA pCi/l
Radium-226	-0.0102		0.0673
(T) Barium-133	*87.9*		

L1272419-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1272419-08 10/28/20 14:09 • (DUP) R3588851-5 10/28/20 14:12

Analyte	Original Result pCi/l	DUP Result pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.409	0.476	1	15.0	0.165		20	3
(T) Barium-133	*87.9*	*88.8*						

Laboratory Control Sample (LCS)

(LCS) R3588851-2 10/28/20 14:12

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.02	5.85	117	80.0-120	
(T) Barium-133			*93.2*		

L1271751-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1271751-01 10/28/20 14:20 • (MS) R3588851-3 10/28/20 14:12 • (MSD) R3588851-4 10/28/20 14:12

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	0.293	23.0	21.3	113	105	1	75.0-125			7.54		20
(T) Barium-133		*88.2*			*72.8*	*72.2*							

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.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

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
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

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* 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.

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

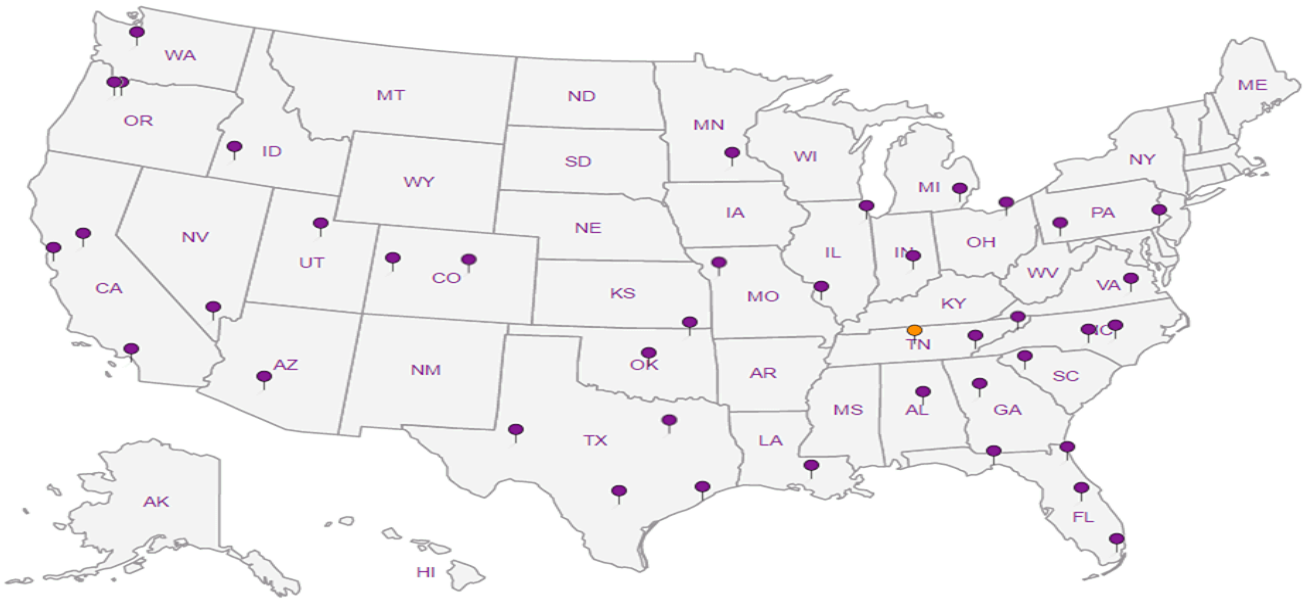
Third Party Federal Accreditations

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

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.



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

CHAIN-OF-CUSTODY RECORD

G175

Work Order: 2010054

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

12 12 Y19

Subcontractor:

Pace Analytical
12065 Lebanon Rd
Mt. Juliet, TN 37122

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

08-Oct-20

Sample ID	Matrix	DHL#	Date Collected	Bottle Type	Requested Tests					
					Ra-228	Ra-226				
					E904.0	M7500 Ra B M				
H-28	Aqueous	01C	10/06/20 09:50 AM	1LHDPEHNO3	1					01
H-28	Aqueous	01D	10/06/20 09:50 AM	1LHDPEHNO3		1				01
H-29	Aqueous	02C	10/06/20 10:40 AM	1LHDPEHNO3	1					02
H-29	Aqueous	02D	10/06/20 10:40 AM	1LHDPEHNO3		1				02
H-31	Aqueous	03C	10/06/20 11:25 AM	1LHDPEHNO3	1					03
H-31	Aqueous	03D	10/06/20 11:25 AM	1LHDPEHNO3		1				03
H-32	Aqueous	04C	10/06/20 12:20 PM	1LHDPEHNO3	1					04
H-32	Aqueous	04D	10/06/20 12:20 PM	1LHDPEHNO3		1				04
H-33	Aqueous	05C	10/06/20 01:15 PM	1LHDPEHNO3	1					05
H-33	Aqueous	05D	10/06/20 01:15 PM	1LHDPEHNO3		1				05
Dup-01	Aqueous	06C	10/06/20 01:15 PM	1LHDPEHNO3	1					06
Dup-01	Aqueous	06D	10/06/20 01:15 PM	1LHDPEHNO3		1				06
H-26	Aqueous	07C	10/06/20 02:05 PM	1LHDPEHNO3	1					07
H-26	Aqueous	07D	10/06/20 02:05 PM	1LHDPEHNO3		1				07
H-27	Aqueous	08C	10/06/20 03:00 PM	1LHDPEHNO3	1					08
H-27	Aqueous	08D	10/06/20 03:00 PM	1LHDPEHNO3		1				08

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
Relinquished by:	E	10/8/20 1700	**Received by:**		10/12/20 10:30
Relinquished by:			**Received by:**		

APPENDIX B

Groundwater Modeling

APPENDIX B: GROUNDWATER MODELING DOCUMENTATION - MARTIN LAKE ASH PONDS

By: William Vienne, Golder

Date: December 2020

Objective: Create a groundwater model using Visual MODFLOW (Version 4.6) to set up steady-state hydrogeological conditions for use in geochemical reactive transport model.

Units

length:	feet	pumping rate:	gal/min
time:	day	recharge:	in/year
concentration:	mg/L	mass:	kg
conductivity:	cm/s		

Default Parameters

Kx:	4E-5 cm/s	(From APAR slug test data (PBW 2011))	Sy:	0.22	(assumed based on typical sand value)
Ky:	4E-5 cm/s		eff. Porosity:	0.25	(assumed based on typical sand value)
Kz:	4E-6 cm/s		tot. porosity:	0.40	(assumed based on typical sand value)
Ss:	2.3E-4 ft^{-1}	(assumed based on typical sand value)	SS simulation time :	1 day	

No recharge or evapotranspiration
(input for geochemical reactive transport model)

Base Map

Base map: September 2019 CCR groundwater potentiometric surface map

Two-point georeference:

Model Coordinates	Georeferenced Coordinates	
Model origin (0, 0 ft)	N6798900/E3183300	Coordinate System: Texas State Plane, N-Central, NAD83
H-26	N6800853/E3184441	
H-31	N6801110/E3185967	

Model Setup

2 layers:

Layer 1: Upper sandy silt/clay. Thickness varies with ground elevation -- generally ~30 feet thick; 315-285 feet amsl (PBW 2011)
- Kxy = 4E-5 cm/s; Kz = 4E-6 cm/s (based on 2011 APAR slug tests in upper sandy silt/clay)
- All other hydro parameters set to default values
- All ponds are completed in this layer

Layer 2: Lower sand (uppermost GWBU). ~10 feet thick; set at 275 feet to 285 feet amsl in model (PBW 2011).
- All CCR monitoring wells are completed in this layer.
- Kxy = 9E-4 cm/s; Kz = 9E-5 cm/s (based on 2011 APAR slug tests in primary groundwater bearing-unit (lower sand) (PBW 2011))

Model extent: 3700 ft x 3700 ft

Columns	Rows	
74	74	(50-ft grid cells)

- Generated ground surface elevation grid using monitoring well ground surface elevations (PBW 2017), berm elevation (B&M 2015), and bathymetric map of Martin Lake (TWDB 2015).
  - Imported excel file with model coordinates and elevations. Used Natural Neigbor function for interpolation.

Boundary Conditions

- Constant head boundary of 310 feet set in Layer 2 on western side of West Ash Pond and 303 feet in Martin Lake east of Ash Ponds (approximately based on normal pool elevation).

- Constant head boundaries created gw gradient similar to that shown on September 2019 pot map, with groundwater flowing toward Martin Lake reservoir.
- Lake Package used for WAP, EAP, and New Scrubber Pond (the Ash Ponds). Assumed constant water levels of 10 feet above bottom of ponds. Pond bottoms based on design criteria summarized in B&M (2015) report. Lake Package parameters:

Pond ID	Start	Stop (days)	Lake Stage (ft amsl)	Bottom (ft amsl)	Precip	Runoff	Evap	Lake Bed (ft)	K of Lake Bed (cm/s)
WAP	0	10950	319	309	0	0	0	3	1E-07
EAP	0	10950	320	310	0	0	0	3	1E-07
NSP	0	10950	316	306	0	0	0	3	1E-07

Calibration

Model vs.Observed Head in CCR wells (Septemeber 2019):

Residual Mean: 0.252 ft
Standard Error of the Estimate: 0.212 ft
Correlation Coefficient: 0.979

Outputs for Geochem Model

1. VMOD head files (x, y, z, and head)
2. Surface elevation grid
3. Shapefile showing pond outlines

References

Burns & McDonnell Engineering Company, Inc (BM), 2015. CCR Study for Martin Lake Steam Electric Station – Final Draft. June 2015.

Pastor, Behling & Wheeler, LLC (PBW), 2011. Revised Affected Property Assessment Report, Martin Lake Steam Electric Station – Ash Pond Area.

Pastor, Behling & Wheeler, LLC (PBW), 2017. Coal Combustion Residual Rule Groundwater Monitoring System Certification, Martin Lake Steam Electric Station – Ash Pond Area. October 16.

Texas Water Development Board (TWDB), 2015. Volumetric Survey of Marting Lake, August 2014 Survey. April.

APPENDIX C

Geochemical Modeling Saturation Indices

MINERAL PHASES - Saturation Indices		H-26 05-2019	H-27 05-2019	H-28 05-2019	H-29 05-2019	H-31 05-2019	H-32 05-2019	H-33 05-2019	Pond Sample 05-2019	Lake Sample 05-2019	H-26 05-2020	H-27 05-2020	H-28 05-2020	H-29 05-2020	H-31 05-2020	H-32 05-2020	H-33 05-2020	Pond Sample 05-2020	Lake Sample 05-2020
Otavite	$CdCO_3$	-2.91	-3.63	-3.74	-3.49	-4.54	-4.72	-2.88	-4.21	-3.25	-3.54	-2.92	-3.66	-3.54	-4.34	-3.75	-3.59	-4.01	-4.00
Ferrihydrite	$Fe(OH)_3$	**4.27**	**2.10**	**1.67**	**1.72**	**1.56**	**2.30**	**4.22**	**1.68**	**2.86**	**3.51**	**2.28**	**2.54**	**2.39**	**1.88**	**3.19**	**2.52**	**1.81**	**1.79**
Siderite	$FeCO_3$	-2.15	-2.86	-3.85	-3.62	-0.79	-2.66	-2.11	-3.40	-2.51	-2.77	-2.17	-3.55	-3.39	-0.71	-1.78	-2.83	-3.24	-3.28
Melanterite	$FeSO_4$ $7H_2O$	-7.37	-6.87	-6.71	-6.75	-3.66	-5.62	-7.31	-6.74	-7.49	-7.39	-6.95	-6.74	-6.62	-3.74	-5.50	-7.13	-6.73	-7.41
Anglesite	$PbSO_4$	-4.66	-4.36	-3.79	-3.87	-4.04	-4.07	-4.73	-4.15	-5.08	-4.46	-4.76	-3.73	-3.74	-4.03	-3.89	-3.86	-4.15	-4.83
Gypsum	$CaSO_4$:$2H_2O$	-1.59	-1.22	-0.84	-0.90	**-0.35**	-1.48	-1.62	**-0.26**	-2.56	-2.09	-1.40	-0.94	-0.93	**-0.36**	-1.38	-1.95	**-0.10**	-2.43
Jarosite-H	$(H_3O)Fe_3(SO_4)_2(OH)_6$	**0.54**	-4.52	-3.40	-4.19	-3.55	-1.04	**0.64**	-3.44	-3.99	-2.23	-4.84	-2.05	-2.95	-4.20	-1.92	-3.45	-4.04	-5.27
Jarosite-K	$KFe_3(SO_4)_2(OH)_6$	**6.63**	**0.93**	**1.38**	**0.80**	**1.81**	**3.56**	**6.71**	**2.60**	**1.42**	**3.82**	**2.28**	**2.95**	**2.38**	**1.64**	**3.77**	**2.60**	**2.40**	**-0.05**
Jarosite-Na	$NaFe_3(SO_4)_2(OH)_6$	**4.01**	-0.85	**0.00**	-0.58	**0.45**	**1.93**	**4.10**	**0.06**	-1.31	**0.99**	-1.02	**1.62**	**0.90**	**0.26**	**2.12**	**-0.01**	**-0.11**	-2.83
Calcite	$CaCO_3$	-0.51	-1.33	-2.10	-1.88	-1.61	-2.64	-0.56	-1.07	-1.71	-1.57	-0.71	-1.85	-1.77	-1.42	-1.73	-1.72	-0.72	-2.36
Magnesite	$MgCO_3$	-2.22	-2.18	-2.92	-2.70	-2.47	-3.76	-2.14	-1.59	-2.78	-2.54	-1.69	-2.74	-2.53	-2.26	-2.81	-2.76	-1.36	-3.44
Barite	$BaSO_4$	**0.66**	**0.28**	**0.35**	**0.28**	**0.60**	**0.01**	**0.64**	**1.07**	**-0.04**	**0.45**	**0.67**	**0.31**	**0.27**	**0.59**	**0.21**	**0.52**	**1.28**	**0.09**
Witherite	$BaCO_3$	-3.55	-5.12	-6.20	-6.00	-5.96	-6.44	-3.59	-5.03	-4.48	-4.33	-3.94	-5.90	-5.88	-5.78	-5.45	-4.57	-4.65	-5.17
Fluorite	CaF_2	-2.78	-3.00	-3.37	-3.32	-1.31	-1.41	-2.74	**1.34**	-3.46	-3.44	-3.39	-3.32	-3.36	-2.53	-1.84	-3.57	**1.30**	-3.63
CoCO3	$CoCO_3$	-2.28	-4.35	-3.53	-3.31	-3.15	-3.70	-2.33	-4.90	-4.03	-3.37	-3.70	-3.31	-3.26	-2.90	-2.78	-3.32	-4.73	-4.79
Cerrusite	$PbCO_3$	-2.07	-2.96	-3.55	-3.36	-3.79	-3.74	-2.18	-3.48	-2.73	-2.41	-2.54	-3.12	-3.04	-3.57	-2.70	-2.09	-3.25	-3.22
Carbon Dioxide	pCO2(g) [b]	-1.59	-2.05	-2.00	-2.20	-1.91	-1.67	-1.50	-1.60	-1.97	-2.36	-1.67	-2.26	-2.41	-2.50	-2.60	-1.78	-1.88	-1.74

Notes:

[a] Saturation indices >0.5 identified by bold type and grey

[b] pCO2(g) values presented at 10^value atm

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APPENDIX C

Tier IV Monitored Natural Attenuation Evaluation Performance Monitoring Plan

GOLDER

REPORT

Tier IV MNA Performance Monitoring Plan

Martin Lake Steam Electric Station - Ash Pond Area

Rusk County, Texas

Submitted to:

Luminant Generation Company LLC

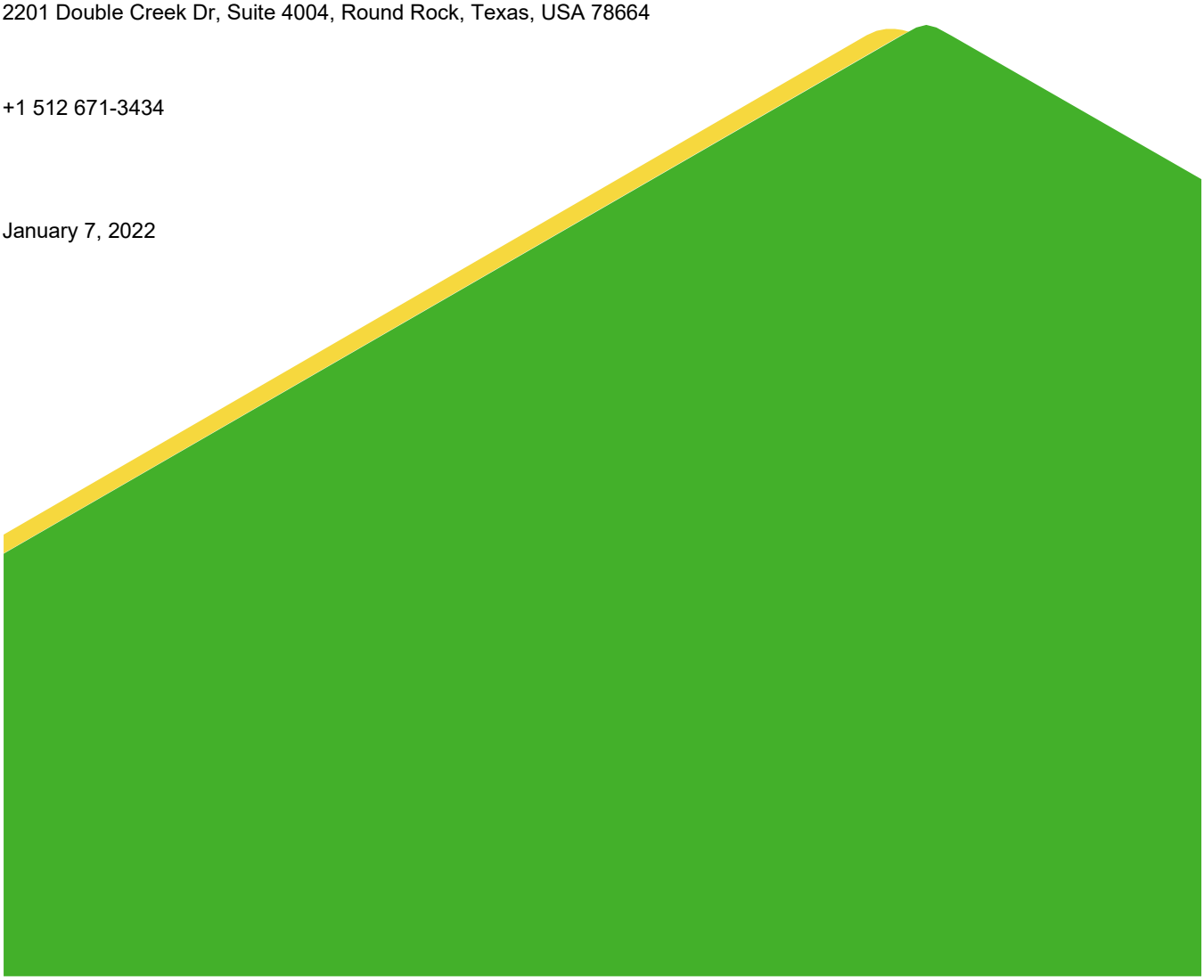
Submitted by:

Golder Associates Inc.

2201 Double Creek Dr, Suite 4004, Round Rock, Texas, USA 78664

+1 512 671-3434

January 7, 2022



Distribution List

Renee Collins, Luminant

David Mitchell, Luminant

Eric Chavers, Luminant

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FIGURES

1.0 INTRODUCTION

On behalf of Luminant Generation Company LLC (Luminant), Golder Associates Inc. (Golder), Member of WSP, has prepared this Tier IV Monitored Natural Attenuation (MNA) Performance Monitoring Plan 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") (**Figure 1)**. Luminant manages coal combustion residuals (CCR) generated from the MLSES in the Ash Pond Area per the applicable requirements of 40 Code of Federal Regulations (CFR) Part 257 as amended (CCR Final Rule).

Statistically significant levels (SSLs) of beryllium, cobalt, and lithium above groundwater protection standards (GWPSs) were detected in the uppermost groundwater-bearing unit (GWBU) hydraulically downgradient of the Ash Pond Area during 2018 assessment monitoring. SSLs of lithium were not observed in subsequent semi-annual assessment monitoring events completed from 2019 to 2021; therefore, lithium is not currently considered a constituent with SSLs. SSLs of beryllium (in monitoring wells H-29, H-31, and H-32) and cobalt (in monitoring wells H-28, H-31, and H-32) were observed in subsequent semi-annual assessment monitoring events completed from 2019 to 2021 and are currently considered constituents with SSLs.

In response to the SSLs identified in 2018, an Assessment of Corrective Measures (ACM) Report was completed for the Ash Pond Area in September 2019 as required by 40 CFR § 257.96 (Golder 2019a). The ACM demonstrated that groundwater concentrations of beryllium, cobalt, and lithium were stable or decreasing at all CCR monitoring wells and that the extent of beryllium, cobalt, and lithium SSLs was delineated on-site (i.e., no offsite migration was indicated). The ACM evaluated various source control and groundwater response technologies to address the beryllium, cobalt, and lithium SSLs.

As documented in the Remedy Selection Report for the Ash Pond Area (Golder 2021a), MNA in conjunction with source control measures was selected as the remedy to address beryllium, cobalt, and lithium SSLs at the Site. MNA refers to the reliance on natural attenuation processes (within the context of a carefully controlled and monitored approach) to achieve site-specific groundwater remediation objectives. MNA relies on a range of natural processes, including sorption, (co)precipitation, radioactive decay, dispersion, dilution, and abiotic degradation/transformation to achieve remediation objectives.

A Tier I MNA evaluation report was completed in December 2019 (Golder 2019b) and a Tier II/III MNA evaluation report was completed in June 2021 (Golder 2021b). Based on the results of these MNA evaluations, the following was concluded regarding the Appendix IV constituents identified at SSLs:

- Physical and chemical attenuation of beryllium, cobalt, and lithium is occurring at the Site. Concentrations of these constituents in groundwater are stable and the aquifer has adequate capacity to attenuate these constituents in a reasonable timeframe. Geochemical modeling indicates that attenuation will be efficient and stable in the long term. Therefore, MNA with source control measures is considered an effective corrective measure for the Ash Pond Area.

The purpose of this Tier IV MNA Performance and Monitoring Plan is to describe the groundwater monitoring network, sampling and analysis methods, procedures for assessing long-term MNA effectiveness, and reporting for the MNA monitoring program.

2.0 SITE SETTING

The MLSES is located approximately 5 miles southeast of Tatum, Rusk County, Texas. The Ash Pond Area is located immediately east of the MLSES power units and adjacent to the Martin Lake Reservoir (**Figure 1**). The MLSES is expected to remain in operation for the foreseeable future, depending on future power demands.

2.1 Site Hydrogeology and CCR Monitoring Well Network

The Site lies 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 Wilcox Group is overlain by sands of the Carrizo Formation at higher elevations in the area; however, the Carrizo Formation is not present at the Site.

Soil borings completed at the Site indicate 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 unit with minor clayey sand. The upper zone is underlain by an intermediate zone composed of poorly-graded fine sand and silty sand 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 (PBW 2017). 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 Reservoir (PBW, 2017).

The CCR groundwater monitoring well network at the Ash Pond Area was established in 2015 using monitoring wells H-26, H-27, H-28, H-29, H-31, H-32, AND H-33 (**Figure 1**). The CCR monitoring wells are completed in the intermediate sand and silty sand zone that is the uppermost aquifer at the Site.

3.0 CCR GROUNDWATER SAMPLING AND ANALYSIS PROGRAM

The CCR Rule establishes groundwater sampling and analysis criteria that are designed to create consistency and ensure that monitoring results provide accurate representations of groundwater quality at the CCR groundwater monitoring wells. The groundwater monitoring program at the Ash Pond Area consists of a combination of detection monitoring of Appendix III constituents in accordance with 40 CFR §257.94 and assessment monitoring of Appendix IV constituents in accordance with 40 CFR §257.95. The current CCR groundwater monitoring program includes the sampling and analysis of beryllium, cobalt, and lithium as part of the assessment monitoring program and satisfies the sampling and analysis requirements of the MNA monitoring program.

4.0 MNA MONITORING PROGRAM

Routine groundwater monitoring is required to verify that the MNA component of the selected Site remedy is achieving the site-specific groundwater remediation objectives. The MNA monitoring well network will be the same as the CCR monitoring network, and includes the CCR wells listed in Section 2.1 and shown on **Figure 1**. The assessment monitoring program groundwater samples, which are collected semi-annually, will be used to assess the effectiveness of the MNA remedy in addressing SSLs observed at the Site.

4.1 MNA Groundwater Sampling Procedures

This section describes groundwater sampling and analysis procedures to comply with the requirements of 40 CFR §257.90 - §257.95 of the CCR Rule and to satisfy requirements of the MNA monitoring program.

4.1.1 General Groundwater Sampling Procedures

Prior to collecting groundwater samples, each well is inspected for signs of damage to the well protective casing and well pad. Each field instrument is calibrated according to the manufacturer's instructions prior to use. Special care should be exercised to prevent contamination of the groundwater and extracted samples during the sampling activities. The primary way in which such contamination can occur is contact with improperly cleaned equipment. To prevent such contamination, all non-dedicated sampling equipment is thoroughly cleaned before and between use at different sampling locations.

4.1.2 Groundwater Level Measurements

Groundwater levels are measured prior to purging the wells. Using a pre-cleaned water level meter, the groundwater surface is measured from the casing datum to the nearest 0.01-foot. Total depth measurements should also be collected periodically to assess potential occlusion of the well screen.

4.1.3 Well Purging and Sampling

Well purging and sampling are conducted using either a submersible pump, peristaltic pump, or other similar device in accordance with standard low-flow sampling procedures. The sampler withdraws water in a manner that minimizes stress (drawdown) to the system to the extent practicable. When the pump intake is located within the screened interval, the water pumped is drawn in directly from the formation with little mixing of casing water or disturbance to the sampling zone. Thus, sample results are more representative of the constituents present in the groundwater than when pumping at higher rates.

Purging rates during sample collection are generally performed at 0.5 liters per minute (L/min) or less. Field parameters (pH, temperature, conductivity, turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP)) are measured to evaluate when the well is adequately purged. pH, DO, and ORP are also considered key MNA parameters important for evaluating geochemical conditions in the groundwater-bearing unit. Turbidity in the samples should be minimized as much as possible by using minimal pumping rates, dedicated equipment whenever possible, and positioning the intake for the sample tubing or submersible pump off of the bottom of the well.

At least three field measurements should be taken during the course of purging the well. If the parameters have not stabilized at that time, field measurements and purging will continue until two consecutive readings have stabilized to within the following limits:

- Temperature: +/-1° C
- pH: +/-0.1 pH units
- Conductivity: +/-10%
- Turbidity: +/- 10%
- Dissolved oxygen: +/- 10%
- Oxidation-reduction potential: +/- 10%

Sample extraction is accomplished by using the pump that was previously used to purge the well. The sample bottle is filled directly from the pump line. The pumping rate and parameter measurements are recorded on groundwater sampling forms in the field. If a well goes dry during purging, sampling is performed after the well has sufficiently recharged to allow sample collection. Groundwater samples are not filtered in the field prior to collection in accordance with Section 257.93(i) of the CCR Rule.

4.1.4 Chain-of-Custody Control

Samples are collected in laboratory-supplied containers and chain-of-custody procedures are followed to establish a written record concerning sample movement between the sampling site and the testing laboratory. Each shipping container has a chain-of-custody form completed by the sampling personnel packing the samples. The chain-of-custody form for each container is completed and sealed in the shipping container.

4.2 MNA Analytical Procedures

The laboratory analytical methods are appropriate and commonly utilized U.S. Environmental Protection Agency (EPA) methodologies, or other similar standard methodologies. Typical methodologies used to analyze the MNA constituents are presented below:

- Beryllium, cobalt, and lithium by EPA Method SW6010/6020 (evaluated during each MNA sampling event).
- General geochemical parameters (evaluated periodically):
  - Major cations: calcium, magnesium, potassium, and sodium by EPA Method SW6010/6020;
  - Major anions: chloride and sulfate by Standard Method E300; and
  - Alkalinity (bicarbonate, carbonate, hydroxide, and total) by Standard Method M2320.

4.3 MNA Data Assessment

The MNA monitoring program is a long-term performance monitoring program designed to confirm concentration reductions and document trends due to attenuation mechanisms. The MNA program will assess the effectiveness of the remedy by:

- Evaluating whether beryllium, cobalt, and lithium concentrations are present in groundwater at SSLs above the GWPS;
- Evaluating long-term trends in beryllium, cobalt, and lithium concentrations in CCR wells where SSLs have been identified to demonstrate that the groundwater plume is stable or decreasing and not expanding; and
- Evaluating geochemical parameters measured in the field (e.g., pH, DO, and ORP) during each sampling event and periodically collecting the general geochemistry parameter data listed in Section 4.2 to assess changes to the general geochemical conditions of the aquifer.

Per 40 CFR §257.98(c), the selected remedy will be considered complete when: (1) The owner or operator of the CCR unit demonstrates compliance with the GWPS established under 40 CFR § 257.95(h) has been achieved at all points within the plume of contamination that lie beyond the groundwater monitoring well system established under 40 CFR § 257.91, (2) Compliance with the GWPS established under 40 CFR § 257.95(h) has been achieved by demonstrating that concentrations of constituents listed in appendix IV to this part have not exceeded the GWPSs for a period of three consecutive years using the statistical procedures and performance standards in 40 CFR § 257.93(f) and (g), and (3) All actions required to complete the remedy have been satisfied.

4.4 Reporting

A summary of the MNA data assessment will be included in the *Annual Groundwater Monitoring and Corrective Action Report* each year. The report will: 1) confirm whether the groundwater plume is stable, shrinking, or expanding; 2) contain data summaries including Appendix III and Appendix IV constituent concentrations and geochemical data summaries, and 3) evaluate the general effectiveness of attenuation processes with trend analysis and other statistical evaluations of the data, as appropriate.

5.0 REFERENCES

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Signature Page

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FIGURES

LEGEND

- DOWNGRADIENT CCR MONITORING WELL
- UPGRADIENT CCR MONITORING WELL

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	2020-01-23
DESIGNED	AJD
PREPARED	AJD
REVIEWED	WFV
APPROVED	WFV

PROJECT NO.	REV.	FIGURE
19134019	0	1

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